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Cover: Emperor Tamarin *Saguinus imperator*: a look into a better world through the mustache lens – mixed media illustration. © Maya Santhanakrishnan.

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ARTICLE

Nesting habits of Baya Weaver *Ploceus philippinus* (Linnaeus, 1766) on power and television cables in the agricultural landscape of Kallakurichi district, Tamil Nadu, India

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Abstract: The nesting habits of Baya Weaver *Ploceus philippinus* with nesting site (e.g., power and television cables), source of nest materials, various developmental stages of nests, abnormal nests, number of individuals and their association with other bird species, and threats to their nests were studied between March and September 2021 in the agrarian landscapes of 42 villages in Kallakurichi District, Tamil Nadu. A total of 155 nest colonies containing 1,725 nests of various developmental stages and 1,993 adult birds were counted on power/television cables. The number of nests per colony found varied from one to 57. The average number of nests per colony was eleven. Baya Weaver had preferred power/television cables as nesting sites in the study area in spite of availability of potential nest-supporting trees, such as *Cocos nucifera* and *Borassus flabellifer* within 500 m radii from cables bearing nests. Birds used fibres of sugarcane leaves (*Saccharum officinarum*) for the construction of nests. Out of 778 helmet stage nests observed, 90% (n = 716) helmet stage nests had clay deposits on their inner walls and no clay deposits were found in the remaining 10% (n = 62) helmet stage nests. Eleven types of abnormal nests constituted 17% (n = 286) of the total nests. Sixteen other bird species (e.g., birds of order: Passeriformes, Coraciiformes, Piciformes, Cuculiformes and Columbiformes) were found associated with the individuals of Baya Weaver. These bird species strictly shared similar roosting and foraging grounds. The avian predators such as House Crow *Corvus splendens*, Large-billed Crow *Corvus macrorhynchos*, Black Drongo *Dicrurus macrocercus*, Rufous Treepie *Dendrocitta vagabunda*, Coucal *Centropus senegalensis*, and Shikra *Accipiter badius* had damaged the nests, eggs and chicks. The study revealed that about 1.1% nests (n = 197) were probably damaged by these avian predators. Power cables in the study sites had provided suitable nesting sites for Baya Weavers. The causes for utilization of power cables as nesting sites in larger geographical areas require further studies.

Keywords: Abnormal nests, associated birds, clay deposits, communal roosting, nest material, nest predation, threats.

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INTRODUCTION

Baya Weaver *Ploceus philippinus* (Linnaeus, 1766) (Aves: Passeriformes: Ploceidae) is a gregarious, social, polygamous, colonial nester and they are commonly distributed in the Indian subcontinent (Ali et al. 1956), Java, Malacca, and Sumatra (Blyth 1845; Wood 1926), Nepal, China, Indonesia, Laos, Myanmar, Singapore, Thailand, and Vietnam (BirdLife International 2016). Several authors have studied the breeding biology (Ali 1931; Ali et al. 1956; Ambedkar 1964; Mathew 1976) and abnormal nesting behaviours of this bird in India (Ambedkar 1964; Crook 1964; Sharma 1989; Pandian & Natarajan 2018; Pandian 2021). Baya Weavers used leaf fibres of Indian Date Palm *Phoenix sylvestris* and Sugarcane *Saccharum officinarum* as nest materials for construction of nests (Pandian 2021, 2023). Nests of Baya Weavers were found attached to telegraph wires running through sugarcane fields along the Chittoor-Chandragiri routes (Kirkpatrick 1952), Kumaon Terai region, Uttarakhand (Ambedkar 1969), Assam and Tamil Nadu (Davis 1976), and Mysore-Bangalore-Chennai regions (Subramanya 1982). Incidents of Rufous Treepie *Dendrocitta vagabunda* damaging nests and anthropogenic factors causing damages to nests and nest-supporting trees were recorded in Vellore and Viluppuram districts, Tamil Nadu (Pandian 2021, 2023). The IUCN Red List of Threatened Species has classified Baya Weaver under 'Least Concern' (LC) (Birdlife International 2016) category.

In this paper, I sought answers to questions relating to choice of power cables for nest construction by Baya Weaver with specific reference to Kallakurichi District, Tamil Nadu. The following were the objectives of the study: (1) extent and pattern of selection of cables for nesting, (2) preference of cables and proportions of selection of potential nest-supporting trees for construction of nests, (3) features of nest building including sources of nesting material, stages of nest developments, plastering of clay on inner walls, and abnormal nests with variations, (4) association with other bird species, and (5) threats faced by the nest colonies. Detailed studies on the constructions of nests on power cables in Tamil Nadu are still scarce. Hence the present study was carried out to fill this gap.

MATERIALS AND METHODS

Study Area

The present study was carried out in 42 villages in Ulundurpet and Kallakurichi taluks, Kallakkurichi District of northeastern Tamil Nadu. The district spreads over c. 3,530 km^2, with a human population of c. 13,40,000 (Census 2011) (Kallakurichi 2021). Agriculture is the primary occupation of the people. The major crops of the area are paddy *Oryza sativa*, sugarcane, followed by Jowar Sorghum *bicolor*, Pearl Millet *Pennisetum glaucum*, Finger Millet *Eleusine coracana*, Groundnut *Arachis hypogaea*, Green Gram *Vigna radiata*, and Tapioca *Mannihot utilisimma*. The practices of monoculture of Casuarina *Casuarina equisetifolia* are very common in the district. Flower and vegetable cultivations also occur. The maximum and minimum temperatures in the districts are 36°C and 20°C, respectively. The average annual rainfall is 1,060 mm (Kallakurichi 2021) (Figure 1).

Methods

With help from three field assistants, I identified 42 villages having definite nesting habitats of Baya Weaver on overhead power transmission cables in the cultivating lands in Kallakurichi District, Tamil Nadu. No particular sampling method was adopted, as I followed the entire area census covering all the arable lands in 42 villages in the district. The nests attached to the power cables and television cables between two poles and nests attached to service cables between electric poles and motor pump sets were considered a single nest colony. These nesting colonies were surveyed on daily basis covering six villages per day by each field assistant when the birds were found active from 0600 h to 1200 h and 1500 h to 1800 h between March and September 2021. Each nest colony was viewed daily continuously for one hour and recorded number of nests, progress on nest constructions (nesting developments), male birds plucking of fibres and carrying clay, and sighting of predators in the vicinity of nest colonies. The heights of the cables from the ground were ascertained from the data provided on power transmission poles while heights between overhanging nests and sugarcane crops, and the distance between the overhanging nests over the bunds were measured using a dried bamboo stick. Then the length was converted to standard scales of measurement. The sources of nesting materials was identified by observing the birds which plucked and carried fibres from nearby sugarcane leaves to the nesting sites and analysing six fallen and 15 damaged nests. The types of cultivating crops underneath the overhanging power cables were

recorded. The locations of all the cables that bore nest colonies were determined using GPS (Gramin Etrex 20x). The nests, their developmental stages, and deposits of clay on the inner walls of helmet stage nests were observed by using field binoculars (Super Zenith 20 x 50). In the completed nests, the clay deposits were studied by dissecting the fallen nests. The nest damages by avian predators and other factors were observed by binoculars. According to Sharma (1995), abnormal nest is defined as abnormality in structure of nest or any part of it due to duplication of part (s) or/and formation of additional part (s) or/and elaboration of nests or/and abolition of normal parts. All the abnormal nests built on power cables were photographed and classified based on the guidelines of Sharma (1995). Type of birds associated with Baya Weaver during perching/roosting, foraging, and nest predation by avian predators were observed by using binoculars, without disturbing nests

