Birds of Alagarkovil Range, Dindigul District, Tamil Nadu

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Abstract

I present here an analysis of bird species observed over a period of five years (2006–2011) in Alagarkovil Range, Dindigul District, Tamil Nadu, which is one of the "associated hill ranges" (Ali & Ripley 2001) of the Palni Hills. A total of 108 species (77 resident birds, and 22 migrants) were recorded, including the Dark-fronted Babbler *Rhopocichla atriceps*, nearly 55 km away from the nearest recorded location in the Palni Hills. The hills hold significant populations of Forest Wagtail *Dendronanthus indicus*, Blue-throated Flycatcher *Cyornis rubeculoides*, Brown-breasted Flycatcher *Muscicapa muttui*, and Black-naped Oriole *Oriolus chinensis* during winter. Compared to the adjacent Sirumalai- and Palni Hills, the Alagarkovil Range is comparatively less diverse in its avifauna, and factors influencing this disparity are discussed.

Introduction

Ali & Ripley (2001) provide a rough distribution of several bird species as the 'Nilgiris', 'Palnis', and 'associated hills' (e.g., Shervaroys). The dearth of more exact information on the bird life of many of these isolated hill ranges—except the Shervaroys (David *et al.* 2013), Kolli Hills (Daniels & Saravanan 1986), and the Sirumalais (Santharam *et al.* 2014), remains.

This work is an attempt to enumerate and analyse the distribution of birds found in one of the ornithologically less explored hill ranges of Tamil Nadu, the Alagarkovil Range (hereinafter, AR). Barring two references to this hill range, the earlier one, a pre-independence work on the birds of Madurai District (Nichols 1944a, 1944b, 1945) and the latter, a note on the Eurasian Hobby *Falco subbuteo* at AR foothills (Santharam 2013), no subsequent documentation of its avifauna exists.

Study area

AR (10.06°N–10.17°N, 78.19°E–78.28°E) is one of the southern-most hill ranges of Tamil Nadu that is not connected to the Western Ghats. It is located in Dindigul District, south of the Cauvery River, and covers an area of 60.83 sq. km. AR lies east of the Palni Hills, which is an east–west oriented arm of the main Western Ghats chain of hills. The range is about 15 km from Sirumalai, which itself is separated from the Palni Hills by another 15 km. The range is named after the Alagarkovil temple, located at its base, about 22 km north-east of Madurai. It forms a part of the discontinuous hills running east of the Palni Hills (Fig. 1) that include Sirumalai, Perumalai, Karandhamalai, the Natham Hills, and Nagamalai, apart from AR. Foote (1883) opined that AR is an extension of the gneissic bed of the Palni Hills. In that sense, AR can be considered an outlier of the Western Ghats. However, AR has also been described as the southern-most part of the Eastern Ghats, along with Sirumalai, and Karandamalai (Pulliah *et al.* 2002).

The highest peak of AR, Thalaianaiparai (805 m; 10.10°N, 78.23°E), is situated in the middle of the 16 km long range. There are two valleys, the 12 km-long Peria-aruvi Valley (290 m; centred at 10.12°N, 78.24°E) **[117]**, and the eight kilometre-long Bison Valley (670 m; centred at 10.11°N, 78.24°E), branching off towards the north-east from this peak. Extending in a south-westerly direction from the peak is the six kilometre-long Silambar Valley **[118]**. These valleys are fed by rivulets: the Peria-aruvi, Thirumanimuthar, and Silambar. The western slopes of AR (240 m, centred at 10.11°N, 78.21°E) have a gentle gradient, whereas the eastern slopes are steep. Bison Valley, the highest of the valleys, adjoins the eastern slopes.

Fig. 1. Alagarkovil Hills along with neighbouring hill ranges.

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117. Peria-aruvi Valley.

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118. Silambar Valley.

There are two springs: the seasonal Garudathirtham (420 m), and the perennial Nupuragangai (450 m; 10.26°N, 78.37°E). There is a motorable road from the foot of the hills to Nupuragangai in Silambar Valley. Beyond Nupuragangai is a horse track leading to a plateau, from which the three valleys originate. There are no waterbodies within the range except for a couple of small ponds. Peria-aruvi Dam (265 m; 10.32°N, 78.46°E) lies just north of the commencement of Peria-aruvi Valley, between AR and Mottaimalai, a small hillock just north of AR. There are a few small stony hillocks east of the eastern slopes of the range, the most important of these being Arittapatti (175m; 10.04°N, 78.27°E), which is the only place in Tamil Nadu from where the Laggar Falcon *Falco jugger* has been reported (Anand 2015). Based on data collected from adjacent areas like Nagamalai, Madurai airport, and Pulpatti, precipitation is erratic, with six–seven dry months, and ranges between 600 and 1300 mm (Sriganesan 1984).

