

# Avifauna conservation in temple premises of Tamil Nadu, India

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## ABSTRACT

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Tamil Nadu is the land of temples. Amongst several traditional worship practices, found associated with these temples, an important one is known as Temple Trees (*Sthalavriksha*; sthala: locality, vriksha: tree). Most of the temples have their own *Sthalavrikshas*, *Nanthavanam* (flower garden) and several other plants. These plants form a feeding and foraging ground for various birds. During 2005–2010, a survey was conducted in 1165 temples of Tamil Nadu and Puducherry to document birds found in temple premises. Altogether, 112 *sthalavriksha* species and 90 bird species were recorded, including three threatened and one endemic species.

**Keywords:** Birds, *Nanthavanam*, *Navaghraha*, *Sthalavrikshas*, Temples, Theppakulam, Tamil Nadu, India.

## INTRODUCTION

Tamil Nadu is well known for its ancient culture and temples. There are about 25,000 ancient temples occurring in different localities of Tamil Nadu. Most of these are under the administrative control of Hindu Religious and Charitable Endowment, Government of Tamil Nadu. Here, people follow several traditional practices with great religious beliefs. One such practice is known as *sthalavriksha* (sthala: locality, vriksha: tree). The temples have their own *Nanthavanam* (flower garden for deities) and several other trees in its premises. Most of these flower gardens were established by the kings during the construction of temples. Generous donations were made by ancient rulers and their subjects to institute flower gardens in temples. Flowers harvested from these gardens are used in the ornamentation of deities and their *Pooja* (worship).

*Sthalavrikshas*, temple gardens and other plants form an ideal micro-habitat for number of bird communities.

*Sthalavriksha* is referred to a plant (mostly single tree) which is equally venerated from times immemorial by the devotees as holy as the presiding deity of a temple (Gunasekaran & Balasubramanian 2005). Most of the temple myth (*sthalapuranas*) and temple history (*sthalavaralaru*) state that the prime deity was first unearthed or found under the tree. After the construction of temples, these plants were treated as *sthalavriksha* or temple tree (sacred plant). There are only a few studies available on *sthalavrikshas* (Samy 1978, Aravanan 1984, Sobitharaj 1994, Thiruganam 1995, Amirthalingam 1998). Gunasekaran and Balasubramanian (2010, 2012, 2016) reported on taxonomy and economic importance of *sthalavrikshas*, their ethnomedicinal uses and as indicator species for

remnant flora. Rekka et al. (2021) indicated association of sacred groves with *sthalavrikshas*. However, only a few studies referred on birds of temple premises, for instance, Neelanarayanan (2007) reported diet of Barn Owl in the temples. Hence, present study was initiated to document bird species utilizing both *sthalavrikshas* and temple premises.

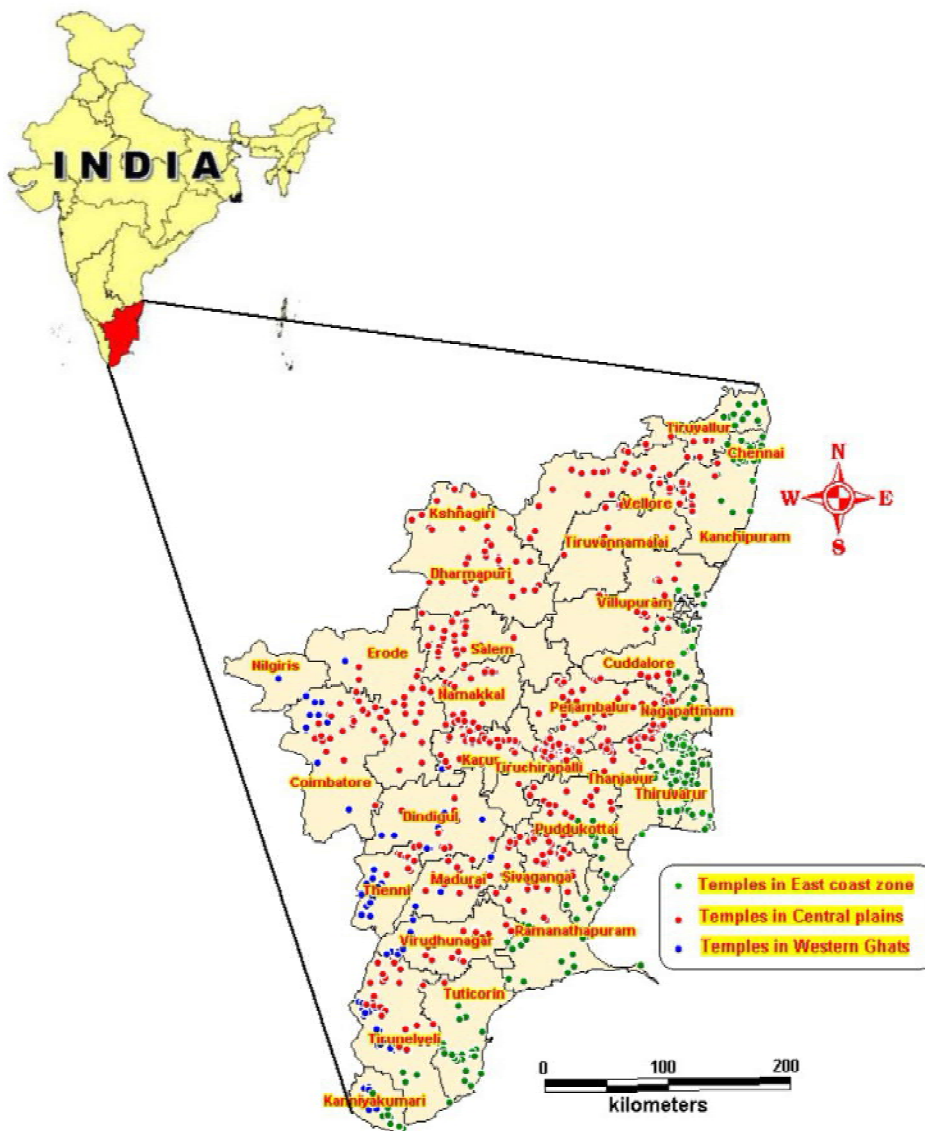
The present study was carried out in Tamil Nadu and Puducherry. Tamil Nadu is located between 8°05' and 13°35' north latitudes and 76°15' and 80°20' east longitudes and covers an area of 1,30,058 km<sup>2</sup>,

occupying 4.08% of the total area of India. During the study, a total of 1165 temples in Tamil Nadu were surveyed to cover all geoclimatic zones, e.g. East Coast, Central Plains and Western Ghats (Figure 1).