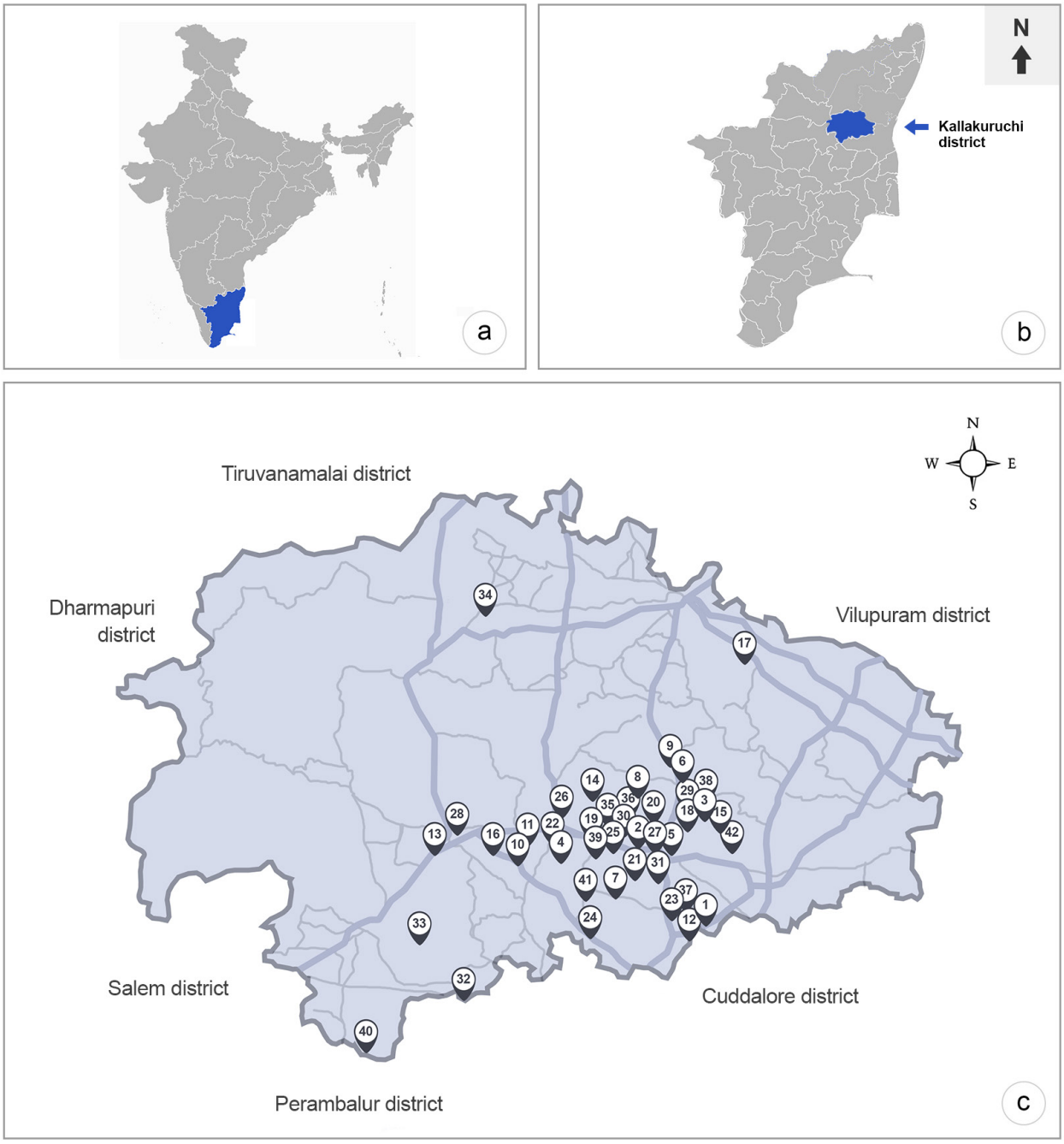

Figure 1. Study area map: a—India map showing Tamil Nadu | b—Tamil Nadu map showing Kallakurichi District | c—Kallakurichi District map showing locations of 42 villages containing nest colonies (Names of villages with GPS coordinates are furnished in Table 1).

and their residents. Each nest colony was observed uninterruptedly for 60 min and the maximum number of birds observed in that colony was counted. Two types of nest-supporting palms trees (*Cocos nucifera* and *Borassus flabellifer*) present in the area of 500 m radii around the cables containing nests were completely checked for the presence of nests. Out of the total such nest-supporting trees observed, the proportion of trees preferred by Baya Weaver for nesting and the proportion of trees that were not preferred by the birds for nesting was also taken into account. The distance between nest colonies and the nearest buildings/ human settlements and roads were measured using measurement tape. No nesting activities on these trees were studied in detail except enumerating the number of nesting and non-nesting trees. Utmost care was taken not to disturb the nests or birds and we maintained a minimum distance of c. 30 m during observations. Number of live nests, eggs, chicks and adult birds were neither disturbed nor handled during the study period. Nikon P 1000 digital camera was used for photography. Collected data were tabulated, analysed using SPSS (Statistical Package for Social Sciences) version 25.0 software and shown as graphical representation. The relationship between proximity of roads, buildings, human settlement and selection of cables by Baya Weavers for construction of nests were also analysed.

RESULTS

A group of males with breeding plumage started to carry fibres from sugarcane leaves and plaited knots on power/television cables during third week of May 2021 in the study sites. A total of 1,725 nests of various developmental stages and 1,993 adult birds were enumerated on 155 nest colonies attached to cables. The average number of nests in each colony ranged from one to 57. In all the sites (n = 155), the nesting cables were found overhanging sugarcane crops and no cable bearing nests was found overhanging other crops (Table 1).

Preference of power/ television cables for construction of nests

The study revealed that within 500 m radii from the cables bearing nest colonies, there were 2,919 potential nest-supporting trees, such as *Cocos nucifera* (n = 2541) and *Borassus flabellifer* (n = 378) in 42 villages. Individuals of Baya Weaver utilized only 1.5% (n = 41) of the total trees for construction of nests. That is, out of 2541 *C. nucifera* trees, the birds constructed nests on 25 trees and out of 378 *B. flabellifer* trees, the birds constructed nests on 20 trees alone. Proportionately, the birds preferred more number of *B. flabellifer* trees than *C. nucifera* trees for construction of nests. No nests of Baya Weavers were found on the remaining 98.5% of potential nest-supporting trees (n = 2874) of those two palm species (Arecaceae).

Type of nesting substrata

The study revealed that overhead power transmission aluminium cables bore 80% nests (n = 1,375) and 80% birds. Another 11% nests (n = 217) and 12% birds (n = 238) were reported on television cables passing over crop fields and the remaining 9% nests (n = 133) and 8% birds (n = 159) occurred on service cables connected between electric poles and motor pump sets. The study revealed that out of 1,375 nests enumerated on overhead power transmission aluminium cables, 17.8% nests (n = 245) were found attached to places/ junctures where aluminium cables and reel insulators were connected. In one instance, the birds plaited knots by joining aluminium cable and the stem of a climber *Cocculus carolinus* (Menispermaceae) in Emam village (11.729701°N & 79.242676°E) (Image 1a). The stalks of all the nests (n = 217) were found attached to the places where television cables and supporting strings/rings joined together. Similarly the stalks of all the nests (n = 133) enumerated on pump set service wires were found attached to multiple cables or at the junctures of cables and reel insulators (Image 1).