AR, despite its considerable extent, is unique among the hill ranges of Tamil Nadu as there are no plantations in it, nor any agricultural activity. Forestry operations have been carried out for timber extraction in the past, and the scattered tamarind *Tamarindus indicus* trees that are found, were probably planted to replace those that had been felled. An important human factor is the presence of two temples in this hill range. These temples, the Kallalagar Temple (260 m; 10.07°N, 78.21°E) at Alagarkovil, and Murugan Temple (380 m; 10.26°N, 78.33°E) at Pazhamuthircholai, do not seem to have had any significant influence in protecting these forests which is contrary to what is seen in the countryside around AR in the districts of Dindigul (Natham Taluk), Madurai (Melur Taluk), Sivagangai and Pudukottai which are dotted with many Sacred Groves (e.g., Kasampatti Veerakoil Sacred Grove) in which even fallen tree branches are not removed (Kent 2013). The incremental impact of several years of pilgrimage and tourism, to these temples has also caused degradation of the forests.

AR came under the control of the colonial government as a Reserved Forest in 1882 with the enactment of the Madras Forest Act (Francis 1906). Prior to this, the entire length, especially the slopes, of all the ranges in and around Natham town (Sirumalai, AR, Karandamalai and Ayyalur Hills) had been denuded, and in 1871 every stick had been cleared up to the base of the Sirumalai (Francis 1906). By 1906 the entire range, especially the southern slopes of AR, overlooking Madurai city, had recovered and was covered with a dense growth of vegetation (Francis 1906) apparently only due to protection and not due to plantation.

Presently, the vegetation of AR is dominated by the *Albizzia amara* series, which is a combination of the dry evergreen forest and tropical southern thorny forest (Champion & Seth 1968). The occurrence of deciduous elements such as *Shorea roxburghi*, and *Terminalia chebula*, and evergreen elements such as *Mangifera indica, Artocarpus hirsutus*, and *Ficus callosa* amidst thorny thickets and dry deciduous elements must be due to selective timber extraction that left behind important tree species for humans like wild Mango and Tamarind (Sriganesan 1984).

Methodology

My frequent visits to AR from 1983 onwards had produced a comprehensive bird list; but it was not quantitative. In an effort to quantify the relative abundance of species, a list-based approach was followed. The Mackinnon Phillips Method (Bibby *et al.* 1998) was chosen, as it seemed to be fairly objective, not technically demanding, and suitable for the hilly terrain, apart from being a good measure of relative abundance.

Potential survey sites in AR were selected based on my prior experience. The study period was from 27 March 2006 to 25 December 2011. During this time, the selected sites were visited at least once every two months. The hills were approached from all four directions. Care was taken to choose paths that crossed all types of habitats. Only pre-existing paths were chosen and no new paths were laid. Birding was done between 0700 and 1100 hrs, which typically coincides with the period of peak bird activity.

As per Bibby *et al.* (1998), multiple bird lists of fixed length were drawn up during each walk. As species richness of AR was not dramatically high, ten species was used as the length of the lists. Each species detected was recorded in the first list as the surveyor walked along the path. Once the number of species reached ten, the list was terminated and a fresh list started. In this methodology, each species can figure only once in every list while it may be recorded in multiple lists. Care was taken to ensure that the same individual was not listed in the next consecutive list due to double counting.

At the end of the study, the frequency of occurrence of each species (index of abundance) is deduced from the number of lists in which it occurred. If a particular species known to be generally resident in the state was found intermittently, then it was categorised as 'uncertain'. For the basis of analysis, 'winter' was defined as the period extending from 01 September to 30 April, though this varies by a few weeks from species to species.

In addition, a running cumulative species list was made. A species discovery curve was drawn by plotting the cumulative number of species against the number of lists made.

A special effort was made to visit the hills during moonlit nights in summer as these were identified as the time of the greatest vocal activity of owls and nightjars. The data obtained from the night surveys were not subjected to quantitative analysis.

Results

A total of 209 lists were generated of which 50 were from Silambar, 105 from Peria-aruvi, and rest from the eastern and western slopes of AR. Additional records from previous and subsequent birding trips were utilised to create a site checklist (Table 1), though this was not used for quantitative analysis.