## MATERIALS AND METHODS

A scientific approach was made to document the bird species found on the *sthalavrikshas*, temple gardens and other plants present in the ancient temple premises in Tamil Nadu during 2005–2010. A total of 378 temples with an age of >1000 years old, 470 temples between 500 and 1000 years old, 312 temples

between 100 and 500 years old and only five temples <100 years old were surveyed. Altogether, a total of 1165 temples, distributed in 30 districts of Tamil Nadu and Puducherry, were surveyed. Bird species were recorded by Visual Encounter Survey (VES) in temples premises. Photographic documentation was also done with special permission obtained from the temple authorities. Geographical coordinates of the temples were recorded through a 'Global Positioning System' instrument to prepare location map. For identification of birds, the publication of Ali and Ripley (1989) was referred. *Sthalavrikshas* and other plants in the temples were collected for herbarium preparation and identification. Plants were identified on the basis of Flora of the Presidency of Madras (Gamble 1915–1936, reprint 1986) and Flora of Tamil Nadu (Nair & Henry 1983, Henry et al. 1987, 1989).



**Figure 1.** Temples surveyed in three different geoclimatic zones in Tamil Nadu.

**Table 1.** List of *Sthalavrikshas* recorded during the survey.

S. No	Botanical Name and Family	Vernacular Name	Habit
1	<i>Acacia chundra</i> (Roxb. ex Rottl.) Willd. ( <i>Mimosaceae</i> )	Karungali	Tree
2	<i>Acacia farnesiana</i> DC. ( <i>Mimosaceae</i> )	Odaimaram	Tree
3	<i>Acacia leucophloea</i> (Roxb.) Willd. ( <i>Mimosaceae</i> )	Velavel	Tree
4	<i>Aegle marmelos</i> (L.) Corr. ( <i>Rutaceae</i> )	Vilvam	Tree
5	<i>Alangium salvifolium</i> (L.f.) Wang. ( <i>Alangiaceae</i> )	Alangiam	Tree
6	<i>Albizia amara</i> (Roxb.) Boivin ( <i>Mimosaceae</i> )	Osilai	Tree
7	<i>Albizia lebbbeck</i> (L.) Benth. ( <i>Mimosaceae</i> )	Vahai	Tree
8	<i>Andropogon pumilus</i> Roxb. ( <i>Poaceae</i> )	Vizhal	Grass
9	<i>Artabotrys hexapetalus</i> (L.f.) Bhandari ( <i>Annonaceae</i> )	Manoranjitham	Climber
10	<i>Artocarpus heterophyllus</i> Lam. ( <i>Moraceae</i> )	Pala	Tree
11	<i>Artocarpus hirsutus</i> Lam. ( <i>Moraceae</i> )	Ayini	Tree
12	<i>Atalantia monophylla</i> (L.) Corr. ( <i>Rutaceae</i> )	Kurunthai	Tree
13	<i>Azadirachta indica</i> Adr. Juss. ( <i>Meliaceae</i> )	Vembu	Tree
14	<i>Bambusa arundinacea</i> (Retz.) Willd. ( <i>Poaceae</i> )	Moongil	Grass
15	<i>Bauhinia acuminata</i> L. ( <i>Caesalpiniaceae</i> )	Mantharai	Tree
16	<i>Bauhinia purpurea</i> L. ( <i>Caesalpiniaceae</i> )	Mantharai	Tree
17	<i>Bauhinia racemosa</i> Lam. ( <i>Caesalpiniaceae</i> )	Mantharai	Tree
18	<i>Borassus flabellifer</i> L. ( <i>Arecaceae</i> )	Panai	Tree
