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Checklist and nesting patterns of avifauna in and around Mayiladuthurai region, Tamil Nadu, India

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Abstract: Seventy-five taxa of birds belonging to 41 families were recorded in the Mayiladuthurai region, Tamil Nadu, India during January 2006 to December 2006. Sixty-two species of these were residents and 13 were local migrants. Among the birds recorded in this study, about 26 species were insectivores and other dominating types included omnivores, predators, granivores and frugivores. Breeding habits of 30 species were recorded, of five different nesting types, viz., cup nesters, cavity / hole nesters, platform nesters, pendant nesters and ground nesters. The birds used a variety of nesting materials, mostly twigs, fibres, sticks, leaves and grasses for nest construction. Thirteen species laid pure white eggs without any markings and nine species laid white eggs with various colour combinations and markings. Some species laid glossy blue, blue green, red and brown coloured eggs.

Keywords: Avifauna, eggs, nesting birds, nest types.

The Indian subcontinent has diverse avifauna with 1300 bird species (Grimmett et al. 1999). Recently there is an increased awareness of the need to prepare checklists of birds on a wider scale, although such work is often confined to sanctuaries and forest ranges (Kannan 1998; Mahabal 2000). Collective checklists of birds for specific regions like lakes (Sahu & Rout 2005; Reginald et al. 2007), wetlands (Ravindran 1995; Sivaperuman & Jayson 2000), mangroves (Pandav 1997; Oswin 1999), wildlife sanctuaries (Relton 1998; Mahabal 2000; Aravind et al. 2001; Chhangani 2002) and university campuses and institutes (Jayapal 1995; Sundar 1998; Nameer et al. 2000; Ramitha & Vijayalaxmi 2001; Dookia 2002; Praveen & Joseph 2006) have also been published.

The information on checklists and nesting patterns of birds in Mayiladuthurai region is scattered. A few reports that exist (Asokan 1998 a,b; Chandru & Asokan, 1999; Asokan et al. 2003, 2009b; Sivakumaran & Thiyagesan 2003; Neelanarayanan 2007) are chiefly related to the population and feeding ecology of birds. Barring a few observations on the nesting behaviour of birds (Thiyagesan 1991; Sivakumar & Jayabalan 2004; Asokan et al. 2008, 2009a) there are no detailed studies of their nesting patterns. We present in this paper a detailed account of our observations on checklists and nesting patterns of avian species in Mayiladuthurai region.

Materials and Methods

Study area: The Mayiladuthurai Taluk is located on the Cauvery River bank between 18^{0}18'N and 79^{0}50'E in Nagapattinam District, Tamil Nadu, India. Agriculture is the major economics of this area, which contributes a high share of rice production to the state. Sugarcane, groundnut, green gram, black gram, cotton, etc are the other major crops cultivated in this area. The Cauvery River and its tributaries are major perennial water sources used for irrigation. Woody vegetation is sparse in the form of groves and roadside trees. The predominant tree species found in the study area are

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Coconut *Cocos nucifera,* Palm *Borassus flabellifer,* Iluppai *Madhuca indica,* Mango *Mangifera indica,* Rain Tree *Enterolobium saman,* Tamarind *Tamarindus indicus,* Banyan *Ficus benghalensis,* Peepal *Ficus religiosa,* Poovarasu *Thespesia populnea,* Karuvai *Acacia arabica,* Odhian *Odina wodier* and Neem *Azadirachta indica.* Important shrub species are Kattukaruvai *Prosopis juliflora,* Kattamani *Jatropha glandulifera* and Adathoda *Adathoda visica.* Plantations of Casuarina *Casuarina equisetifolia,* Teak *Tectona grandis* and Bamboo *Bamboosa arundinacea* are also found in the study area. Based on the northeast monsoon the study area is divided into four seasons viz., post-monsoon, summer, pre-monsoon and monsoon. Summer ranges from April to June (with a mean maximum temperature of 38^{0}C) and the northeast monsoon between October and December. The cold season starts in November and may last till January.