Table 1: Annotated checklist of birds of Alagarkoil Range

S. No	Species	Sites			Percent of Total Lists	EGN	Notes
		SBV	PAV	Other sites			
1	Indian Peafowl *Pavo cristatus*	X		Western slopes		X	
2	Grey Francolin *Francolinus pondicerianus*			Outer slopes	2	X	
3	Grey Junglefowl *Gallus sonneratii*	X	X	Outer slopes	8	X	
4	Little Grebe *Tachybaptus ruficollis*			Peria-aruvi Dam		X	
5	Eurasian Collared Dove *Streptopelia decaocto*			Outer slopes		X	
6	Spotted Dove *Streptopelia chinensis*	X	X		39	X	
7	Laughing Dove *Streptopelia senegalensis*		X	Outer slopes	1	X	
8	Emerald Dove *Chalcophaps indica*	X			2	X	
9	Grey Nightjar *Caprimulgus indicus*	X	X			X	
10	Jerdon's Nightjar *Caprimulgus atripennis*		X			X	
11	Indian Nightjar *Caprimulgus asiaticus*			Vembarali rest house		X	
12	Crested Treeswift *Hemiprocne coronata*			Bison Valley		X	
13	Asian Palm Swift *Cypsiurus balasiensis*			Outer slopes	1	X	
14	Alpine Swift *Tachymarptis melba*		X		1	X	
15	Indian House Swift *Apus affinis*	X				X	Near the tower of Alagarkovil temple
16	Greater Coucal *Centropus sinensis*	X	X		36	X	
17	Sirkeer Malkoha *Taccocua leschenaultii*		X		1	X	Two records on 31 November 2008 and 08 May 2009.
18	Blue-faced Malkoha *Phaenicophaeus viridirostris*	X	X		1	X	
19	Asian Koel *Eudynamys scolopaceus*	X	X		3	X	
20	Banded Bay Cuckoo *Cacomantis sonneratii*	X					A historical record in the 1980s
21	Grey-bellied Cuckoo *Cacomantis passerinus*	X			1		One record from Silambar Valley.
22	Drongo Cuckoo *Surniculus lugubris*		X		1		Two records on 31 November 2008 and 22 February 2010.
23	Common Hawk Cuckoo *Hierococcyx varius*		X		5	X	Seen at the commencement of Peria-aruvi Valley.
24	Slaty-legged Crake *Rallina eurizonoides*	X				X	Recorded in the 1980s in Silambar Valley on a rainy day in a rivulet.
25	Indian Pond Heron *Ardeola grayii*		X	Peria-aruvi Dam	1	X	Only seen at commencement of Peria-aruvi Valley and at the dam.
26	Little Egret *Egretta garzetta*			Peria-aruvi Dam		X	
27	Little Cormorant *Microcarbo niger*			Peria-aruvi Dam		X	
28	Red-wattled Lapwing *Vanellus indicus*		X	Peria-aruvi Dam, Peria Thoppu	1	X	
29	Oriental Honey Buzzard *Pernis ptilorhynchus*		X	Outer slopes		X	
30	Crested Serpent Eagle *Spilornis cheela*	X	X	Peria Thoppu	6	X	
31	Short-toed Snake Eagle *Circaetus gallicus*	X	X		6	X	
32	Red-headed Vulture *Sarcogyps calvus*	X				X	Historical records, pers. obsv., in the 1980s and in early 1990s (Kumaran Sathasivam, verbally 2015). Locally extinct.
33	White-rumped Vulture *Gyps bengalensis*	X	X			X	Historical records, pers. obsv., in the 1980s. Locally extinct. Supposed to have roosted on tall mango trees (Sriganesan, verbally 1986).
34	Changeable Hawk Eagle *Nisaetus cirrhatus*	X	X		8	X	Has bred in Silambar Valley.
35	Black Eagle *Ictinaetus malaiensis*	X	X		5	X	
36	Indian Spotted Eagle *Clanga hastata*		X	Arittapatti			