Preference of Baya Weaver in building nests on cables occurring close to human dwellings

The study also tested the relationship between proximity of roads, buildings, human settlement and selection of cables by Baya Weavers for construction of nests. Cables bore 62.5% nests (n = 1,078) occurred within 100 m radius from constructed structures such as cattle sheds, motor-pump sheds, isolated human dwellings or buildings in crop fields (Figure 2). Cables bore 61.4% nests (n = 1,059) occurred within 100 m distance from the nearest roads. The males select apparently those cables found adjacent to roads with busy vehicular traffic and movement of general public to build nests (Figure 3). Cables bore 32 % nests (n = 551) occurred within 200 m distance from human settlements and the birds even built nests on power cables occurring 20 m from human settlements (Figure 4).

Table 1. Details of villages, GPS coordinates, nest colonies, number of nests of Baya Weaver, developmental stages of nests, and number of birds in the study area (as on 2nd week of September 2021).

	Name of the village	GPS coordinates	Total no of nest colonies	Total no. of nests	Developmental stages of nests						Total no. of birds
					Wad stage	Ring stage	Helmet stage	Egg-chamber closed stage	Complete nests	Abnormal nests	
1	A. Mazhavarayanur	11.641323°N–79.207476°E	1	1	0	1	0	0	0	0	1
2	Alangiri	11.720209°N–79.143198°E	1	23	0	0	12	0	3	8	26
3	Anganur	11.742198°N–79.218901°E	3	46	2	2	26	7	4	5	55
4	Chithalur	11.675684°N–79.077867°E	1	24	0	1	12	0	10	1	30
5	Elavanasoorkottai	11.717443°N–79.174617°E	8	133	1	7	57	24	23	21	130
6	Eraiyur	11.775540°N–79.194864°E	1	6	0	0	6	0	0	0	6
7	Gudiyanallur	11.675005°N–79.115207°E	3	13	0	0	11	2	0	0	68
8	K.Kunjaram	11.763302°N–79.176961°E	4	108	12	0	53	9	16	18	101
9	Keezha palayam	11.702912°N–79.193709°E	2	53	0	0	28	3	16	6	64
10	Kurur	11.714977°N–79.035672°E	2	8	0	0	7	0	0	1	15
11	Madur	11.734778°N–79.015647°E	2	53	2	7	28	0	5	11	70
12	Mavidandhal	11.622296°N–79.219110°E	1	11	0	0	10	1	0	0	12
13	Moolasamudhiram	11.703817°N–79.266068°E	3	15	0	1	10	3	0	1	18
14	Mugamathiyarpettai	11.613614°N–79.126747°E	1	1	0	0	1	0	0	0	1
15	Nathakali	11.720346°N–79.242060°E	1	2	0	0	2	0	0	0	4
16	Niraimathi	11.727576°N–79.015314°E	2	24	1	4	9	0	0	10	22
17	P. Konalavadi	11.720749°N–79.266429°E	2	9	0	0	5	2	0	2	10
18	P. Malaiyanoor	11.689187°N–79.215930°E	1	23	0	1	19	0	0	3	38
19	Periyamambattu	11.730288°N–79.107724°E	3	26	0	1	19	4	2	0	30
20	Pinnalavadi	11.746075°N–79.140752°E	1	20	2	3	8	0	4	3	31
21	Poraiyur	11.694635°N–79.147242°E	10	149	1	0	79	7	22	40	153
22	Prithivimangalam	11.736117°N–79.062063°E	2	22	2	1	10	5	2	2	30
23	Pudhukeni	11.656788°N–79.178831°E	2	9	0	0	9	0	0	0	18
24	Pudu Uchimedu	11.627965°N–79.109939°E	2	45	0	0	8	6	24	7	63
25	Ravuthanayankuppam	11.684929°N–79.267855°E	3	13	0	0	8	2	2	1	17
26	Rottumangalam	11.71844°N–79.153619°E	1	8	0	0	4	2	0	2	6
27	Saalapakkam	11.723739°N–79.156647°E	4	19	2	1	15	0	0	1	18
28	Seevamangalam	11.660459°N–79.170434°E	3	86	0	1	65	3	7	10	23
29	Sembatta malayanoor	11.757158°N–79.218858°E	7	78	8	2	41	8	8	11	90
30	Sembimadevi	11.719075°N–79.160805°E	5	43	3	0	29	0	5	6	60
31	Sirunagalur	11.679898°N–79.157217°E	4	19	0	1	18	0	0	0	19
32	Sirupakkam	11.712586°N–79.225664°E	1	30	6	1	14	0	2	7	48
33	Siruvathur	11.678482°N–79.204069°E	4	20	0	0	17	0	0	3	20
34	Thakka	11.704111°N–79.267421°E	1	4	0	0	3	1	0	0	4
35	Thenerikuppam	11.145194°N–79.138345°E	9	65	4	3	38	0	9	11	64
36	Thimmalai	11.730138°N–79.123026°E	16	216	6	4	110	8	50	38	262
37	Tiruppeyar	11.648811°N–79.200328°E	2	4	0	0	4	0	0	0	5
38	Vadakurumboor	11.774587°N–79.213622°E	2	10	0	0	7	2	0	1	11
39	Vazhavandankuppam	11.724222°N–79.124699°E	8	69	0	1	46	8	4	10	94
40	Vellaiyur	11.722458°N–79.241880°E	22	198	6	1	99	18	29	45	237
41	Vengaivaadi	11.679030°N–79.095074°E	1	7	2	4	1	0	0	0	7
42	Emam	11.736110°N–79.243968°E	3	12	1	0	10	0	0	1	12
Total			**155**	**1725**	**61**	**48**	**958**	**125**	**247**	**286**	**1993**