Bird survey: The checklist is primarily based on field work conducted in two habitats, viz., river banks (Cauvery River) and agricultural lands of Mayiladuthurai region from January 2006 to December 2006. Birds were observed between 0500 and 0900 hr with the help of 7x50 field binoculars. Birds sighted during the study period were categorized according to their status as residents and local migrants. The identification of birds was done using field guides (Grimmett et al. 1999; Ali 2002). The checklist was prepared using standardized common and scientific names by Manakadan & Pittie (2001).

Nesting patterns: The nesting behaviour study was carried out during January 2006 to July 2006, when most birds breed. Nests were located and data on nest characteristics, eggs and nest sites were recorded with standard methodologies as described by Pettingill (1985) and Soni et al. (2004). The photographs were taken with a NIKON Digital Camera.

Results and Discussion

A list of birds recorded from Mayiladuthurai region and their common name, scientific name, vernacular name (Tamil) and feeding habits is reported in Table 1. The study reveals the occurrence of 75 species of birds belonging to 41 families and 13 orders. Among the 13 orders, Passeriformes dominated the list with 35 species followed by Ciconiiformes, Cuculiformes and Coraciiformes with six species each; Falconiformes with five species, Charadriiformes and Columbiformes with three species each; Galliformes, Strigiformes, Apodiformes and Piciformes with two species each; Podicipediformes, Gruiformes and Psittaciformes with one species each. Out of the 75 species, 62 species were common residential birds and 13 species were local migrants. The local migrants, viz., Little Grebe *Tachybaptus ruficollis*, Yellow Bittern *Ixobrychus sinensis*, Asian Open-bill Stork *Anastomus oscitans*, Yellow-wattled Lapwing *Vanellus vanellus*, Common Sandpiper *Actitis hypoleucos*, Pied Crested Cuckoo *Clamator jacobinus*, Small Green-billed Malkoha *Phaenicophaeus viridirostris*, Indian Pitta *Pitta brachyura*, Common Swallow *Hirundo rustica*, Red-rumped Swallow *Hirundo daurica*, Blyth's Reed Warbler *Acrocephalus dumetorum*, Asian Paradise Flycatcher *Terpsiphone paradisi* and Ashy Woodswallow *Artamus fuscus* were recorded only in certain months of the year i.e. August–January. Birds of diverse food habits were observed, viz., insectivores (26 species), omnivores (22 species), predators (16 species), granivores (8 species) and frugivores (3 species).

A greater diversity of avian species was recorded at the Cauvery River banks because of greater vegetation densities and food availability. Along both sides of the river banks, many wooded tree species, scrub and bushy type stumpy vegetation were distributed and it provided roosting and nesting-sites for many bird species. A number of birds were recorded in the agricultural fields. Paddy is the main crop of the study area and is cultivated round the year. Birds such as the Black Drongo, Indian Roller, Small Bee-eater, White-breasted Kingfisher, Common Myna, Pond Heron, egrets, etc., are very common birds in the agricultural lands and feed mostly on insects. Such birds are useful in the control of injurious insects in various crops (Asokan et al. 2009b).

The number of species recorded in the present study was low when compared to some earlier studies in Tamil Nadu (Jayapal 1995; Oswin 1999; Balasundaram & Rathi 2004; Reginald et al. 2007). The present study was carried out on two selected habitats only, future studies will cover all the areas of Mayiladuthurai regions and list more numbers of avian species.

In total, 30 species belonging to 22 families were recorded nesting in the study area (Table 2; Image 1). A total of 125 nests were recorded during the study period and the highest number of nests observed were of the Common Myna (n=16) followed by the Small Bee-eater (n=15) and the White-breasted Kingfisher (n=9). Five