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S. No	Species			Sites	Percent of Total Lists	EGN	Notes
37	Bonelli's Eagle *Aquila fasciata*			Arittapatti		X	
38	Booted Eagle *Hieraaetus pennatus*	X		Arittapatti, Outer slopes		X	
39	Shikra *Accipiter badius*	X	X		11	X	
40	White-eyed Buzzard *Butastur teesa*		X	Peria thoppu	1	X	
41	Jungle Owlet *Glaucidium radiatum*		X			X	Heard several times in Peria-aruvi Valley at night. Once seen during the day.
42	Spotted Owlet *Athene brama*	X	X		5	X	
43	Oriental Scops Owl *Otus sunia*		X			X	Heard only once.
44	Collared Scops Owl *Otus bakkamoena*			Vembarali rest house		X	Heard only once.
45	Brown Fish Owl *Ketupa zeylonensis*	X	X			X	Roosts on massive mango trees in Peria-aruvi Valley.
46	Common Hoopoe *Upupa epops*		X			X	Very occasional at the commencement of the valleys.
47	Lesser Golden-backed Woodpecker *Dinopium benghalense*	X	X		15	X	Only seen at the commencement of the path.
48	Lesser Yellow-naped Woodpecker *Picus chlorolophus*	X				X	Call heard in Silambar Valley (Santharam, verbally, dated 01 November 2007).
49	Brown-headed Barbet *Psilopogon zeylanicus*	X	X		51	X	Breeding resident. Seen excavating hole.
50	Coppersmith Barbet *Psilopogon haemacephalus*	X	X		17	X	
51	Blue-bearded Bee-eater *Nyctyornis athertoni*	X				X	A pair seen on 25 July 2013 after completion of Silambar Valley walk
52	Green Bee-eater *Merops orientalis*			Peria-aruvi Dam		X	Occasionally met with in the dry outer slopes, Hawa Valley and in the western slopes.
53	Indian Roller *Coracias benghalensis*	X	X		14	X	Only at the commencement of the valleys.
54	White-throated Kingfisher *Halcyon smyrnensis*	X	X		11	X	Only at the commencement of the two valleys.
55	Common Kestrel *Falco tinnunculus*			Hawa Valley	1	X	Seen rarely in the drier outer slopes.
56	Eurasian Hobby *Falco subbuteo*	X					One seen at the Temple tower (Santharam 2013)
57	Rose-ringed Parakeet *Psittacula krameri*	X	X		27	X	Common at the commencement of Peria-aruvi Valley, which could be a roosting site
58	Indian Pitta *Pitta brachyura*	X	X		1	X	
59	Black-headed Cuckooshrike *Lalage melanoptera*			Hawa Valley		X	
60	Indian Golden Oriole *Oriolus kundoo*	X	X		7	X	
61	Black-naped Oriole *Oriolus chinensis*	X	X		7		Slightly more common than Indian Golden Oriole. Earliest winter record on 23 November 2006; Other records: 05 November 2007, 17 March 2008, 22 February 2010; latest on 27 March 2010
62	Ashy Woodswallow *Artamus fuscus*			Hawa Valley	3	X	Rarely seen in the western outer slopes.
63	Common Woodshrike *Tephrodornis pondicerianus*		X	Peria-aruvi Dam		X	Met with in the drier areas.
64	Common Iora *Aegithina tiphia*	X	X		13	X	More often met with in the drier outer slopes.
65	Black Drongo *Dicrurus macrocercus*		X		7	X	Seen more often in the drier outer slopes.
66	Ashy Drongo *Dicrurus leucophaeus*	X	X	Bison Valley	30	X	Earliest wintering record on 31 October 2006 and latest on 27 March 2006.
67	White-bellied Drongo *Dicrurus caerulescens*	X	X		3	X	
68	Brown Shrike *Lanius cristatus*	X	X			X	
69	Rufous Treepie *Dendrocitta vagabunda*	X	X		23	X	
70	House Crow *Corvus splendens*			Outer slopes		X	Not seen within the valleys.