19	<i>Butea monosperma</i> (Lam.) Taub. ( <i>Papilionaceae</i> )	Purasu	Tree
20	<i>Cadaba fruticosa</i> (L.) Druce ( <i>Capparaceae</i> )	Vizhi	Shrub
21	<i>Calamus rotang</i> L. ( <i>Arecaceae</i> )	Pirambu	Climber
22	<i>Calophyllum inophyllum</i> L. ( <i>Clusiaceae</i> )	Punnai	Tree
23	<i>Calotropis procera</i> (Ait.) R. Br. ( <i>Asclepiadaceae</i> )	Velerukku	Shrub
24	<i>Canthium parviflorum</i> Lam. ( <i>Rubiaceae</i> )	Karai	Tree
25	<i>Capparis divaricata</i> Lam. ( <i>Capparaceae</i> )	Thoratti	Tree
26	<i>Capparis zeylanica</i> L. ( <i>Capparaceae</i> )	Peyarillamaram	Tree
27	<i>Carissa carandas</i> L. ( <i>Apocynaceae</i> )	Kala	Shrub
28	<i>Carissa spinarum</i> L. ( <i>Apocynaceae</i> )	Kala	Shrub
29	<i>Cassia fistula</i> L. ( <i>Caesalpiniaceae</i> )	Sarakondrai	Tree
30	<i>Citrus aurantifolia</i> (Christm. & Panz.) Swingle ( <i>Rutaceae</i> )	Yelumichai	Shrub
31	<i>Citrus pennivesiculata</i> (Lush.) Tanaka ( <i>Rutaceae</i> )	Narathai	Tree
32	<i>Cocos nucifera</i> L. ( <i>Arecaceae</i> )	Thennai	Tree
33	<i>Commiphora caudata</i> (Wight & Arn.) Engl. ( <i>Burseraceae</i> )	Kiluvai	Tree
34	<i>Cordia domestica</i> Roth. ( <i>Boraginaceae</i> )	Uthalam	Tree
35	<i>Coryphaum bracuifera</i> L. ( <i>Arecaceae</i> )	Thalapanai	Tree
36	<i>Crateva magna</i> (Lour.) DC. ( <i>Capparaceae</i> )	Mavilangam	Tree
37	<i>Crescentia cujeta</i> L. ( <i>Bignoniaceae</i> )	Thiruvottukai	Tree
38	<i>Dichrostachys cinerea</i> (L.) Wight & Arn. ( <i>Mimosaceae</i> )	Vedathalan	Shrub
39	<i>Diospyros montana</i> Roxb. ( <i>Ebenaceae</i> )	Vakkanai	Tree
40	<i>Dodonaea viscosa</i> L.f. ( <i>Sapindaceae</i> )	Virali	Shrub
41	<i>Ehretia ovalifolia</i> Wight ( <i>Boraginaceae</i> )	Karukattan	Tree
42	<i>Ensete edule</i> Horan. ( <i>Musaceae</i> )	Monthan	Tree
43	<i>Euphorbia nivulia</i> Bunh.-Ham. ( <i>Euphorbiaceae</i> )	Ilaikalli	Tree
44	<i>Excoecaria agallocha</i> L. ( <i>Euphorbiaceae</i> )	Thillai	Tree
45	<i>Ficus religiosa</i> L. ( <i>Moraceae</i> )	Arasu	Tree
46	<i>Ficus benghalensis</i> L. ( <i>Moraceae</i> )	Aal	Tree
47	<i>Ficus microcarpa</i> L.f. ( <i>Moraceae</i> )	Kallal	Tree
48	<i>Ficus mollis</i> Vahl ( <i>Moraceae</i> )	Kalathi	Tree
49	<i>Ficus nervosa</i> Heyne ex Roth ( <i>Moraceae</i> )	Selamaram	Tree
50	<i>Ficus racemosa</i> L. ( <i>Moraceae</i> )	Athi	Tree
51	<i>Ficus virens</i> Aiton ( <i>Moraceae</i> )	Ithi	Tree
52	<i>Guettarda speciosa</i> L. ( <i>Rubiaceae</i> )	Panneer	Tree
53	<i>Holoptelea integrifolia</i> (Roxb.) Planch. ( <i>Ulmaceae</i> )	Aacha	Tree
54	<i>Imperata cylindrica</i> (L.) Raeusch. var. <i>major</i> (Nees) Hubbard ex Hubbard & Vaughan ( <i>Poaceae</i> )	Tharupai	Grass
55	<i>Jasminum auriculatum</i> Vahl ( <i>Oleaceae</i> )	Mullai	Climber
56	<i>Jasminum cuspidatum</i> Rottl. ( <i>Oleaceae</i> )	Mullai	Climber

