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Cover: Green Bee-eater with colour pencils and watercolor wash by Elakshi Mahika Molur.



Habitats and nesting habits of Streaked Weaver *Ploceus manyar* in select wetlands in the northern districts of Tamil Nadu, India

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Abstract: The habitats and nesting habits of Streaked Weaver *Ploceus manyar* was studied in the Narrow Leaf Cattail *Typha angustifolia* (Typhaceae) wetlands in Ranipet, Kancheepuram, and Viluppuram districts of northern Tamil Nadu. A total of 349 nests, in various developmental stages, in 24 colonies and of 536 adult individuals were enumerated. Of these 349 nests, 43 nests were in wad stage, 28 in ring stage, 123 in helmet stage, 55 egg-chamber-closed stage, and 100 complete nests including two abnormal nests were recorded. Streaked Weaver used fibres of *T. angustifolia* for building nests. Females were also observed to be engaged in nest construction, while males placed blobs of cow dung on the inner or both walls of helmet stage nests before pairing with females; 88.7% helmet stage nests had deposition of cow dung on their inner walls and the remaining 11.3% nests had no such deposits. In 59% nests the entrance tubes were found facing east. They showed communal foraging and the flock size ranged from 50–80 birds. No antagonistic interactions were observed between Streaked Weavers and other species over sharing of common perching sites and foraging grounds. Harvesting of nest-supporting reeds and sightings of avian predators, such as House Crow *Corvus splendens*, Large-billed Crow *Corvus macrorhynchos*, and Rufous Treepie *Dendocitta vagabunda* near nest colonies may pose threats to Streaked Weavers.

Keywords: Abnormal nests, communal foraging, deposition of cow dung, nest colonies, nest orientation, *Typha angustifolia*.

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INTRODUCTION

Ploceidae is a family of Passerine birds, many of which are called weavers. The family is believed to have originated in the mid-Miocene (De Silva et al. 2017). The group comprises a total of 116 species in 15–17 genera (Clements et al. 2022) and is well known for their intriguing and dramatic variation in behaviour, nest structure, and plumage coloration (Collias & Collias 1964). The Afro-Asian region harbours 64 species of weavers (Dickinson & Christidis 2014). Four species alone occur in India: Baya Weaver *Ploceus philippinus*, Black-breasted Weaver *P. benghalensis*, Streaked Weaver *P. manyar*, and Finn's Weaver *P. megarhynchus* (Ali & Ripley 1987). Though the Streaked Weaver occurs widely in India, its nesting colonies are scattered across the peninsular region (Rasmussen & Anderton 2005). Detailed accounts of its breeding biology were studied in Kumaon Terai (Ambedkar 1972), Wazirabad, Delhi (Prakash et al. 2020), and Veedur wetlands, Tamil Nadu (Pandian 2022). The other published works on the Streaked Weaver are either anecdotal accounts of its natural history, e.g., roosting behaviour (Dhindsa & Toor 1981), crop damage (Dhindsa 1982), causes of nest destruction (Sharma 1997), and on nesting in *Ipomoea* reed beds (Panwar et al. 2020); or records in regional checklists, e.g., Dharmapuri (Vasanth 1990), Coringa Wildlife Sanctuary (Srinivasulu et al. 2000), Pallikaranai (Raj et al. 2010), Mayiladuthurai (Ali et al. 2011), Kalpakkam (Hussain et al. 2011), Tiruchirappalli (Siva & Neelanarayanan 2017), and Chengalpet (Nagarajan 2021).

The present study documents the various habitats and nesting habits of the Streaked Weaver in the *T. angustifolia* reeds in northern Tamil Nadu. The aim of this study was to investigate the habitats, nesting behaviours, and probable threats to their populations.

MATERIALS AND METHODS

Study area

The present study was carried out in the selected reeds covered wetlands providing definite habitats to Streaked Weavers in Ranipet, Kancheepuran, and Viluppuram districts of northeastern Tamil Nadu (Figure 1). These three districts cover an area of c. 7600 km² with a human population of c. 44,00,000. Monsoon-dependent Palar, Kosasthalaiyar, Ponnaiyar, Thenpennai, Varaha, and Thondi rivers pass through these districts. The reeds at the study sites comprise Narrow Leaf Cattail

Typha angustifolia, spread over c. 4 ha. Apart from that *Chrysopogon zizanioides* and *Phragmites* spp. occur abundantly in the study sites. Agriculture is the primary occupation in the district. The major crops of the area are Rice *Oryza sativa*, Jowar *Sorghum bicolor*, Pearl Millet *Pennisetum glaucum*, Finger Millet *Eleusine coracana*, Sugarcane *Saccharum officinarum*, and pulses such as Black Gram *Vigna mungo*, Green Gram *Vigna radiata*, & Pigeon Pea *Cajanus cajan*. Monoculture of *Casuarina equisetifolia* and cultivation of vegetables & flowers are also common. Temperatures range from 20–36 °C. The average annual rainfall is c. 1,000 mm.