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S. No	Species			Sites	Percent of Total Lists	EGN	Notes
71	Large-billed Crow *Corvus macrorhynchos*			Outer slopes		X	Not seen within the Silambar Valley. Twice seen in Peria-aruvi Valley
72	Black-naped Monarch *Hypothymis azurea*	X	X		24	X	Resident in all three valleys all throughout the year; Breeding recorded. Whereas, Nichols lists it as uncommon.
73	Indian Paradise-flycatcher *Terpsiphone paradisi*	X	X		42	X	Winter Migrant. Both rufous and white males recorded. Earliest wintering record on 31 October 2006 and latest on 27 March 2006. Interestingly, recorded by Nichols in Alagarkovil in July and August.
74	Pale-billed Flowerpecker *Dicaeum erythrorhynchos*	X	X		46	X	Resident in all three valleys all throughout the year.
75	Purple-rumped Sunbird *Leptocoma zeylonica*	X	X		51	X	Resident in all three valleys all throughout the year. Breeding recorded.
76	Purple Sunbird *Cinnyris asiaticus*			Outer slopes		X	Not within the valleys; Common in the outer slopes.
77	Loten's Sunbird *Cinnyris lotenius*	X	X		31	X	Resident. Presumed to breed.
78	Asian Fairy-bluebird *Irena puella*	X	X		6	X	Seen in the riverine forest in Peria-aruvi Valley. Presumed breeding.
79	Jerdon's Leafbird *Chloropsis jerdoni*	X	X		13	X	Presumed breeding resident in all three valleys
80	White-rumped Munia *Lonchura striata*			Western slopes		X	Rare within the hill range.
81	Forest Wagtail *Dendronanthus indicus*	X	X		14	X	Earliest wintering record on 31 October 2006 and latest on 27 March 2006
82	Paddyfield Pipit *Anthus rufulus*			Peria-aruvi Dam		X	Not found within the hill range.
83	Grey Wagtail *Motacilla cinerea*	X			1	X	
84	White-browed Wagtail *Motacilla maderaspatensis*			Peria-aruvi Dam		X	
85	Rufous-tailed Lark *Ammomanes phoenicura*			Eastern slopes		X	
86	Jerdon's Bushlark *Mirafra affinis*			Hawa Valley		X	
87	Jungle Prinia *Prinia sylvatica*			Outer slopes		X	Common in the scrub of the outer slopes
88	Common Tailorbird *Orthotomus sutorius*	X	X		13	X	
89	Blyth's Reed Warbler *Acrocephalus dumetorum*		X		6	X	
90	Red-rumped Swallow *Cecropis daurica*			Outer slopes, Hawa Valley		X	Found collecting mud presumably to breed at Arittapatti, a hillock 6 km SE of Alagarkovil on 02 June 2013.
91	Barn Swallow *Hirundo rustica*			Outer slopes		X	
92	Dusky Crag Martin *Ptyonoprogne concolor*			Pulipatti Ayyanar Temple		X	Seen on 01 July 2012 and presumed to be breeding 3 km east of Alagarkovil
93	Red-whiskered Bulbul *Pycnonotus jocosus*	X		Western slopes		X	Twice seen in small flocks of 10 to 20
94	Red-vented Bulbul *Pycnonotus cafer*		X	Outer slopes	1	X	Rare within the valleys
95	White-browed Bulbul *Pycnonotus luteolus*	X	X		74	X	
96	Green/Greenish Leaf Warbler *Seicircus nitidus/trochiloides*	X	X		54	X	The most common migrant and no attempt made to differentiate the two species. Earliest wintering record on 28 August 2006 and latest on 27 April 2014.
97	Large-billed Leaf Warbler *Seicercus magnirostris*	X	X	Bison Valley	44	X	Winter migrant in all three valleys. Earliest wintering record on 30 September 2006 and latest on 27 March 2006.
98	Tawny-bellied Babbler *Dumetia hyperythra*			Western slopes		X	Only one record.
99	Dark-fronted Babbler *Rhopocichla atriceps*		X		11	X	Only in the Peria-aruvi Valley where seen on every visit. Presumed breeding as it was seen carrying twigs on 26 April 2010

Table 1: Annotated checklist of birds of Alagarkoil Range

S. No	Species			Sites	Percent of Total Lists	EGN	Notes
100	Puff-throated Babbler *Pellorneum ruficeps*	X	X		34	X	Presumed breeding
101	Yellow-billed Babbler *Turdoides affinis*			Outer slopes		X	Not seen within the valleys; Common in the outer slopes
102	Common Myna *Acridotheres tristis*	X	X		10	X	Vey rare in the valleys. Seen only at the commencement
103	Indian Robin *Saxicoloides fulicatus*			Outer slopes		X	Not seen in the valleys but often met with in the outer slopes
104	Oriental Magpie Robin *Copsychus saularis*	X	X		17	X	More common in the drier parts of the valleys
105	White-rumped Shama *Kittacincla malabarica*	X	X		32	X	Along the shady wooded rivulets where more common than Oriental Magpie Robin.
106	Asian Brown Flycatcher *Muscicapa dauurica*	X			3	X	
107	Brown-breasted Flycatcher *Muscicapa muttui*	X	X	Bison Valley	17	X	Winter migrant in all valleys and more common than Asian Brown Flycatcher though considered rare by Nichols. Earliest wintering record on 30 September 2006 and latest on 27 March 2006.
108	Rusty-tailed Flycatcher *Muscicapa ruficauda*		X		1	X	One record from Peri-aruvi valley
109	Blue-throated Flycatcher *Cyornis rubeculoides*	X	X	Bison Valley	36	X	Winter migrant in all valleys though considered very rare by Nichols. Earliest wintering record on 30 September 2006 and latest on 27 March 2006.
110	Verditer Flycatcher *Eumyias thalassinus*	X	X			X	Just once each in Silambar and Peria-aruvi valleys.
111	Blue-capped Rock Thrush *Monticola cinclorhyncha*	X	X	Bison Valley	4	X	Earliest wintering record on 31 October 2006 and latest on 28 February 2007
112	Blue Rock Thrush *Monticola solitarius*	X		Arittapatti, Meenakshipuram		X	Rare within the valley but commoner in the hillocks.
113	Pied Thrush *Geokichla wardii*		X		1	X	A record of a female on 20 March 2011 in Peria-aruvi Valley
114	Orange-headed Thrush *Geokichla citrina*	X	X		3	X	Both *citrina* (Silambar: 27 March 2006; Peria-aruvi : 22 February 2010 and 25 December 2011) and *cyanota* (Silambar: 23 November 2006, 28 February 2007 and 25 December 2006) were recorded in winter months only. Subspecies *citrina* was not recorded by Nichols for Madurai District.