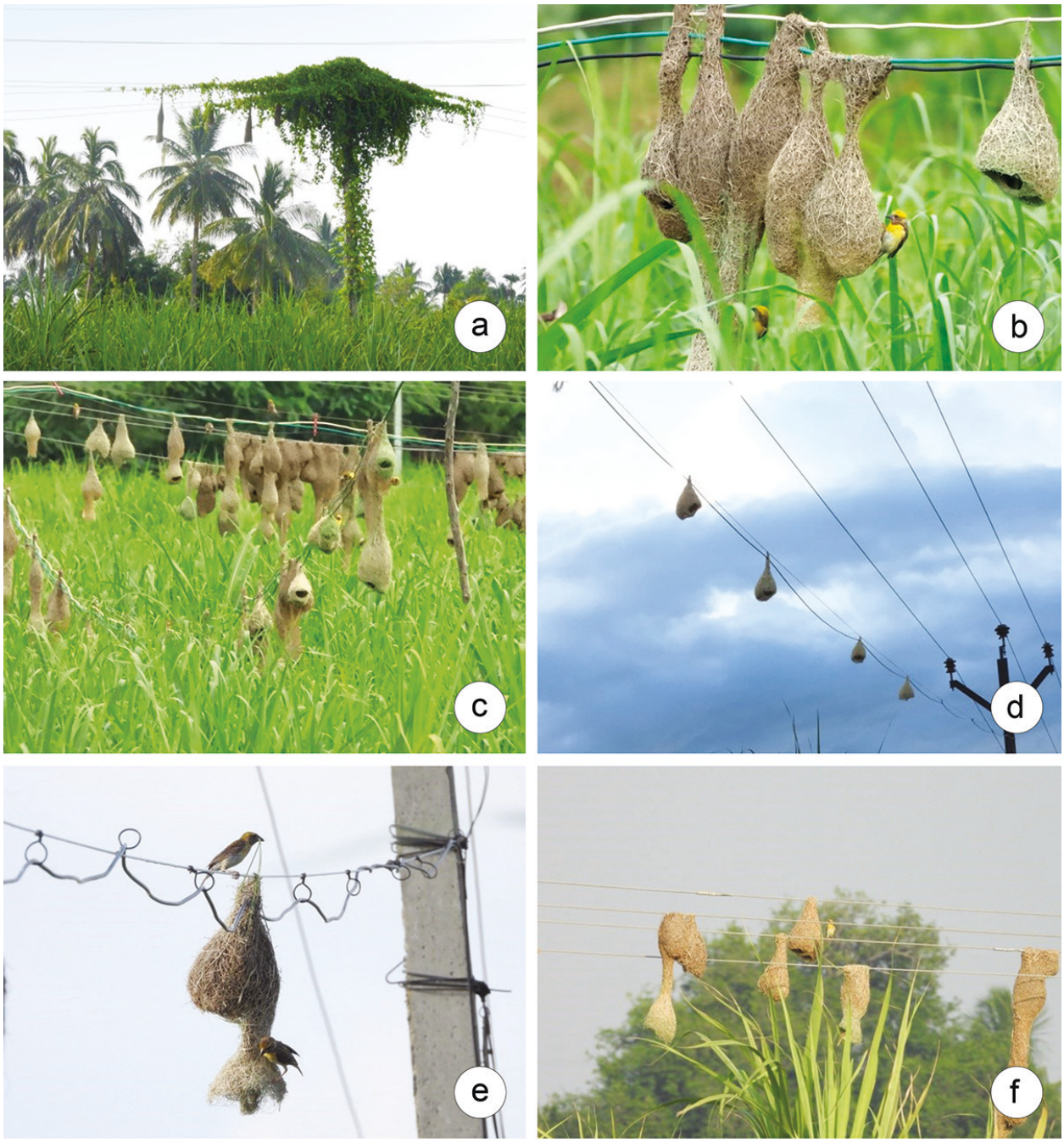

Image 1. Pictures showing overhanging nest colonies: a—Climber *Cocculus carolinus* spread over electric pole and cables and nests attached to power cable and climber | b—Nests attached to power cables overhanging harvested sugarcane field, (c) Nests attached to multiple service cables leading to motor pump sets | d—Nests attached at joints of television cable and supporting string | e—Nest attached to television cable and supporting string | f—Nests attached to joints of power cable and reel insulators. © M. Pandian.

Crops occurred close to nest colonies

Even though cables bearing nest colonies directly overhanging sugarcane crops, 63% nests (n = 1,086) and 67% birds (n = 1,276) occurred within 200 m distance from paddy crops. Another 37% nests (n = 639) and 33% birds (n = 640) occurred within 250 m distance from paddy and millet crops, such as pearl millet, finger millet, sorghum, and foxtail millet. Hence, all the cables bearing nests occurred within 250 m distance from grain and millet crops. It indicated that the Baya Weavers preferred their nesting sites close to grain crops.

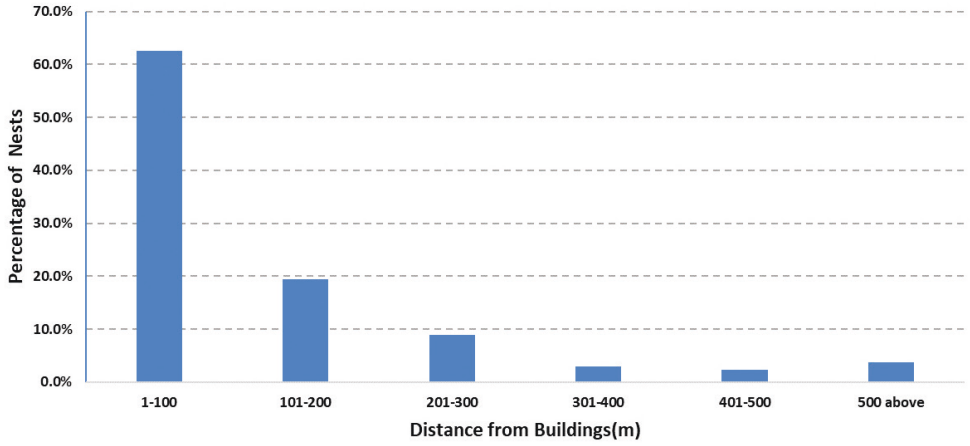

Figure 2. The distance between the nearest buildings and cables bearing nest colonies.

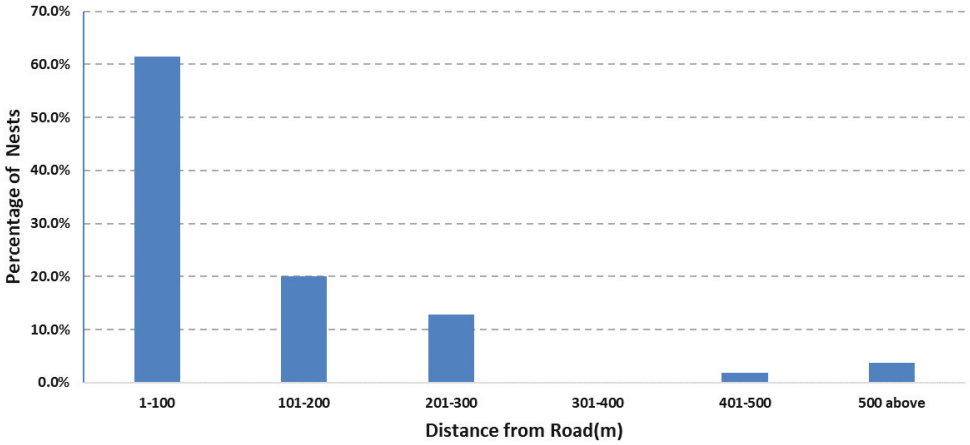

Figure 3. The distance between the nearest roads and cables bearing nest colonies.

Crop bunds

The study on the relationship between the distance of nest colonies (n = 155) with bunds in the crop fields were as follows: two nest colonies were found directly overhanging bunds; 21 colonies were found 1–2 m away from the bunds; 68 colonies at 3–4 m distance; 43 colonies at 5–6 m; 21 colonies at >6 m. The study revealed that only 1.3% nest colonies (n = 2) were found directly overhanging crop bunds and the remaining 98.7% nest colonies (n = 153) were found away from bunds and overhanging sugarcane crops.

Source of fibres

Study on the source of nest materials revealed that male Baya Weaver used leaves of Sugarcane *Saccharum officinarum* as nesting materials.

Stages of nest constructions

A total of 1,725 nests observed at the end of the breeding period (2nd week of November 2021) that included: wad stage nests–3.5% (n = 61), Ring stage–2.8% (n = 48), helmet stage nests–55.5% (n = 958), egg-chamber closed stage nests–7.2% (n = 125), complete nests–14.3% (n = 247), and abnormal nests–16.6% (n = 286). An average of 11 nests per colony was found in the study area (Figure 5).