S. No	Botanical Name and Family	Vernacular Name	Habit
57	<i>Jasminum grandiflorum</i> L. ( <i>Oleaceae</i> )	Jathimalli	Climber
58	<i>Jasminum sambac</i> (L.) ( <i>Oleaceae</i> )	Malligai	Climber
59	<i>Lepisanthes tetraphylla</i> (Vahl) Radlk. ( <i>Sapindaceae</i> )	Neikotta	Tree
60	<i>Limonia acidissima</i> L. ( <i>Rutaceae</i> )	Vila	Tree
61	<i>Madhuca longifolia</i> (Koen.) Macbr. ( <i>Sapotaceae</i> )	Ilupai	Tree
62	<i>Magnolia grandiflora</i> L. ( <i>Magnoliaceae</i> )	Malaimagudam	Tree
63	<i>Mangifera indica</i> L. ( <i>Anacardiaceae</i> )	Ma	Tree
64	<i>Manilkara hexandra</i> (Roxb.) Dubard ( <i>Sapotaceae</i> )	Paala	Tree
65	<i>Michelia champaca</i> L. ( <i>Magnoliaceae</i> )	Senpagam	Tree
66	<i>Millingtonia hortensis</i> L. f. ( <i>Bignoniaceae</i> )	Maramalli	Tree
67	<i>Mimosa pudica</i> L. ( <i>Mimosaceae</i> )	Thottachinungi	Herb
68	<i>Mimusops elengi</i> L. ( <i>Sapotaceae</i> )	Mahizham	Tree
69	<i>Morinda pubescens</i> Smith. ( <i>Rubiaceae</i> )	Manjanathi	Tree
70	<i>Moringa pterygosperma</i> Gaetnner, Fruct. ( <i>Moringaceae</i> )	Murungai	Tree
71	<i>Murraya koenigii</i> (L.) Spreng. ( <i>Rutaceae</i> )	Karuveppilai	Shrub
72	<i>Musa paradisiaca</i> L. ( <i>Musaceae</i> )	Vazhai	Tree
73	<i>Naringi crenulata</i> (Roxb.) Nicolson ( <i>Rutaceae</i> )	Mahavilvam	Tree
74	<i>Neolamarckia cadamba</i> (Roxb.) Bosser ( <i>Rubiaceae</i> )	Kadampu	Tree
75	<i>Nerium oleander</i> L. ( <i>Apocynaceae</i> )	Arali	Shrub
76	<i>Nyctanthes arbor-tristis</i> L. ( <i>Nyctanthaceae</i> )	Pavazhamalli	Tree
77	<i>Ochna obtusata</i> DC. var. <i>gamblei</i> . (King ex Brandis) Kanis ( <i>Ochnaceae</i> )	Silanthi	Tree
78	<i>Ocimum tenuiflorum</i> L. ( <i>Lamiaceae</i> )	Thulasi	Herb
79	<i>Phoenix sylvestris</i> (L.) ( <i>Arecaceae</i> )	Icham	Tree
80	<i>Phyllanthus emblica</i> L. ( <i>Euphorbiaceae</i> )	Nelli	Tree
81	<i>Pleiospermium alatum</i> (Wallich ex Wight & Arn.) Swingle ( <i>Rutaceae</i> )	Kurunthai	Tree
82	<i>Pongamia pinnata</i> (L.) Pierre ( <i>Papilionaceae</i> )	Pungam	Tree
83	<i>Premna latifolia</i> Roxb. var. <i>mollissima</i> (Roth) Clake ( <i>Verbenaceae</i> )	Kattuminnai	Tree
84	<i>Prosopis cineraria</i> (L.) Druce ( <i>Mimosaceae</i> )	Vanni	Tree
85	<i>Pterocarpus marsupium</i> Roxb. ( <i>Papilionaceae</i> )	Vengai	Tree
86	<i>Punica granatum</i> L. ( <i>Punicaceae</i> )	Madulai	Shrub
87	<i>Ricinus communis</i> L. ( <i>Euphorbiaceae</i> )	Amanaku	Shrub
88	<i>Salvadora persica</i> L. var. <i>wightiana</i> (Planch. ex Thw.) Verdc. ( <i>Salvadoraceae</i> )	Kalar Ugai	Tree
89	<i>Santalum album</i> L. ( <i>Santalaceae</i> )	Santhanam	Tree
90	<i>Saraca asoca</i> (Roxb.) Willde. ( <i>Caesalpiniaceae</i> )	Asokam	Tree
91	<i>Schleichera oleosa</i> (Lour.) Oken ( <i>Sapindaceae</i> )	Poovan	Tree
92	<i>Seaevola plumieri</i> (L.) Vahl ( <i>Goodeniaceae</i> )	Rutharacham	Shrub
93	<i>Securinega leucopyrus</i> (Will.) Muell.-Arg. ( <i>Euphorbiaceae</i> )	Venpoola	Shrub
94	<i>Stereospermum chelonoides</i> (L. f.) in Biblioth. ( <i>Bignoniaceae</i> )	Pathiri	Tree
95	<i>Stereospermum colais</i> (Buch.-Ham. ex Dillwyn) Mabb. ( <i>Bignoniaceae</i> )	Pathiri	Tree
96	<i>Strobilanthes kunthiana</i> (Nees) T. And. ex Benth. ( <i>Acanthaceae</i> )	Kurunji	Shrub
97	<i>Streblus asper</i> Lour. ( <i>Moraceae</i> )	Parai	Tree
98	<i>Strychnos nux-vomica</i> L. ( <i>Loganiaceae</i> )	Yetti	Tree
99	<i>Strychnos potatorum</i> L.f. ( <i>Loganiaceae</i> )	Thettra	Tree
100	<i>Syzygium cumini</i> (L.) Skeels. ( <i>Myrtaceae</i> )	Naval	Tree
101	<i>Tabernaemontana divaricata</i> (L.) R. Br. ex Roem. & Schultes ( <i>Apocynaceae</i> )	Nanthiavattai	Shrub
102	<i>Tabernaemontana heyneana</i> Wall. ( <i>Apocynaceae</i> )	Nanthiavattai	Shrub
103	<i>Tamarindus indica</i> L. ( <i>Caesalpiniaceae</i> )	Puli	Tree
104	<i>Tarenna asiatica</i> (L.) Kuntz ex K. Schum. ( <i>Rubiaceae</i> )	Kura	Tree
105	<i>Telosma minor</i> (Andr.) Craib ( <i>Asclepiadaceae</i> )	Sambangi	Climber
106	<i>Terminalia arjuna</i> (Roxb. ex DC) Wight & Arn. ( <i>Combretaceae</i> )	Marutham	Tree
107	<i>Terminalia bellirica</i> (Gaertner) Roxb. ( <i>Combretaceae</i> )	Thani	Tree
108	<i>Terminalia catappa</i> L. ( <i>Combretaceae</i> )	Badam	Tree
109	<i>Terminalia chebula</i> Retz. ( <i>Combretaceae</i> )	Kadukkai	Tree
110	<i>Vitex negundo</i> L. ( <i>Verbenaceae</i> )	Nochi	Shrub
111	<i>Wrightia tinctoria</i> (Roxb.) R. Br. ( <i>Apocynaceae</i> )	Palai	Tree
112	<i>Zizyphus mauritiana</i> Lam. ( <i>Rhamnaceae</i> )	Ilandai	Tree