Abbreviations: EGN: Recorded by E. G. Nichols for Madurai District; PAV: Peria-aruvi Valley; SBV: Silambar Valley.

A total of 108 species were recorded in the present survey with 77 resident species, 22 winter migrants, and nine species whose status was uncertain.

The number of lists in which each species was recorded was taken to be the index of relative abundance of that particular species. Accordingly, the species could be categorised into percentage bands of frequency (Table 2) as follows:

Table 2. Distribution of species in terms of their abundance

Percentage Bands	Number of species
0 to 20	40
20 to 40	10
40 to 60	7
More than 60	1

The most abundant species was the White-browed Bulbul *Pycnonotus luteolus*, which was listed in 74% of the total number of lists, as well as 74% of the lists drawn up in winter. The other common resident species were Purple- rumped Sunbird *Leptocoma zeylanica* (51%), Pale-billed Flowerpecker *Dicaeum erythrorhynchos* (46%), Brown-headed Barbet *Psilopogon zeylanicus* (51%), Puff-throated Babbler *Pellorneum ruficeps* (34 %), and White-rumped Shama *Kittacincle malabarica* (32 %) (Table 3).

There were quite a few migrant species. The most common were the Green/Greenish Leaf Warbler *Seicircus trochiloides/ nitidus* (54%; 72% in winter), Large-billed Leaf Warbler *S. magnirostris* (44%; 60% in winter) Blue-throated Flycatcher *Cyornis rubeculoides* (36%; 50% in winter), Ashy Drongo *Dicrurus leucophaeus* (30%), and Brown-breasted Flycatcher *Muscicapa muttui* (17%).

Table 3. Most abundant birds of the Alagarkoil Range

Abundance band	Species	Percentage lists
>60%	White-browed Bulbul	74
60–40%	Green/Greenish Leaf Warbler	54
	Purple-rumped Sunbird	51
	Brown-headed Barbet	51
	Pale-billed Flowerpecker	46
	Large-billed Leaf Warbler	44
	Indian Paradise-flycatcher	42
40–20%	Spotted Dove	39
	Greater Coucal	36
	Blue-throated Flycatcher	36
	Puff-throated Babbler	34
	White-rumped Shama	32
	Loten's Sunbird	31
	Ashy Drongo	30
	Rose-ringed Parakeet	27
	Black-naped Monarch	24
	Rufous Treepie	23

The only resident, and breeding, flycatcher was the Black-naped Monarch *Hypothymis azurea* (observed at a nest). Tickell's Blue Flycatcher, which was expected to be more common, was seen just once.

Several species found a place only in one or two lists, indicating their rarity, like the Drongo Cuckoo *Surniculus lugubris*, and Pied Thrush *Geokichla wardii*.

The only range-restricted species recorded was the Dark-fronted Babbler *Rhopocichla atriceps*, which occurs only in the Peria-aruvi Valley in a damp area along the rivulet, even though most of the original vegetation has been replaced by planted *Cassia* species.

The raptors, being at the height of the food chain, cannot be compared with the other bird species with respect to the frequency of occurrence, but could be compared within the group. The commonest, in descending order were, the Shikra *Accipiter badius* (11%), Changeable Hawk Eagle *Nisaetus cirrhatus* (8%), Short-toed Snake-Eagle *Circaetus gallicus* (6%), and Crested Serpent-Eagle *Spilornis cheela* (6%).

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119. Brown Fish Owl

Most of the nocturnal birds were recorded in the Peria-Aruvi Valley. The commonest were the Jerdon's Nightjar *Caprimulgus atripennis*, which was heard often in Peria-aruvi Valley, Jungle Owlet *Glaucidium radiatum*, Spotted Owlet *Athene brama*, and Brown Fish Owl *Ketupa zeylonensis* **[119]**. Indian Nightjar *C. asiaticus*, and Grey Nightjar *C. indicus* among the nightjars, and Oriental Scops- *Otus sunia*, and Collared Scops Owl *O. s. bakkamoena* were heard calling only once or twice.

The month-wise distribution of birds in the Silambar- and Peria-aruvi valleys was analysed. As was to be expected, most of the resident birds, so described in standard references (Ali & Ripley 2001; Rasmussen & Anderton 2012) were found year-round, while the migrants were found only during the winter. However, some instances of possible local migration were also noted. White-bellied Drongo *Dicrurus caerulescens*, a resident species, was found to occur only from July–September. Drongo Cuckoo *Surniculus lugubris,* another resident bird, was seen in February and November only. The *cyanota* subspecies of Orange-headed Thrush *Geokichla citrina* does not breed here, but is present only during winter.