Nest colonies

The number of nests in each nest colony varied: 63.8% of nest colonies (n = 99) bore nests ranged between 1–10. These include 13 nest colonies contained solitary nests, whereas 17.5% of nest colonies (n = 21) bore 11–20 nests, 10.3% nest colonies (n = 16) bore 21–30 nests, 5.2% (n = 8) colonies bore 31–40 nests. The remaining 3.2% nest colonies (n = 5) contained 41–57

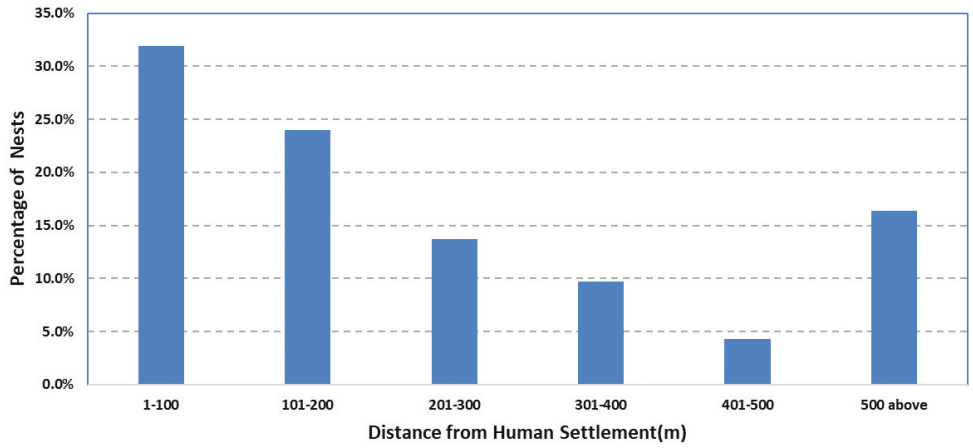

Figure 4. The distance between the nearest human settlement and cables bearing nest colonies.

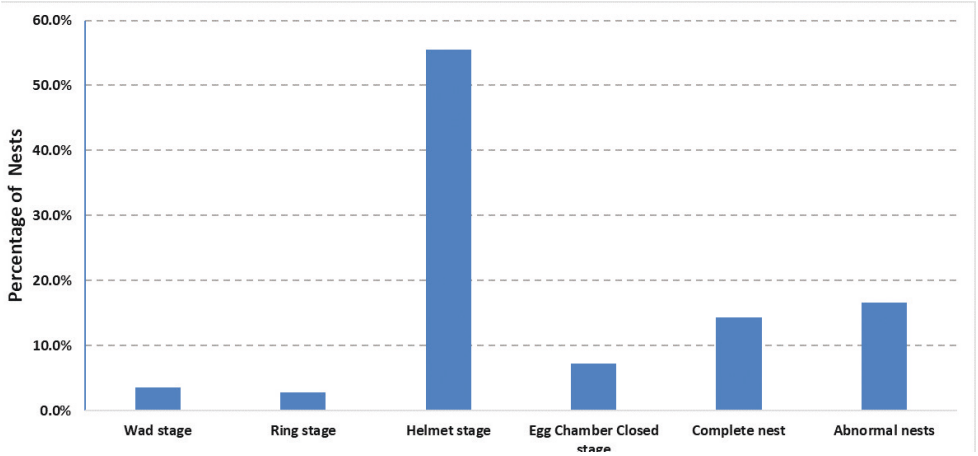

Figure 5. Details of various developmental stages of nests of Baya Weaver counted in the study area.

nests. The average number of nests per colony was 11. The heights between the overhanging nest colonies and the tip of sugarcane crops were found varied 1–2.5 m. However, nests of 27 colonies were found directly touching the sugarcane crops.

Abnormal nests

Abnormal nests constituted 17% (n = 286) of the total nests (n = 1,725) with 11 types of variations: 55% (n = 156) abnormal nests belonged to 1+1/2 storeyed type, followed by 16% (n = 46) mixed abnormal types, 8% (n = 23) 1+1 storeyed type, 7% (n = 21) chain storeyed type, 5% (n = 14) ½+½ storeyed, 5% (n = 14) fused nests, and 2% (n = 6) multi-stalked type. The remaining four nests (2%) constituted: two nests were bell-jar shaped and one was meshed type and another nest contained three openings.

Deposition of clay in the nests

The study on 778 helmet stage nests using binoculars revealed that clay deposits were found in 90% (n = 716) nests and no such clay deposit was observed in the remaining 10% helmet stage nests (n = 62). Exceptionally the birds plastered the entire outer walls of 42 completed nests with wet clay. The examination of six fallen nests of such category reveals that spaces between interwoven fibres were completely filled with clay and the nests resembled unfired wet clay pots (Image 3).

Associated birds

The study revealed that 16 other bird species were found associated with Baya Weaver during perching/roosting on power cables, sugarcane crops, *Prosopis juliflora* trees and while foraging on grain/millet crops. Of them only three other bird species have shared common foraging grounds. No antagonistic behaviours