**Table 2.** Birds associated with *Sthalavrikshas* and temples. \*: Western Ghats Endemic, #: Vulnerable, Δ: Near-threatened

S. No	Common Name	Zoological Name	Number	Percentage	Legal status
1	Ashy wren Warbler	<i>Prinia socialis</i>	5	0.02	S-IV
2	Asian Koel	<i>Eudynamis scolopacea</i>	99	0.43	S-IV
3	Asian Paradise Flycatcher	<i>Terpsiphone paradisi</i>	2	0.01	S-IV
4	Barn Owl	<i>Tyto alba</i>	4	0.02	S-IV
5	Black bellied Finch-Lark	<i>Eremopterix grisea</i>	5	0.02	S-IV
6	Black Drongo	<i>Dicrurus adsimilis</i>	11	0.05	S-IV
7	Black headed Myna	<i>Sturnus pagodarum</i>	175	0.77	S-IV
8	Black headed Oriole	<i>Oriolus chinensis</i>	3	0.01	S-IV
9	Black Ibis	<i>Pseudibis papillosa</i>	5	0.02	S-IV
10	Black-headed Munia	<i>Lonchura malacca</i>	4	0.02	S-IV
11	Blue Rock Pigeon	<i>Cloum balivia</i>	7266	76.32	S-IV
12	Blue tailed Bee eater	<i>Merops philippinus</i>	6	0.03	S-IV
13	Blue winged Parakeet *	<i>Psittacula columboides</i>	47	0.21	S-IV
14	Brahminy Kite	<i>Haliastur indus</i>	22	0.1	S-I
15	Common Babbler	<i>Turdoides caudatus</i>	40	0.18	S-IV
16	Common Green Pigeon	<i>Treron phoenicoptera</i>	8	0.04	S-IV
17	Common Grey Hornbill	<i>Ocyrceros birostris</i>	2	0.01	S-I
18	Common Iora	<i>Aegithi natiphia</i>	9	0.04	S-IV
19	Common Myna	<i>Acridotheres tristis</i>	584	2.58	S-IV
20	Common Peafowl	<i>Pavo cristatus</i>	38	0.17	S-I
21	Common Wood Shrike	<i>Tephrodornispon dicerianus</i>	3	0.01	S-IV
22	Coot	<i>Fulica atra</i>	2	0.01	S-IV
23	Coppersmith	<i>Megalaima haemacephala</i>	3	0.01	S-IV
24	Crow Pheasant	<i>Centropus sinensis</i>	24	0.11	S-IV
25	Darter Δ	<i>Anhinga rufa</i>	3	0.01	S-IV
26	Golden backed Woodpecker	<i>Dinopium benghalense</i>	3	0.01	S-IV
27	Golden Oriole	<i>Oriolus oriolus</i>	6	0.03	S-IV
28	Gray Tit	<i>Parrus major</i>	6	0.03	S-IV
29	Grey Headed Flycatcher	<i>Culicicapa ceylonensis</i>	11	0.05	S-IV
30	Grey Heron	<i>Ardea cinerea</i>	2	0.01	S-IV
31	Grey Partridge	<i>Francolinu spondicerianus</i>	4	0.02	S-IV
32	Hoopoe	<i>Upupa epops</i>	19	0.08	S-IV
33	House Crow	<i>Corvus splendens</i>	1471	6.5	S-IV
34	House Sparrow	<i>Passer domesticus</i>	695	3.07	S-IV
35	House Swift	<i>Apus affinis</i>	7	0.03	S-IV
36	Indian Pitta	<i>Pitta brachyura</i>	4	0.02	S-IV
37	Indian Robin	<i>Saxicoloides fulicata</i>	10	0.04	S-IV
38	Indian Roller	<i>Coracias benghalensis</i>	8	0.04	S-IV
39	Jungle Babbler	<i>Turdoides striatus</i>	60	0.27	S-IV
40	Jungle Crow	<i>Corvus corax</i>	13	0.06	S-IV
41	Jungle Myna	<i>Acridotheres fuscus</i>	12	0.05	S-IV
42	Large Egret	<i>Ardea alba</i>	120	0.53	S-IV
43	Large Green Barbet	<i>Megalaima zeylanica</i>	3	0.01	S-IV
44	Large Grey Babbler	<i>Turdoides malcolmi</i>	18	0.08	S-IV
45	Large Pied Wagtail	<i>Motacilla maderaspatensis</i>	13	0.06	S-IV
46	Little Brown Dove	<i>Streptopelia senegalensis</i>	2	0.01	S-IV
47	Little Cormorant	<i>Phalacrocorax niger</i>	55	0.24	S-IV
48	Little Egret	<i>Egretta gularis</i>	70	0.31	S-IV
49	Little Grebe	<i>Tachyboptus ruficollis</i>	5	0.02	S-IV
50	Little Green Heron	<i>Ardeola striatus</i>	25	0.11	S-IV
51	Lorikeet	<i>Loriculus vernalis</i>	4	0.02	S-IV
52	Magpie Robin	<i>Copsychus saularis</i>	9	0.04	S-IV
53	Median Egret	<i>Egretta intermedia</i>	47	0.21	S-IV
54	Night Heron	<i>Nycticorax nycticorax</i>	27	0.12	S-IV
55	Openbill Stork	<i>Anastomus oscitan</i>	7	0.03	S-IV