METHODS

Data collection

A survey was conducted in the c. 4 ha reed beds situated along the arable lands in three districts. The selected wetlands in three districts were identified that had a definite history of the existence of *P. manyar* populations and their nests in the previous years. These sites were surveyed between 0600 h and 1800 h during the breeding season from 01 February–15 July 2022. The following variables were quantified: area of nesting colonies, depth of water (measured using a bamboo pole), size of nest colonies, number of nests in each colony, the distance between adjacent nest colonies, number of nests in various developmental stages, the orientation of nests, and distance between the reeds & foraging sites, i.e., paddy fields. The communal foraging behaviours, interactions with other species, and threats to their populations were observed uninterruptedly from a reasonable distance (c. 20 m) through binoculars, without causing disturbance to the birds. The number of birds was enumerated by following the total count method (Bibby et al. 2000) and analysing photographs taken when the birds were foraging and perching on nearby plants. Bird census was conducted over four monthly sessions during the second week of every month, i.e., March–June 2022. The total number of birds is expressed as the highest count of the session's total count. Photographic documentation of various developmental stages of nests and deposition of cow dung on the wall of helmet stage nests was done. The choices of grains/seeds foraged by the Streaked Weavers were observed and identified plant species foraged by these birds. The damaged nests, size of harvested reed areas by humans, and other plants that caused disturbance to nest colonies were quantified. The sighting of avian predators in the vicinity of nest colonies



Figure 1. Study area map: a—India map indicating Tamil Nadu (Black colour) | b—Tamil Nadu map indicating study districts | c —Location of study sites showing *Typha angustifolia* reeds with nest colonies.

were observed and recorded.

Data analysis

After the breeding season was over and the nests were completely abandoned by the birds, the number of leaves attached to the roofs of nests, the length, and the diameter of entrance tubes were measured in 15 nests. The number of nests per colony, the distance between the nest colonies, and the nearest roads, buildings & electric cables were measured. Based on these data, bar charts were made. Karl Pearson's correlation coefficient (r) test was used to assess the significant relationship between the height of reeds above water level & the total number of nests and between the depth of water & the number of nests. No live nest, adult bird, egg or

chick was handled during the study. Locations of the nest colonies in the reeds were determined using a Garmin Etrex 20x GPS device. Photographs and videography were made using a Nikon P1000 digital camera. The collected data were tabulated, analysed, and shown as a graphical representation.

RESULTS

A total of 349 nests, including some in various developmental stages in 24 nest colonies, and 536 individuals of Streaked Weaver were enumerated. Colony size ranged 4–43 nests. Of the 349 nests, 12% nests ($n = 43$) were in wad stage, 8% in ring stage ($n =$

Table 1. Details of the number of birds, nesting habits, various stages of nests, and orientation of nests of Streaked Weaver during peak breeding period (2nd week of July 2022).

	Name of village	GPS coordinates	Area size (ha)	Total number of birds	Total number of nests	Stages of nests					Total number of nests studied for orientation	Orientation of nests			
						Wad stage	Ring stage	Helmet stage	Egg-chamber closed stage	Complete nests		East	West	North	South
1	Minnal	13.082°N–79.552°E	0.20	48	30	1	0	11	1	17	18	11	2	1	4
2	Kodaikal mottur	13.060°N–79.403°E	0.28	36	19	2	0	7	0	10	10	8	2	0	0
3	Anvarthikanpet	13.044°N–79.568°E	0.36	46	25	4	0	5	4	12	16	12	3	1	0
4	Melkalathur	13.040°N–79.567°E	0.20	30	15	3	0	4	4	4	8	5	0	3	0
5	Periyakarumpur	12.911°N–79.681°E	0.16	8	4	0	0	2	2	0	2	2	0	0	0
6	Urani	12.151°N–79.907°E	0.12	68	43	4	6	19	6	8	14	1	0	13	0
7	Kazhuveli	12.152°N–79.898°E	0.20	26	22	2	4	8	4	4	8	6	2	0	0
8	Marakkanam	12.158°N–79.916°E	0.80	26	21	4	3	4	3	7	10	4	2	4	0
9	Nemili	12.064°N–79.648°E	0.24	49	37	5	0	17	5	10	15	9	2	4	0
10	Veedur	12.069°N–79.586°E	1.42	199	133	18	15	46	26	28	54	33	5	13	3
		Total	3.98ha	536	349	43	28	123	55	100	155	91	18	39	7