Table 1. Checklist of birds recorded in and around Mayiladuthurai region

	Common name	Scientific name	Vernacular name	Feeding habit
	Podicipediformes: Podicipedidae			
1	Little Grebe	*Tachybaptus ruficollis*	Mukkulipan	IN
	Ciconiiformes			
	Ardeidae			
2	Little Egret	*Egretta garzetta*	Vellai Kokku	PR
3	Large Egret	*Casmerodius albus*	Periya Kokku	PR
4	Cattle Egret	*Bubulcus ibis*	Mattu Kokku	PR
5	Indian Pond-Heron	*Ardeola grayii*	Madaiyan	PR
6	Yellow Bittern	*Ixobrychus sinensis*	Sengkokku	PR
	Ciconiidae			
7	Asian Openbill-Stork	*Anastomus oscitans*	Nathai-kothi Narai	PR
	Falconiformes: Accipitridae			
8	Black-shouldered Kite	*Elanus caeruleus*	Kalla Parunthu	PR
9	Black Kite	*Milvus migrans*	Semparaunthu	PR
10	Brahminy Kite	*Haliastur indus*	Karudan Paraunthu	PR
11	Shikra	*Accipiter badius*	Valluru	PR
12	Eurasian Sparrowhawk	*Accipiter nisus*	Parunthu	PR
	Galliformes: Phasianidae			
13	Grey Francolin	*Francolinus pondicerianus*	Kowtharai	OM
14	Indian Peafowl	*Pavo cristatus*	Myil	OM
	Gruiformes: Rallidae			
15	White-breasted Waterhen	*Amaurornis phoenicurus*	Kanankozhi	OM
	Charadriiformes: Charadriidae			
16	Yellow-wattled Lapwing	*Vanellus vanellus*	Manjal-mooku Aalkatti	IN
17	Red-wattled Lapwing	*Vanellus indicus*	Chivapu-mooku Aalkatti	IN
	Scolopacidae			
18	Common Sandpiper	*Actitis hypoleucos*	Ullan	IN
	Columbiformes: Columbidae			
19	Blue Rock Pigeon	*Columba livia*	Maada Pura	GR
20	Spotted Dove	*Streptopelia chinensis*	Mani Pura	GR
21	Eurasian Collared Dove	*Streptopelia decaocto*	Sambal Pura	GR
	Psittaciformes: Psittacidae			
22	Rose-ringed Parakeet	*Psittacula krameri*	Pachaikilli	FR
	Cuculiformes: Cuculidae			
23	Pied Crested Cuckoo	*Clamator jacobinus*	Kondai Kuyil	OM
24	Brainfever Bird	*Hierococcyx varius*	Kuyil	OM
25	Common Cuckoo	*Cuculus canorus*	Kuyil	OM
26	Asian Koel	*Eudynamys scolopacea*	Kuyil	OM
27	Small Green-billed Malkoha	*Phaenicophaeus viridirostris*	Kuyil	OM
28	Greater Coucal	*Centropus sinensis*	Senbaham	PR
	Strigiformes: Tytonidae			
29	Barn Owl	*Tyto alba*	Koogai / Chavukuruvi	PR
	Strigidae			
30	Spotted Owlet	*Athene brama*	Pullianthai	IN
	Apodiformes: Apodidae			
31	Asian Palm Swift	*Cypsiurus balasiensis*	Uzhavara Kuruvi	IN
32	House Swift	*Apus affinis*	Uzhavara Kuruvi	IN
	Coraciiformes: Alcedinidae			
33	Small Blue Kingfisher	*Alcedo atthis*	Meankothi	PR
34	White-breasted Kingfisher	*Halcyon smyrnensis*	Ven-marbu Meankothi	PR