S. No	Common Name	Zoological Name	Number	Percentage	Legal status
56	Paddyfield Warbler	<i>Acrocephalus agricola</i>	10	0.04	S-IV
57	Painted stork Δ	<i>Mycteria leucocephala</i>	290	1.28	S-IV
58	Palm swift	<i>Cypsiurus parvus</i>	115	0.51	S-IV
59	Black Kite	<i>Milvus migrans</i>	60	0.27	S-I
60	Pied Bush Chat	<i>Saxicola caprata</i>	8	0.04	S-IV
61	Pied Kingfisher	<i>Ceryle rudis</i>	62	0.27	S-IV
62	Pond Heron	<i>Ardeola grayii</i>	21	0.09	S-IV
63	Purple Moorhen	<i>Porphyrio porphyrio</i>	3	0.01	S-IV
64	Purple rumped Sunbird	<i>Nectarinia zeylonica</i>	7	0.03	S-IV
65	Purple Sunbird	<i>Nectarinia asiatica</i>	13	0.06	S-IV
66	Racket-Tailed Drongo	<i>Dicrurus paradiseus</i>	3	0.01	S-IV
67	Red-vented Bulbul	<i>Pycnonotus cafer</i>	21	0.09	S-IV
68	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	18	0.08	S-IV
69	Rose ringed Parakeet	<i>Psittacula krameri</i>	626	2.77	S-IV
70	Rosy Pastor	<i>Sturnus roseus</i>	37	0.16	S-IV
71	Scarlet Minivet	<i>Pericrocotus flammeus</i>	4	0.02	S-IV
72	Shama	<i>Copsychus malabaricus</i>	1	0.01	S-IV
73	Shikra	<i>Accipiter badius</i>	3	0.01	S-I
74	Small Blue Kingfisher	<i>Alcedo atthis</i>	13	0.06	S-IV
75	Small green Bee eater	<i>Merops orientalis</i>	9	0.04	S-IV
76	Spoonbill	<i>Platalea leucorodia</i>	11	0.05	S-I
77	Spotted Dove	<i>Streptopelia chinensis</i>	12	0.05	S-IV
78	Spotted Munia	<i>Lonchura punctulata</i>	6	0.03	S-IV
79	Spotted Owllet	<i>Athene brama</i>	13	0.06	S-IV
80	Spottedbilled Pelican #	<i>Pelecanus philippensis</i>	7	0.03	S-IV
81	Tailor Bird	<i>Orthotomus sutorius</i>	5	0.02	S-IV
82	Tickell's Flowerpecker	<i>Dicaeum erythrorhynchos</i>	11	0.05	S-IV
83	Rufous Tree pie	<i>Dendrocitta vagabunda</i>	10	0.04	S-IV
84	White bellied Drongo	<i>Dicrurus leucophaeus</i>	4	0.02	S-IV
85	White breasted Kingfisher	<i>Halcyon smyrnensis</i>	47	0.21	S-IV
86	White breasted water hen	<i>Amaurornis phoenicurus</i>	2	0.01	S-IV
87	White Eye	<i>Zosterops palpebrosus</i>	5	0.02	S-IV
88	White headed Babbler	<i>Turdoides affinis</i>	47	0.21	S-IV
89	White Ibis	<i>Threskiornis aethiopica</i>	6	0.03	S-IV
90	Yellow Wagtail	<i>Motacilla flava</i>	6	0.03	S-IV
<b>Total</b>			<b>22,622</b>		

The herbariums at the Botanical Survey of India, Southern Circle, Coimbatore were consulted for correct botanical identity. After confirming the identity, the herbarium specimens were deposited in the Herbarium of Salim Ali Centre for Ornithology and Natural History, Anaikatty, Coimbatore.

## RESULTS

The study revealed occurrence of 112 *sthalavrikshas* species in Tamil Nadu (Table 1). *Sthalavrikshas* and other plants in temple premises provide suitable foraging and roosting sites to birds. A total of 90 species belonging to 37 avian families were recorded in temples (Table 2). Blue Rock Pigeon

*Columba livia* (Figure 2.a) is the commonest species. 'Raja Gopura' (temple tower above the main entrance), other *gopuras* (towers above the inner entrances) and *Vimana* (tower above the sanctum sanctorum) are the prominent dwelling places of this species, hence it is known as 'Mada Pura' (pigeon living in the chambers of tower). *Sthalavrikshas* form temporary roosting sites for this species. The devotees provide food (cereals) to the birds. Flocks of Blue Rock Pigeon are commonly sighted in the temples of Tamil Nadu (Figure 2.b). For example, 15 Blue rock Pigeon nests in Mahendirapalli, (Figure 2.c) were recorded in corridors, of which 12 were active nests.



**Figure 2.** Birds found in Temples. **a.** Blue Rock Pigeon at Mahendirapalli. **b.** Flocks of Blue Rock Pigeon at Padi, Chennai. **c.** Blue Rock Pigeon Nesting at Mahendirapalli. **d.** Crow peasant Nest at *Sthalavriksha*. **e.** A hanging *Nelsaram* in Temple. **f.** Priest feeding Egyptian Vulture in Thirukazhukundram Temple. **g.** Peacock feeding on the offering in Gangaikondan temple. **h.** Cage to nurse fallen chicks, Thirupudaimaruthur Temple.

House crow *Crovis splendens* and Raven *Crovis corax* are the other common birds nesting in *sthalavrikshas* (Figure 2.d). Several nests were found in Bengal Quince trees, the most common *sthalavriksha* occurred in the temples of the state. Crows being omnivorous and scavengers adapted to live in temples. Waste from *Madapalli* (Kitchen used to prepare deity's food offerings) form their main food source. House Sparrow *Passer domesticus* is yet another common species well adapted to the temple environment. Most of the temples accommodate the nests of this species. Their preferable nest sites in temple premises are the architectural crevices in ceiling and niche in temple pillar top. Temples not only provide nest sites to house sparrows but also offer food in the form of *Nelsaram* (a hanging structure tied up of several full grown paddy plants) (Figure 2.e). Devotees offer this to the deities and after performing *pooja* (worship), the structure used to reversely hang in the temple corridors. After this ritual, devotees start paddy harvest. This is the major food source to house sparrows. It is important to note that the populations of house sparrows elsewhere have come down and concern has been expressed by naturalists. In this context, temple premises would to be the safest place for the house sparrows. Blue winged parakeets and Rose ringed parakeets are also common in the temples. Most of the top layers of the *Raja Gopurams* are occupied by these birds. Wherever *Ficus* species are found in the temples, Rose ringed parakeets could be seen. In Sornamurtheeswarar temple at Kandadevi, a huge Jamun tree *Syzygium cumini* (*sthalavriksha* of the temple) harbour large number (more than 50) of Blue winged parakeets. In Ramasamy temple at Kumbakonam, hole nesting birds such as Blue Rock Pigeon, Common Myna and Rose Ringed parakeets share holes in the tower above the Sanctum Sanctorum.