28), 35% in helmet stage ($n = 123$), 16% in egg-chamber closed stage ($n = 55$), and 29% complete nests ($n = 100$). The size of reeds containing nest colonies varied from a minimum of 0.04 ha to a maximum of 0.24 ha. The minimum distance between the adjacent nest colonies was 30 m and the maximum was 70 m. The depth of water in the wetland also varied. It was shallowest at 0.3 m, and deepest at 1.6 m. Maximum nests ($n = 43$) was observed on reeds standing in water containing 30 cm depth, followed by 41 nests on reeds having 120 cm depth, and 33 nests on reeds with 100 cm depth. The height of the reeds above the water level also varied: minimum of 1.4 m and maximum of 3 m. Maximum nests ($n = 271$; 77.65%) were enumerated on reeds having height ranges of 1.6 m–2 m (Table 1).

Nest construction and materials

The study revealed that Streaked Weaver used fibers of *T. angustifolia* for the construction of nests in all three districts. Both sexes contributed to nest construction. Males built nests up to helmet stages and then, after pairing with females, both sexes collected fibres and continued the building. No other plant materials were used by the birds for the construction of nests.

Selection of nesting sites and stages of nest construction

Individuals of male Streaked Weaver with breeding

plumages first appeared on reeds in first week of February 2022. The males visited various leaves, perching during the day on particular leaves of the *T. angustifolia*, 1–2 m above the water except for the duration of forage, but they did not engage in nest construction. From the second week of February onwards, males brought fibres from adjacent *T. angustifolia* and started building wad stage nests (by tying knots) and later the wad stage nests were developed into various stages of nests. After selecting a nesting site, a male Streaked Weaver bends and lowers the distal ends of two *T. angustifolia* leaves, holding them together with its toes, and plaits a knot around the leaves with its beak. Once this initial knot is tied, the male easily pulls down adjacent leaf tips, one by one and in a similar manner, and makes the basal knot stronger, creating a wad. The number of leaves attached to each wad nest varies from nest to nest. Males brought fibres continuously and made the wad stronger, like an amorphous roof/ceiling-like structure into which they enmeshed many green leaves. Out of 349 nests observed, only 29 % nests ($n = 100$) were developed into complete nests including two abnormal nests (bistoried 1+1 type) at the end of the breeding period (Figure 2) (Table 1). Only females were observed feeding their chicks. On three occasions, males were carrying the food in their beaks to the nesting colony but it was not possible to observe whether they entered the

nests with food or not.

The length of the entrance tube varies from nest to nest and the measurement of entrance tubes of 15 abandoned nests revealed variations of 9–20 cm in length and 4–5 cm in diameter. The base of the nests was attached with 30–55 leaves. Apart from leaves, the birds also enmeshed peduncles with the base of nests ($n = 22$). The nests did not swing freely, because they were attached to many leaves of the *T. angustifolia*. A nest rarely swung along with the nest-supporting plants, during a gust, remaining suspended, and static most of the time. The distal ends of entrance tubes were 0.8–1.5 m above the water's surface (Figure 3). Pearson's correlation coefficient test reveals that there exists no significant correlation ($r = -0.0946$) between the height of reeds above water level & the number of nests and similarly no correlation ($r = -0.2475$) exists between depth of water under the nest colonies & several nests.

Nest Colonies

The size of reed beds containing nest colonies varied 0.04–0.24 ha. The number of nests per colony also varied 4–43. The distance between adjacent nests ranged 1–4 m. Out of 349 nests enumerated, maximum nests were observed in the nest ranges 21–30 nests, followed by 41–43, and 1–10 nests (Table 2; Image 1i).