The species discovery graphs for Silambar Valley and Peria-aruvi Valley (Figs. 5 & 6) seem to plateau towards the end, indicating that only a few birds could be added by further visits. However, after the survey was over, further visits yielded additional species like Blue-bearded Bee-eater *Nyctyornis athertoni* on 25 July 2013 in Silambar Valley and Dusky Crag Martin *Ptyonoprogne concolor* was seen on 01 July 2012 at an outlying hillock east of AR and Red-rumped Swallow *Cecropis daurica* on 02 June 2013 at the same hillock.

Discussion

Of the 110 species recorded in and around AR, two are old records: White-rumped Vulture *Gyps bengalensis*, and Red-headed Vulture *Sarcogyps calvus* (personal observations from

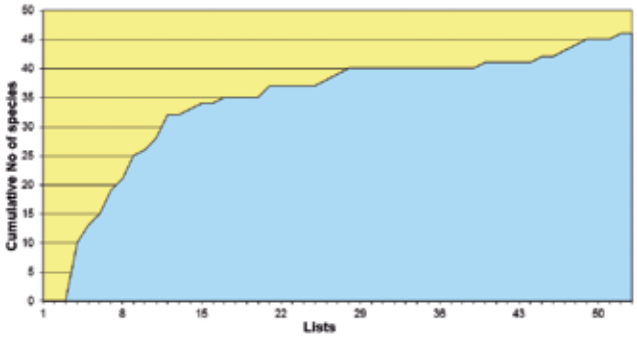

Fig. 5. Species Discovery Graph for Silambar Valley.

Fig. 6. Species Discovery Graph for Peria-aruvi Valley.

1985 to the early 1990s). Some species that are expected only in south-western India as per the standard references (Ali & Ripley 2001; Rasmussen & Anderton 2012), are also found in AR: Black-naped Oriole *Oriolus chinensis*, Brown- breasted Flycatcher *Muscicapa muttui*, and Dark-fronted Babbler *Rhopocichla atriceps*.

Migrants formed only about 20% of the total number of species recorded in AR during winter (September–April). But, looking at the relative numbers, it was seen that the migrant species constituted nearly 40% of the total number of individuals of all species counted in winter. Comparative data from surveys in the Munnar Hills, (Praveen & Nameer 2013), which were carried out in winter, indicate that the migrants in Munnar constituted 22% of the total number of species, but comprised only 15% of the total number of individuals. This may indicate the poor holding capacity of AR. There was no significant difference in the species composition between the avifauna of Silambar Valley and Peria-aruvi Valley (260–520 m) taken together, and the Bison Valley (625–730 m), as they are of comparable altitudes.

Within the two main valleys of AR there was a lot of difference in the number of species recorded in Silambar Valley (46) versus that in Peria-aruvi Valley (80). This could be because of a combination of three factors:

1. The number of visits, and hence the lists recorded in Peria-aruvi Valley, were more than those from Silambar Valley—which could have resulted in an observer-induced bias.
2. There were a number of open farmland and dry scrubland birds like Red-vented Bulbul *Pycnonotus cafer*, Common Hawk Cuckoo *Hierococcyx varius*, Purple Sunbird *Cinnyris asiaticus*, Large-billed Crow *Corvus macrorhynchos*, and Yellow-billed Babbler *Turdoides affinis* present only in Peria-aruvi Valley due to the much more degraded habitat possibly from timber extraction.
3. One striking difference was the presence of the Dark-fronted Babbler in Peria-aruvi Valley only. This could be because of the damage to the riverine vegetation in Silambar Valley—a fallout of years of pilgrimage and the resulting construction of roads.

Nichols (1944a, b) had listed only three species—White-rumped Shama, Chestnut-headed Bee-Eater *Merops leschenaulti*, and Indian Paradise Flycatcher *Terpsiphone paradisi* as specific to AR. It is not known whether he travelled extensively all over the range. Birds recorded by him as common in Madurai District could have been present in AR too. But, birds described by Nichols to be rare in Madurai District, if they had been present in AR, he would have mentioned them specifically. Such examples include:

1. Dark-fronted Babbler: Nichols reported it to be uncommon in the hills (names of the hill ranges not specified by Nichols) from 300 to 1500 m, but was found in 11% of the lists in Peria-aruvi Valley in the present study, where it was sighted on every trip
2. Black-naped Oriole: Nichols did not record it in Madurai District. It was found in 10% of the lists in winter and was found both in Silambar and Peria Aruvi valleys. This could be a recent phenomenon.
3. Forest Wagtail *Dendronanthus indicus*: Nichols recorded as rare in Madurai District. Whereas in AR it was found throughout winter (14% of total and 19% of winter lists). It was recorded both in Silambar and Peria Aruvi valleys practically throughout winter. It is definitely not a passage migrant.
4. Blue-throated Flycatcher, and Brown-breasted Flycatcher: Both were recorded as rare by Nichols, who reported only one sighting. In AR both were found in good numbers as follows: Former: 36% of total and 50% of winter, latter 17% of total and 23% of winter. They were seen throughout the winter months. Both of them are not passage migrants at AR.