Common Peafowl *Pavo cristatus* is frequently sighted in Lord Muruga temples. Most of the Muruga temples are situated on the top of hills and hillocks and these sites, mostly dry scrub forests, are native habitat to this species. Peafowl are very common in Viralimalai, Thirumalaikeni, Saravanampatty, Kurunthamalai,

Anuvavi, Muthumalai, Pazhani, Sivanmalai, Kadithamalai, Chennimalai, Kabilarmalai, Vaippamalai, Surulimalai, Vallimalai, Mylam and Maruthamalai, which are lord Muruga's abodes. It is to be noted here that the Peafowl population elsewhere is coming down due to habitat destruction and mass killing by food poisoning. In this context, temples and adjoining localities form the safest place for this species. *Neolamarckia cadamba* in Senchadainathar temples at Thirumalukandankottai and *Tamarindus indica* of Kailasanatahar temple at Gangikondan are used as roosting sites for Peafowls. In these temples, *Prasatham* (deity's food offerings) rice is the main food source to Peafowls. Spotted owlets *Athene brama* dwell in the holes of *sthalavriksha*, *Bambusa arundinacea* in Pasunathar temple at Thirupasur and in the holes of the temple tower at Jotheeswarar temple at Thirumanthurai. These birds very often perch on *sthalavrikshas*.

All ancient temples in Tamil Nadu have their own *Theppakulam* (sacred Tank in temples). These tanks are breeding ground for several fish species. The introduced fish *Thilapia mossambica* is common in most of the temple tanks. These tanks feed Kingfishers, e.g. White-breasted Kingfisher, Pied Kingfisher and Small Blue Kingfisher. It was noticed that the kingfishers found perch on the branches of *sthalavriksha*, before they hunt their food. Paradise Flycatcher (*Terpsiphone paradisi*) found nesting on Tamarind tree, *Tamarindus indica sthalavriksha* tree of the Chinthamaniswarar temple at Vasudevanallur. Most of the ancient temples have their own lands in the form of paddy fields. After harvesting, farmers provide part of the paddy and straw to the temple authorities. Normally, these harvested materials are stored in the temple corridors. These items form the food and nesting materials to the birds.

During the field survey, an interesting observation was found at Thirukalukundram Hill temple (Thiru+Kaluku+Kundram means 'Sacred Vulture Hillock'). Name of the temple town was derived from this connotation. Over a millennium, two Egyptian vultures regularly visit this temple at noon for feeding. The temple priest gives vegetarian food offering of the

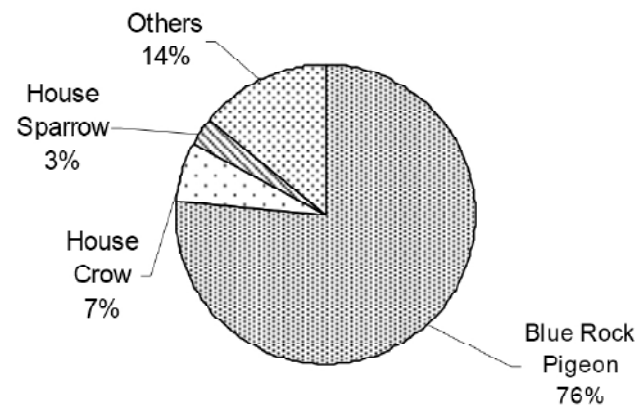


deity to the vultures (Figure 2.f). Saint Gnanasambanthar referred Thirukalukundram in his Devaram hymns in 7<sup>th</sup> century as evidence that the vultures came to the temple during his time. Since last three decades, these vultures come regularly to the temple. The present authors also observed this feeding in 1978. No one knows where the vultures came from and after taking food where they flow away, since the temple is situated near the east coast. Several myths are available about these birds, but only one truth arrived here, Thirukalukundram temple fed two vultures over a millennium. Figure 2.g shows a peacock feeding on the offering in Gangaikondan temple.

A total of 22,622 birds belonging to 90 species and 36 families were recorded in the temple premises. This forms nearly 20% of the bird species recorded in Tamil Nadu by Balasubramanian and Vijayan (2004). Of the 36 avian families recorded in temples, *Muscicapidae* (13 species) is the largest followed by *Ardeidae* (8 species) and *Columbidae* and *Sturnidae* (represented by 4 species each). Three species of birds of prey were also recorded. Thirty eight species were observed feeding on the *sthalavriksha* trees. Nests of 21 species were also recorded. Most of the species are insectivores and few of them are omnivores.

Blue Rock Pigeon (76.32%), followed by House Crow (6.5%) and House sparrow (3.07%) constituted the prominent species (Figure 3). Blue rock pigeon has very well adapted to the temple towers for roosting and nesting. The arches in the temple towers form good asylum for the pigeons and in some places a competition was observed between Blue Rock pigeon and the Barn Owl. While the roosting sites were used by Barn Owls during day hours and the pigeons used them during night hours. The temple towers are very cool and dark and provide a suitable environment for nocturnal animals.

House crow is one of the most common birds recorded in 288 temples. House sparrows were recorded in many of the temples (16%). Common myna and Rose-ringed Parakeet used *sthalavrikshas* for nesting. Devotees offer nine different cereals to the statues of *Navaghrahas* (nine planets) as routine



**Figure 3.** Dominant bird species recorded in *Sthalavrikshas* and temples.

**Table 3.** Bird nests recorded on *Terminalia arjuna*.

S. No.	Birds	Scientific name	Number of nests
1	Painted Stark	<i>Mycteria leucocephala</i>	127
2	Large Egret	<i>Ardea alba</i>	70
3	Little Cormorant	<i>Phalacrocorax niger</i>	34
4	Median Egret	<i>Egretta intermedia</i>	21
5	Little Egret	<i>Egretta garzetta</i>	7
6	Pond Heron	<i>Ardeola grayii</i>	12
7	Green Heron	<i>Ardeola striatus</i>	9
8	Night Heron	<i>Nycticorax nycticorax</i>	11

worship. These grains form major food for pigeons, sparrows and mynas. Temples and the *sthalavrikshas* were used by various birds and other animals and thus offer a suitable environment for these animals.