	Common name	Scientific name	Vernacular name	Feeding habit
35	Lesser Pied Kingfisher	*Ceryle rudis*	Vellai Meankothi	PR
	Meropidae			
36	Small Bee-eater	*Merops orientalis*	Chinna Panchurutan	IN
	Coraciidae			
37	Indian Roller	*Coracias benghalensis*	Panaggadai	IN
	Upupidae			
38	Common Hoopoe	*Upupa epops*	Saval Kuruvi	IN
	Piciformes: Capitonidae			
39	Coppersmith Barbet	*Megalaima haemacephala*	Kukkuruvam	FR
	Picidae			
40	Lesser Golden-backed Woodpecker	*Dinopium benghalense*	Markkothi	IN
	Passeriformes: Pittidae			
41	Indian Pitta	*Pitta brachyura*	Arumani Kuruvi	IN
	Alaudidae			
42	Sykes's Crested Lark	*Galerida deva*	Vanambadi	OM
43	Eastern Skylark	*Alauda gulgula*	Vanambadi	OM
	Hirundinidae			
44	Common Swallow	*Hirundo rustica*	Thailan	IN
45	Red-rumped Swallow	*Hirundo daurica*	Thailan	IN
	Motacillidae			
46	Large Pied Wagtail	*Motacilla maderaspatensis*	Karuppuvalati	IN
47	Paddyfield Pipit	*Anthus rufulus*	Nettaikali	IN
	Campephagidae			
48	Small Minivet	*Pericrocotus cinnamomeus*	Milagai Chitu	IN
49	Common Woodshrike	*Tephrodornis pondicerianus*	Kassappakaram	IN
	Pycnonotidae			
50	Red-vented Bulbul	*Pycnonotus cafer*	Kondai Kuruvi	OM
	Irenidae			
51	Common Iora	*Aegithina tiphia*	Chinna Mambazhakuruvi	OM
	Turdinae			
52	Oriental Magpie Robin	*Copsychus saularis*	Vannathikuruvi	IN
53	Indian Robin	*Saxicoloides fulicata*	Carkuruvi	IN
	Timaliinae			
54	Common Babbler	*Turdoides caudatus*	Thavitu Kuruvi	OM
	Sylviinae			
55	Ashy Prinia	*Prinia socialis*	Saambal Kathirkuruvi	IN
56	Blyth's Reed Warbler	*Acrocephalus dumetorum*	Naanal Kathirkuruvi	IN
57	Common Tailor Bird	*Orthotomus sutorius*	Thaiyalkara Kuruvi	IN
58	Orphean Warbler	*Sylvia hortensis*	Kathirkuruvi	IN
	Monarchinae			
59	Asian Paradise Flycatcher	*Terpsiphone paradisi*	Rajawall Kuruvi	IN
	Dicaeidae			
60	Tickells Flowerpecker	*Dicaeum erythrorhynchos*	Pakku Chittu	FR
	Nectariniidae			
61	Purple-rumped Sunbird	*Nectarinia zeylonica*	Manjal Thenchittu	OM
62	Purple Sunbird	*Nectarinia asiatica*	Thenchittu	OM
	Estrildidae			
63	White-throated Munia	*Lonchura malabarica*	Thiinai Kuruvi	GR
64	Black-headed Munia	*Lonchura malaca*	Thiinai Kuruvi	GR
	Passerinae			
65	House Sparrow	*Passer domesticus*	Chittu Kuruvi	GR

	Common name	Scientific name	Vernacular name	Feeding habit
	Ploceinae			
66	Streaked Weaver	*Ploceus manyar*	Thukkanan Kuruvi	GR
67	Baya Weaver	*Ploceus philippinus*	Thukkanan Kuruvi	GR
	Sturnidae			
68	Brahminy Starling	*Sturnus pagodarum*	Kondai Myna	OM
69	Common Myna	*Acridotheres tristis*	Narathan Kuruvi	OM
	Oriolidae			
70	Eurasian Golden Oriole	*Oriolus oriolus*	Mambazhakuruvi	OM
	Dicruridae			
71	Black Drongo	*Dicrurus macrocercus*	Karuvatuvalli	IN
	Artamidae			
72	Ashy Woodswallow	*Artamus fuscus*	….	OM
	Corvidae			
73	Indian Tree Pie	*Dendrocitta vagabunda*	Val Kakkai	OM
74	House Crow	*Corvus splendens*	Manikagam	OM
75	Jungle Crow	*Corvus macrorhynchos*	Andakagam	OM

IN - Insectivores; PR - Predators; GR - Granivores; FR - Frugivores; OM - Omnivores

different kinds of nesting patterns, viz., cup nesters (11 spp.), cavity / hole nesters (10 sp.), platform nesters (5 sp.), pendant nesters (3 sp.) and ground nester (1 sp.) were recorded.

The birds used a variety of nesting materials for nest construction and most preferred soft fibres, grasses, twigs, sticks and leaves (Table 2). The Common Myna used more than five different varieties of nesting materials (twigs, roots, leaves, polythene, bird feathers and snake skin) for nest construction. Birds such as the Red-wattled Lapwing, Rose-ringed Parakeet, White-breasted Kingfisher, Small Bee-eater and Indian Roller did not use nesting materials and the Barn Owl laid its eggs on regurgitated pellets (Table 2).