Apart from the two vultures, which are no longer found here, there is no endangered or threatened species found here. The Dark-fronted Babbler is a "Biome restricted Species" found in the Indian Peninsula Tropical Moist Forest - Biome 10 (Islam & Rahmani 2004)

When compared with the Sirumalai Range (Santharam *et al* 2014) the total number of species is considerably less in AR (AR: 110 versus Sirumalais: 159). Widespread Western Ghats endemics reported from the Sirumalais—like Blue-winged Parrakeet *Psittacula columboides*, and Rufous Babbler *Argya subrufa*—are not reported from the AR.

The moist deciduous bird species found at Sirumalais—like the Oriental White-eye *Zosterops palbrebrosus,* Plum-headed Parakeet *Psittacula cyanocephala*, Vernal Hanging Parrot *Loriculus vernalis*, Chestnut-headed Bee-eater, White-cheeked Barbet *Psilopogon viridis*, Greater Racket-tailed Drongo *Dicrurus paradiseus*, Bronzed Drongo *Dicrurus aeneus*, Bar-winged Flycatcher-shrike *Hemipus picatus*, many of the woodpeckers, Scarlet Minivet *Pericrocotus flammeus*, and Small Minivet *P. cinnamomeus*—were not found in AR. Chestnut-headed Bee-Eater was a prominent absentee, which was previously recorded by Nichols (1944b) at AR [Alaharmalai] foothills.

The notable birds found in AR, but not in the Sirumalais, were the Brown Fish Owl *Ketupa zeylonensis*, Drongo Cuckoo, Blue-bearded Bee-eater, Verditer Flycatcher *Eumyias thalassinus*, and the Dark-fronted Babbler. The reasons for this disparity could be the greater altitudinal range of the Sirumalais (260–1300 m) versus that of AR (210–805 m), and its relative proximity to the Palni Hills and rest of the main range of the Western Ghats.

In the Palni Hills, only the Lower Palnis have a comparable altitude, where a high number (195) of bird species have been recorded (Balachandran & Rahmani 2005). These also include water birds seen at Manjalaru Dam, which is much larger than the Peria Aruvi Dam. Even after excluding the water birds from both lists one finds that nearly 180 land birds have been recorded in the Lower Palnis when compared with the 105 in AR. The most important reason for this difference could be, that, much of AR has suffered tourism related disturbances, and forestry operations, which have resulted in the replacement of much of the native vegetation with non-native flora, resulting in a lower biodiversity index. Moreover, many of the Palni Hills bird species move freely through all three regions: Lower-, Middle- and Upper Palnis. Therefore even if one particular species prefers the altitude of Upper- or Middle Palnis, it could still be seen in the Lower Palnis.

The key limiting factors, with respect to species richness of birds in AR, are:

1. Limited altitudinal range, with the higher altitudes at crest-line being stony/rocky with sparse vegetation, and consequently the absence of higher altitude species.
2. Limited rainfall, and consequently, the absence of moist deciduous vegetation and its associated birds.

3. Greater distance from the Western Ghats.
4. Replacement of native flora by selective forestry practices, with only the economically important tamarind and mango trees being left behind, and rampant overgrowth of introduced *Cassia* species, dwarfing native vegetation.

Conclusion

Bird life in AR is much less diverse than that of other associated hills that are taller, and closer, to the Western Ghats. However it supports a seemingly isolated population of the Dark-fronted Babbler apart from being a wintering destination for Black-naped Oriole, Forest Wagtail, Blue-throated- and Brown-breasted Flycatchers.

Though this study is fairly comprehensive, Bison Valley is not as well explored as other areas, and future visits may lead to more discoveries.

The habitat of AR could be improved by replacing the planted *Cassia* species and *Albizzia lebbek* with more native plants and trees as hills like this could be considered, as an important buffer area for the main Western Ghats avifauna.

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Errata

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Page 29, left column, line 10: "2nd Light Cavalry" should be '2nd Madras Light Cavalry'.
Page 30, left column, line 5: " 'Catalogue of the birds peninsula India…' " should be 'Catalogue of the birds of the peninsula of India…'.
Page 36, caption to first row of photos, line 11: "44a, c" should be '44b, c'.
Page 41, caption to photo no., 51a, line 3: "earlier plate" should be 'next plate'.
Page 73, Fig. 1: The caption to the map should include, "This map is illustrative in nature, and does not attempt to conform to political boundaries."