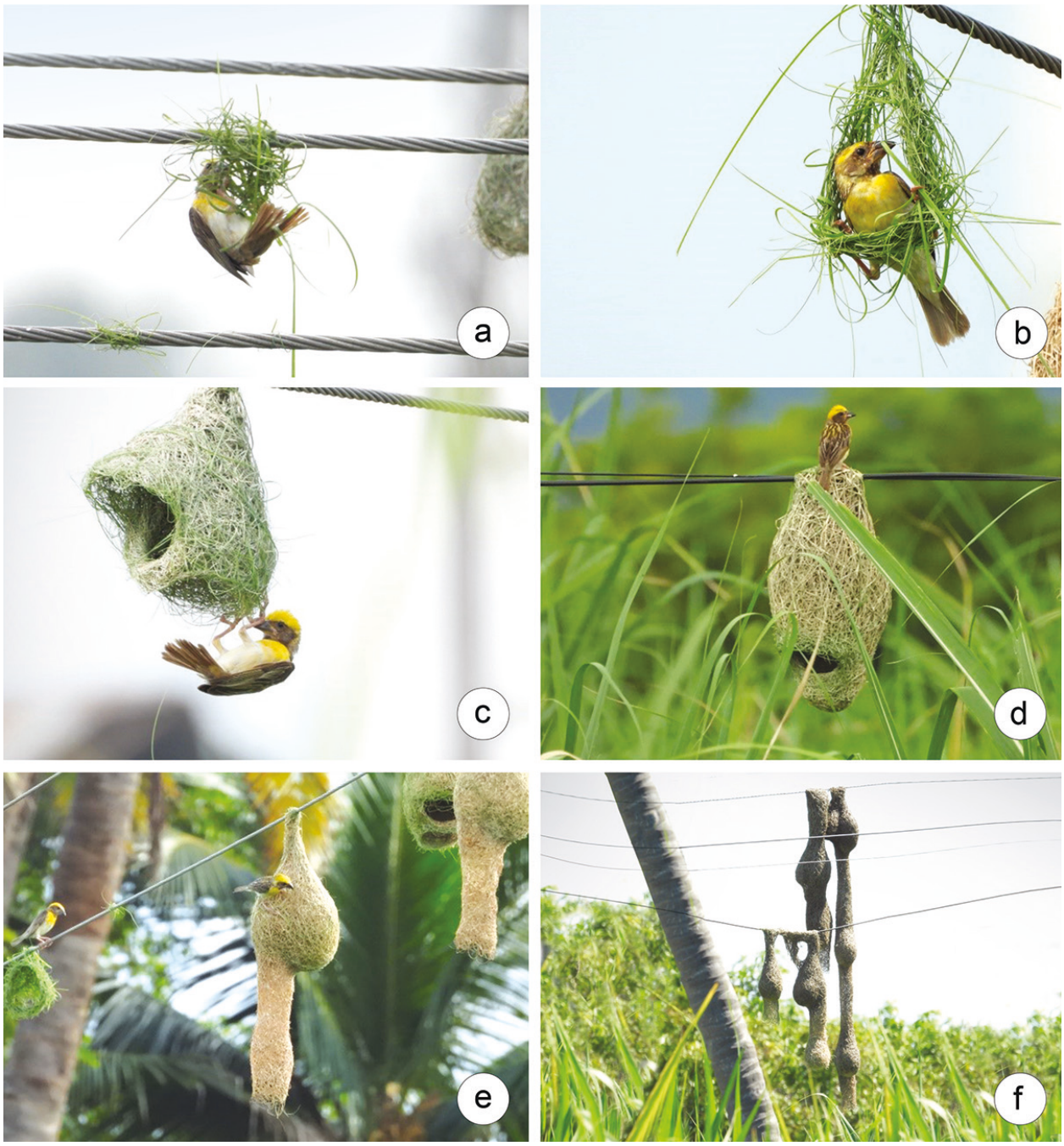

Image 2. Images showing various stages of nest developments: a—Wad stage nest | b—Ring stage nest | c—Helmet stage | d—Egg-chamber closed stage | e—Complete nest | f—Abnormal nests. © M. Pandian.

were observed between them over sharing of common perching/roosting and foraging sites. All the bird species had followed mixed communal roosting behaviours. Apart from that four pairs of Indian Silverbill *Euodice malabarica* had occupied complete nests (n = 4) of Baya Weaver, but it was not possible to ascertain whether they occupied the abandoned nests or usurped the nests of the latter (Table 2; Image 4).

Nest predation

Six avian predators were observed in the proximity of nesting colonies. Incidents of nest predation by Rufous Treepie *Dendrocitta vagabunda* (24) and Coucal *Centropus senegalensis* (12) were recorded. A total of 197 nests (egg-chamber closed stage 55; complete nests 82; and abnormal nests 60) were observed in a damaged condition by having circular holes near egg-chambers or

Table 2. Details of other bird species found associated with Baya Weaver during perching/roosting and foraging in the study area.

	Name/common name of the bird	Binomial	Total no. roosting with Baya Weaver	Total no. of foraging with Baya Weaver
1	Common Myna	*Acridotheres tristis* (Linnaeus, 1766)	35	0
2	Common Babbler	*Argya caudata* (Dumont, 1823)	26	02
3	Indian Silverbill	*Euodice malabarica* (Linnaeus,1758)	70	07
4	White-rumped Munia	*Lonchura striata* (Linnaeus, 1766)	63	13
5	Re-vented Bulbul	*Pycnonotus cafer* (Linnaeus, 1766)	11	0
6	Red-whiskered Bulbul	*Pycnonotus jacosus* (Linnaeus,1758)	08	0
7	Coppersmith Barbet	*Psilopogon haemacephalus* (Statius Muller, 1776)	13	0
8	Pied Bush Chat	*Saxicola caprata* (Linnaeus, 1766)	23	0
9	Grey-breasted Prinia	*Prinia hodgsonii* (Blyth, 1844)	42	0
10	Long-tailed Shrike	*Lanius schach* (Linnaeus, 1758)	06	0
11	Pied Cuckoo	*Clamator jacobinus* (Boddaert,1783)	17	0
12	Asian Green Bee-eater	*Merops orientalis* (Latham, 1801)	85	0
13	Spotted Dove	*Spilopelia chinensis* (Scopoli, 1768)	06	0
14	Black Drongo	*Dicrurus macrocercus* (Vieillot, 1817)	127	0
15	Common Kingfisher	*Alcedo atthis* (Linnaeus, 1758)	42	0
16	Indian Roller	*Coracias benghalensis* (Linnaeus,1758)	35	0
		Total	609	22

Table 3. Details of sightings of avian predators and their impact on the nesting colony in the study area.

	Name of the predator	Binomial	No. of sightings noted	Damages caused to nests
1	House Crow	*Corvus splendens* (Vieillot, 1817)	12	2
2	Large-billed Crow	*Corvus macrorhynchos* (Wagler, 1827)	8	1
3	Coucal	*Centropus senegalensis* (Linnaeus, 1766)	15	12
4	Black Drongo	*Dicrurus macrocercus* (Vieillot, 1817)	127	4
5	Shikra	*Accipiter badius* (Gmelin, 1788)	5	2
6	Rufous Treepie	*Dendrocitta vagabunda* (Latham, 1790)	34	26
	Total		201	47

torn the nests (Table 3; Image 5). The study revealed that out of 1,725 nests recorded, about 1.1% nests (n = 197) were probably damaged by the avian predators.

Nest damages by fire

In one of the nesting sites in Poraiyur village (11.6946^{0}N—79.1472^{0}E), an incident of c.300 sq.km area of sugarcane crop below the power cables bearing nests were gutted to fire probably due to scratching of moit nests after rainfall. In that fire accident, all the nests overhanging the sugarcane crop were burnt. It was not possible to ascertain the number of nests gutted to fire. The accidental fire occurred probably due to electrical short circuits.

DISCUSSION

Preference of cables for construction of nests

In the study areas, Baya Weavers had commonly built their nests on power cables. Baya Weavers constructing nests on telegraph and electric wires are common in India (Bhargava 2017), between Chitttoor and Chandragiri regions (Kirkpatrick 1952), Kumaon Terai region of Uttarakhand (Ambedkar 1969), Tamil Nadu and Assam (Davis 1976) and between Bangalore (Bengaluru) and Madras (Chennai) regions (Subramanya 1982). However in the present study, all the nesting colonies (n = 155) were found attached to cables overhanging sugarcane crops corroborate the findings

Image 3. Clay deposits in the nests: a—Inner wall of helmet stage nest contained a clay patch | c&d—Clay plastering on entire nest | d—Torn nest showing plastering of clay on entire inner walls. © M. Pandian.

of Ambedkar (1969), Kirkpatrick (1952), Davis (1976), and Subramanya (1982). However, no nest colonies were found overhanging paddy crops in the study areas.

Birds have been found to have made nests at odd places like electric transmission cables when other suitable nesting sites were scarce (Toland 1990; Chace & Walsh 2006). However, in the present study area, it was found that in spite of availability of sufficient number of potential nest-supporting palm trees (2,874) in a 500-m radii, Baya Weaver chose cables, indicating that in this instance, it is not the absence of traditional nesting sites that was reason to choose the cables as found by Toland (1990) and Chace & Walsh (2006).

Preference of Baya Weaver in building nests on cables occurring close to human dwellings

Baya Weavers built nests close to human settlement and foraging sites and also trying to coexist with humans (Ulman 2020). The study on the relationship between proximity of roads, buildings, and human settlement and selection of nesting sites, i.e., power/television cables revealed that the birds preferred to build nests on cables occurred close to areas, such as human dwellings, buildings like cattle shed and motor-pump sets, and roads as stated by Ulman (2020). The birds might have selected agricultural landscape due to the availability of nesting sites like power cables and palm trees and also the availability of grain crops close to nesting sites as Baya Weaver are granivorous.