### NARUMPOONATHAR TEMPLE, THIRUPUDAIMARUTHUR—A BIRD SANCTUARY

Narumponathar temple in Tirunelveli District is situated on the eastern banks of Thamirabarani River. *Terminalia arjuna* is the *sthalavriksha* of this temple and the village Thirupudaimaruthur is suitably named after *T. arjuna*. The Thirupudaimaruthur temple and its adjacent portion form bird sanctuary spreads in an area of 10 hectares. This proposed sanctuary is home for several water birds which are protected by local people. A total of 76 bird species are recorded here. Several birds were found nesting on *Terminalia arjuna* trees. A total of 291 nests of various birds were recorded here (Table 3).

White Ibis, Black Ibis, Spoonbill, Openbill Stork are some of the common birds seen around this temple. A separate cage is also maintained in the temple premises to nurture the chicks that fall down from the *sthalavrikshas* and other trees (Figure 2.h). Temple tank and Thamirabarani River form the foraging sites for the birds. Local people have lot of concern for conserving this site and avoid burning crackers during festivals.

### DISCUSSION

No previous record is available on the association of bird life with *sthalavrikshas* and very few documents were available on birds association with temples. Neelanarayanan (2007) referred the nesting activities of Barn owls in six temples of Cauvery delta region. Of the 454 species of birds recorded in the state (Balasubramanian & Vijayan 2004), 90 species (about 20%) could be recorded from the temples of Tamil Nadu during the present study. Of these, one species (Blue winged Parakeet) found in temples is endemic to Western Ghats. Three globally threatened species, e.g. Spotted billed Pelican, Painted stork and Darter, also occur in temples. All the 90 species, recorded from temples, are protected by Wildlife Protection Act 1972; six of these species belong to Schedule I and 84 species belong to Schedule IV. Nesting of water birds in temple campus is an interesting observation. A total of 21 bird species are found nesting in *sthalavrikshas* and temples. Occurrences of House sparrow and Pea fowl that are declining in the wild have conservation implication. Temple acts as traditional granary for several centuries. Harvested grains and paddy straw of the temple lands are stored in the temples. These food and nesting materials attract birds to the temples. Besides, the temples act as a safe abode compared to other habitats resulting in the occurrence of a huge number of birds and bird's nests found in *sthalavrikshas* and temples.

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### REFERENCES

- Ali S. & Ripley D.S. 1989. Compact Handbook of the Birds of India and Pakistan, Oxford Univ. Press, Delhi.
- Amirthalingam M. 1998. Sacred trees of Tamil Nadu, C.P.R. Environmental Education Centre, Chennai: 1–316.
- Aravanan K.P. 1984. Mara Vazhipadu Dravida Africa Opidu, Paari Nilayam, Chennai: 1–75.
- Balasubramanian P. & Vijayan L. 2004. Conservation strategies and Action plan for the avifauna of Tamil Nadu, Annamalai. R. (Editor) – Tamil Nadu Biodiversity Strategy and Action Plan: Chordate Diversity, Tamil Nadu Forest Department, Chennai: 77–99.
- Gamble J.S. 1915–1936. Flora of the Presidency of Madras, Vol. 1–3, Bishen Singh Mahendra Pal Singh, Dehradun: 1–2010.
- Gunasekaran M. & Balasubramanian P. 2005. *Sthalavriksha* worship—A tool in Plant Conservation in Tamil Nadu. In: Kunhikannan C. & Singh G. (Editors) – Proceedings of National Strategy for Conservation of Sacred Groves, Institute of Forest Genetics and Tree Breeding, Coimbatore: 163–166.
- Gunasekaran M & Balasubramanian P. 2010. Taxonomic enumeration and economic values of *Sthalavrikshas* (temple trees) in Tamil Nadu and Puducherry, southern India. Journal of Economic & Taxonomic Botany 34(4): 769–776.
- Gunasekaran M. & Balasubramanian P. 2012. Ethnomedicinal uses of *Sthalavrikshas* (temple trees) in Tamil Nadu, southern India. Ethnobotany Research & Applications 10: 253–268
- Gunasekaran M. & Balasubramanian P. 2016. *Sthalavrikshas* (temple trees): the indicator species for remnant flora of Tamil Nadu, India. Geophytology 46(1): 25–32.
- Henry A.N., Chitra V. & Balakrishnan N.P. 1989. Flora of Tamil Nadu, India. 3. Botanical Survey of India, Coimbatore: 1–171.
- Henry A.N., Kumari G.R. & Chitra V. 1987. Flora of Tamil Nadu, India. 2. Botanical Survey of India, Coimbatore: 1–258.
- Nair N.C. & Henry A.N. 1983. Flora of Tamil Nadu, India. 1. Botanical Survey of India, Coimbatore: 1–184.
- Neelanarayanan P. 2007. Diet of Barn Owl *Tyto alba stertens* Hartert 1929 in a portion of Cauvery Delta, Tamil Nadu, India. Zoos' Print journal 22(8): 2777–2781.
- Rekka R., Nirubama Kumar, Suganya B., Rubavathigokila M. & Felix D. 2021. Sacred Groves—An ancient tradition of nature conservation of *Sthalavrikshas* in Coimbatore, Tamil Nadu, India. Kongunadu Research Journal 8(2): 1–7.
- Samy B.G.L. 1978. Sources for a history of plant science in India, part IV. "Temple-Plants A Reconnaissance in Transactions of the Archaeological Society of South India, 1965–68, The Archaeological Society of South India, Govt. Museum, Madras: 23–62.
- Sobitharaj S.K.K. 1994. Thalamarangal, Sobitham, Chennai: 1–86.
- Thiruganam S. 1995. Thirukoil Marangalin Maruthuva Payangal, Selvi Pathipagam, Thiruchi: 1–91.