Nest construction and placement are correlated with the breeding season, suitable nest sites, nesting materials availability, food availability and predator's interaction (Dial 2003). In the present study 11 species constructed cup nests with various materials and in a variety of locations (trees, bushes and shrubs). Many passerines and a few non-passerines (White-breasted Waterhen and Palm Swift) built this type of nest. Cavity / hole nests were used by numerous bird species and most bred either in natural tree holes / cavities and holes in walls or buildings. Some birds, such as the Rose-ringed Parakeet constructed their own nests and are referred to as primary cavity nesters. Species that use natural cavities / holes constructed by primary cavity nesters are called secondary cavity nesters (mynas, roller, robins, spotted owlet). The White-breasted Kingfisher and the Small Bee-eater are burrow nesting species and they dig a horizontal tunnel into sandy river banks, with a chamber at the tunnel's end to house the eggs. Platform nests were constructed by one raptor (Black Kite), two Columbiformes (Blue Rock Pigeon and Spotted Dove) and two crow species (House and Jungle crows). The Columbiformes constructed simple platform nests with small sticks and fibres. The Blue Rock Pigeon nests were man-made structures like temple towers and the Spotted Dove placed nests in small, thick vegetation and trees. The Black Kite and crows used strong sticks, fibres, roots, cloth, etc. and the nests were usually placed on tree canopy. The nests look like a jumble of materials, but the sticks are usually placed in layers, beginning with a triangle, followed by more rotated, triangular layers. The pendant nests were constructed by the Baya Weaver, Streaked Weaver and Purple-rumped Sunbirds. Pendant nests are elongated sacs woven of pliable materials such as grasses and soft plant fibres. The Baya Weaver mostly preferred Palm trees for nest construction and the Streaked Weaver preferred swampy and rain flooded areas, particularly where there were reeds and tall grasses. The Red-wattled Lapwing laid eggs in open bare ground.

Most species laid pure white eggs or white with various colour combinations. A few species laid blue or blue green, red and brown coloured eggs. Generally white eggs are formed by calcium carbonate; the pigments biliverdin and its zinc chelate give a blue or green and protoporphyrin produces reds and browns as the ground

Table 2. List of nesting bird species, number of nests, nest-site, nest type, nest materials and eggs observed