Crop bunds

The preference of nesting sites on cables away from crop bunds indicate that the birds might have preferred power cables away from bunds/pathways probably to keep a distance/height from the reach of humans, and terrestrial predatory animals.

Source of fibres

Baya Weavers were found to have used fibres from palm fronds and grass leaves to construct nests in Sri Lanka (Wood 1926), coarse grass, paddy, and *Phoenix* spp., in Kolaba District, Maharashtra (Ali 1931), and

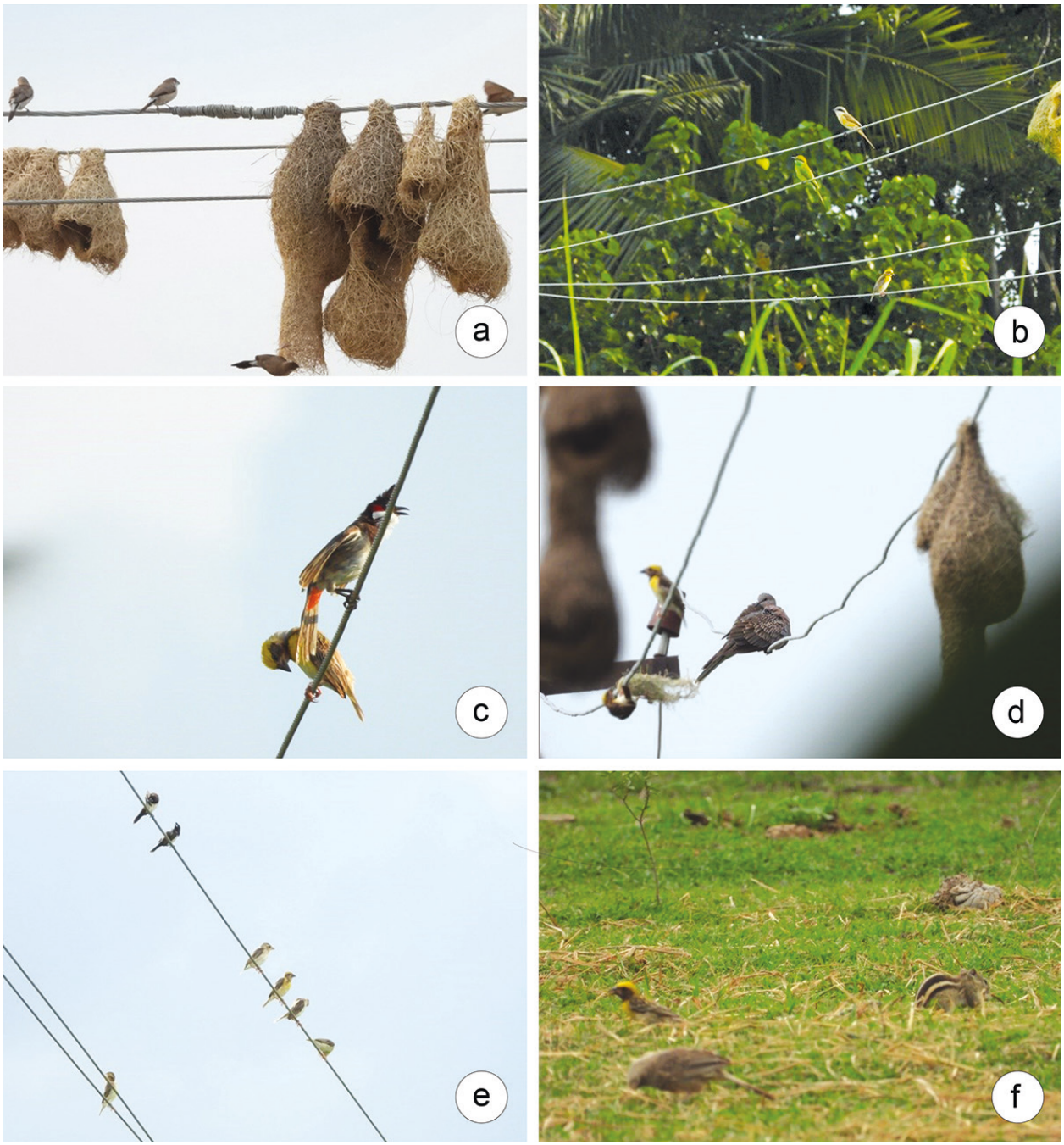

Image 4. Pictures showing associated birds with Baya Weaver: a—Indian Silverbill perching on cables and entering an occupied complete nest of Baya Weaver | b—Asian green bee-eater and Lon-tailed Shrike roosting with Baya Weaver | c—Baya Weaver roosting with Red-whiskered Bulbul | d—Spotted Dove roost near a nest of Baya Weaver | e—White-rumped Munia roosting with Baya Weaver | f—Common Babbler forages with Baya Weaver. © M. Pandian.

paddy, sugarcane, maize, guinea grass and palm fronds in Assam (Ulman 2020), whereas in this study, the birds used fibres from leaves of sugarcane alone. Since all the nests were found on cables overhanging sugarcane crops, the birds had preferred fibres of sugarcane leaves due to proximity of sugarcane crops than other palm trees.

Nest colonies

Baya Weaver is a colonial bird and hence lives in large colonies (Ulman 2020). Sharma (1989) had observed that each nest colony had consisted of 1–250 nests in Rajasthan, 5–24 nests in South Goa (Borkar & Komarpant 2003), 20–30 nests in Assam (Ulman 2020), and 1–61 nests in Vellore District, Tamil Nadu (Pandian 2021). In

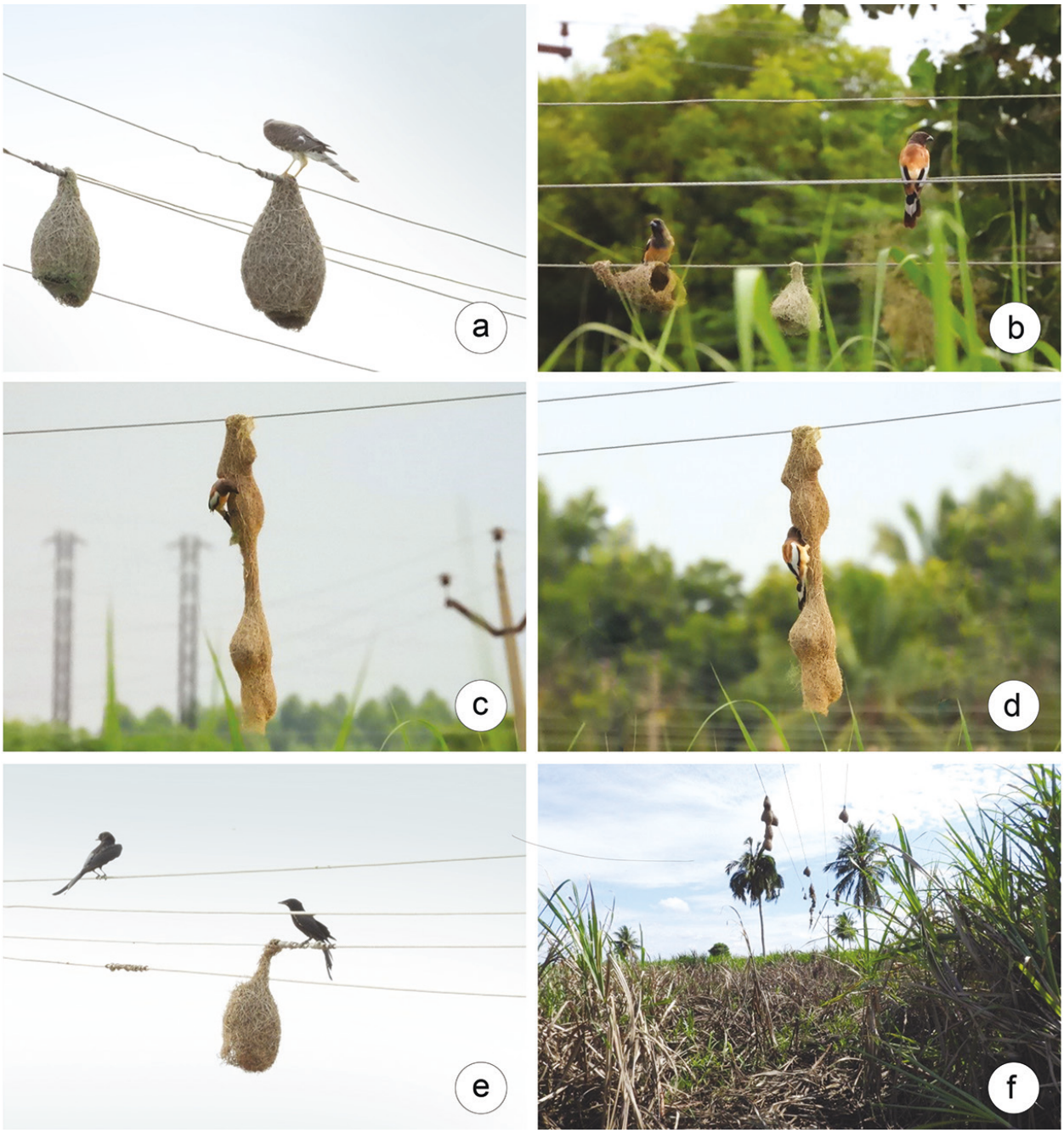

Image 5. Pictures showing probable threats to Baya Weaver: a—Shikra perching on the egg-chamber closed stage nest | b—Rufous Treepie pulled helmet stage nest to cause damage | c&d—Rufous Treepie made a hole and poked its head into an egg-chamber | e—Black Drongo plucked fibres from egg-chamber closed stage nest | f—Sugarcane crop gutted to fire due to short circuit in a wetted nest colony. © M. Pandian.

the present study, the number of nests per colony was found ranging from one to 57 nests.

Nesting substrata

Out of a total of 1,725 nests, 933 nests were found attached to more than one cable or attached at the joints of cables and reel insulators. But in the remaining 792 nests, the knot of one nest was found attached to the knot of adjacent nest and in this manner the knots of all nests were connected adjacently on the cable and formed a mesh like structure. Probably due to the slippery nature of aluminium power cables and smooth surface of service/television cables, the birds might have plaited knots using multiple cables or at the junctures of cables and insulators. Hence, it revealed that the birds required coarse surface or sufficient grip on the cables

for plaiting initial knots.

Abnormal nests

The behaviour of construction of abnormal nests also occurs in some other species of the family *Ploceidae*, such as Black-breasted Weaver *Ploceus benghalensis*, Spectacled Weaver *Ploceus ocularis*, African Black-headed Weaver *Ploceus cucullatus*, Streaked Weaver *Ploceus manyar*, and Sakalava Weaver *Ploceus sakalava* (Delacour 1947; Collias & Collias 1962; Maclean 1985; Mishra 2004). In India, the abnormal nests of Baya Weaver was studied by several authors like Ali et al. (1956), Ambedkar (1958), Sharma (1985, 1988, 1995), and Pandian (2018). The present observations of 11 types of abnormal nests in the study area corroborate the findings of the authors cited above.

Clay deposits

The habits of smudging of clay in the nests are common in three species of Asian weavers (*P. philippinus*, *P. manyar*, and *P. benghalensis*) and not found in African weaver (Crook 1963; Davis 1973). Plastering of inner walls of nest with wet clay is done when the nest construction reaches the helmet stage prior to pairing with females (Dewar 1909; Ali 1931; Ambedkar 1969; Borkar & Komarpant 2003). Hence, the present observations of clay deposits on the inner walls of helmet stage nests corroborate the findings of above authors.

Davis (1973) had recorded that 18.33% nests did not show presence of mud blobs on the inner walls of nests in South Goa. In the present study also 10% helmet stage nests did not show traces of clay and hence it matches with the observations of Davis (1973). As a peculiar feature, plastering of clay on the entire nest walls (n=42) were observed. Probably the birds might have plastered the entire nest walls with wet clay to reinforce the nest walls to protect the nests from avian predators. In this aspect, further detailed study is required.

Associated birds

The mixed communal roosting consisting of different species serves as centre for the instant exchange of information regarding the location of food sources and receives warning about the approach of any predators (Zahavi 1971; Gadgil 1972; Ward & Zahavi 1973; Gadgil & Ali 1975). In the present study also Baya Weaver was found associated with 16 other bird species and shares common roosting and foraging sites among them without any competitions and hence, it matches with the observations of Zahavi (1971); Gadgil (1972); Ward & Zahavi (1973); and Gadgil & Ali (1975)

Nest predation

Nest predation by House Crow, Large-billed Crow, and Rufous Treepie were reported by Ali et al. (1956) and Pandian (2021). In the present study also incidents of House Crow and Large-Billed Crow damaging nests of Baya Weaver were observed. Nest predations by piercing circular hole near egg-chamber by Rufous Treepie and Coucal were recorded. Instances of nest damages by Black Drongo were observed but no predation of eggs/chicks was noticed. It clearly indicates that these predators might have damaged the nests (n = 197) probably to predate eggs/chicks. Apart from nest predation, nests damage by electrical short circuit was also reported in one village. The impact of nest predation by avian predators and nest damages by short circuit on the breeding of Baya Weaver on larger geographical areas need further studies.

CONCLUSION

This is a first systematic study on the preference of Baya Weaver towards overhead power transmission cables, service cables connected between electricity poles and motor pump sheds, and television cables as nesting sites, stages of nests, abnormal nests, associated birds, and threats to the nests in the agrarian landscape of the study area. The survey revealed that Baya Weavers preferred and built nests on power cables/television cables and avoided readily available potential nest-supporting trees, such as *B. flabellifer* and *C. nucifera* for nesting in the study areas. The Baya Weavers had used only leaf fibres of sugarcane for building nests. They preferred power cables hanging over sugarcane crops as nesting sites and shared common roosting sites and foraging grounds with other associated birds. Increasing urbanization by conversion of cultivated lands into residential areas, industrialization, widening of roads along with indiscriminate felling of these principal nest-supporting trees that are vital for Baya Weaver will pose a threat to the populations of this bird in the landscape. Considerable damages to nests occurred due to avian predators. The practices of monoculture of *Casuarina*, sugarcane, vegetables, and flower crops by abandoning the traditional cultivation of cereals and millets crops in the study sites may cause shortage of food grains to adult birds. Though this bird falls in the least concern status of IUCN, it is better to start protecting the populations of this species and their habitats. Local communities,

particularly land holders, agricultural workers, and school students should be sensitized to understand the need to preserve the nesting habitats of this species.

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