Species	# nests	Nest-site	Nest type	Nest materials	Eggs	Clutch size
Black Kite	2	Tree canopy	Platform nest	Twigs, cloth, paper	Dirty pinkish-white	2-3
White-breasted Waterhen	2	Bushes	Cup nest	Twigs, leaves, small stems	Pinkish-white with reddish-brown streaks and blotches	2-3
Red-wattled Lapwing	2	Ground	Ground nest	….	Greyish-brown with black blotches	1-3
Blue Rock Pigeon	3	Temple towers	Platform nest	Small sticks, fibres	White	2-3
Spotted Dove	3	Bush, small trees	Platform nest	Twigs, sticks, fibres	White	2-3
Rose-ringed Parakeet	4	Tree holes	Hole nest	…..	White	2-4
Barn Owl	3	Temple towers	Hole nest	Regurgitated pellets	White	4-6
Spotted Owlet	3	Tree holes / cavities	Hole nest	Fibres	White	2-4
Asian Palm Swift	5	Trees (palm trees)	Cup nest	Soft flowers, feathers	White	2-4
White-breasted Kingfisher	9	Sandy river banks	Hole nest	None	White	3-4
Small Bee-eater	15	Sandy river banks	Hole nest	None	White	3-5
Indian Roller	4	Tree holes	Hole nest	…..	White	3-4
Paddyfield Pipit	3	Paddy fields	Cup nest	Soft grasses	Bluish-white with brown blotches and spots	2-3
Common Woodshrike	2	Trees	Cup nest	Barks, fibres	Pale greenish-white with brown speckles	2-3
Red-vented Bulbul	4	Trees	Cup nest	Fibres, twigs	Pinkish-white with purplish-brown blotches	2-3
Common Iora	2	Trees	Cup nest	Grasses, fibres	Pinkish-white with purplish-brown blotches	1-2
Oriental Magpie Robin	4	Wall, tree holes	Hole nest	Grasses, twigs, leaves	Pale blue green with reddish-brown blotches	3-4
Indian Robin	2	Wall, tree holes	Hole nest	Grasses, feather, straw	White	2-3
Common Babbler	4	Trees	Cup nest	Grasses, rootlets	Glossy blue	2-4
Ashy Prinia	2	Bushes	Cup nest	Fibres, small sticks	Glossy brick-red	2-4
Common Tailor Bird	3	Trees	Cup nest	Fibres, leaves, cotton wool	Reddish-white with brownish-red spots	2-3
Purple-rumped Sunbird	2	Trees, wall	Pendant nest	Grasses, fibres	Greenish-white with brown shades	2-3
Black-headed Munia	3	Bushes, shrubs	Cup nest	Grasses, fibres, straw	White	3-5
Baya Weaver	5	Trees	Pendant nest	Paddy leaves, grasses	White	2-4
Streaked Weaver	3	Reeds	Pendant nest	Paddy leaves, grasses	White	2-4
Brahminy Starling	3	Tree holes	Hole nest	Grasses, leaves	Pale blue	2-5
Common Myna	16	Tree holes / cavities	Hole nest	Twigs, roots, leaves, polythene, feathers, snake skin	Blue	2-5
Black Drongo	5	Trees	Cup nest	Twigs, fibres	White with red spots	2-4
House Crow	4	Trees	Platform nest	Twigs, fine cloth, coir, fibres	Pale blue green with brown speckles and stretches	4-5
Jungle Crow	3	Trees	Platform nest	Twigs, fine cloth, coir, fibres	Pale blue green with brown speckles and stretches	3-5


Black Kite


White-breasted Waterhen


Red-wattled Lapwing


Blue Rock Pigeon

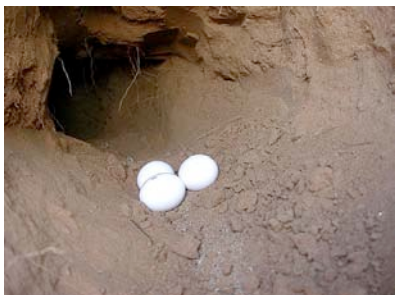

Spotted Dove


Rose-ringed Parakeet

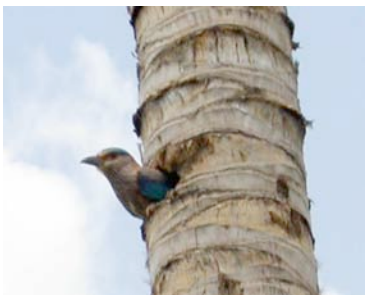

Barn Owl


Spotted Owlet


Asian Palm Swift


White-breasted Kingfisher


Small Bee-eater


Indian Roller

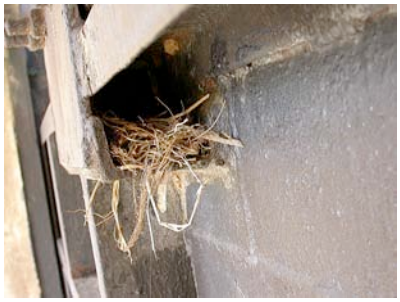

Paddyfield Pipit


Common Woodshrike


Red-vented Bulbul


Commom Iora


Oriental Magpie Robin


Indian Robin


Common Babbler


Ashy Prinia


Black-headed Munia


Baya Weaver


Streaked Weaver


Brahminy Starling


Common Myna


Black Drongo


House Crow


Jungle Crow

Image 1. Nest and eggs of bird's species recorded in the study area

colour (Kilner 2006). Lack (1968) stated that egg colour had no taxonomic significance, but that did show a relationship with the type of nesting-site. For example the hole nesting species tended to have immaculate white eggs, ground nesters surrounded by vegetation laid eggs of obscured brown, gray or olive, those nesting in forks of tree branches had eggs with blotches or shadow-marks on a white or blue background.

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