Preference of Streaked Weaver in building nests on reeds occurring close to human activities

The study also tested the relationship between the proximity of roads, buildings, electric cables, and the selection of nest-supporting plants by individuals of Streaked Weaver. Three percent of nests ($n = 9$) occurred within a 25 m radius from the nearest roads, 33% of nests ($n = 116$) within a 26–50 m radius, and the remaining 65% of nests ($n = 224$) occurred above a 51 m radius from roads. Of the verified details, 32% of the nests ($n = 111$) occurred within a 200 m radius of buildings such as human dwellings, cattle sheds, & motor pump sets in crop fields, and the remaining 68% of nests ($n = 238$) occurred above 200 m radius from buildings; 38% of nests ($n = 132$) were found within 50 m of electric cables and the remaining 62% of nests ($n = 217$) occurred above 50 m from the nearest power cables (Figure 3–5).

Orientation of nests

Examination of the orientation of 155 nests (egg-chamber closed stage-55 & complete nests-100) on the nest-supporting plants revealed that 59% of nests ($n = 91$) were oriented east facing the rising sun, while 12% of nests ($n = 18$) were oriented the west, 25% nests

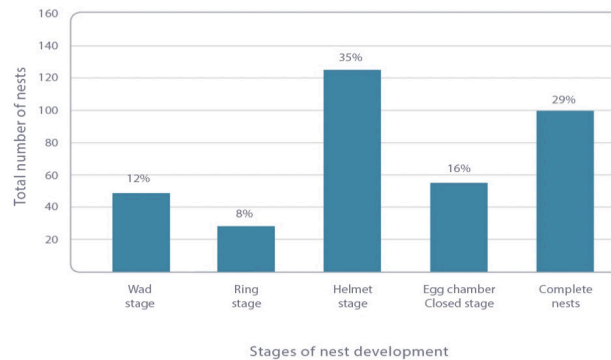


Figure 2. Bar-diagram indicating various developmental stages of nest construction.

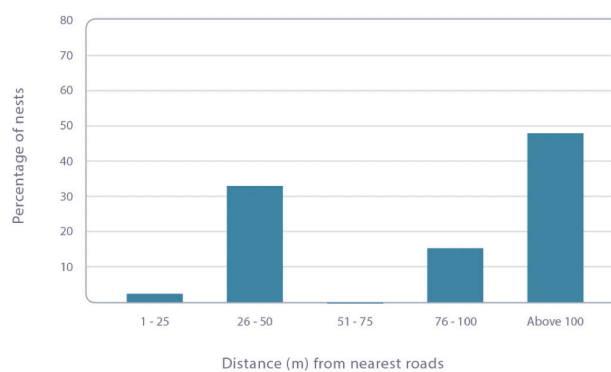


Figure 3. Relationship between a selection of nest-supporting plants and nearest roads.

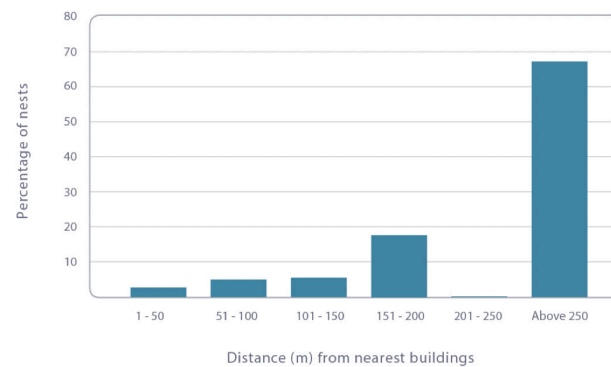


Figure 4. Relationship between a selection of nest-supporting plants and nearest buildings.

towards ($n = 39$) north and 5% nests ($n = 7$) were found facing south. The study reveals that entrance tubes of maximum nests were found facing the east (Figure 6).

Deposition of cow dung

The males have the habit of smudging cow dung on the inner walls of helmet stage nests before pairing with a female. Out of 80 helmet stage nests that were

Table 2. Frequency distribution of nest colony sizes and number of nests in each range.

	Nest ranges (number of nests per colony)	Number of nest colonies	Percentage of number of nest colonies	Total number of nests enumerated	Percentage of number of nests in each range
1	1–10	12	50	77	22.06
2	11–20	5	21	66	18.91
3	21–30	4	17	89	25.5
4	31–40	1	4	33	9.46
5	41–50	2	8	84	24.07
Total		24	100	349	100

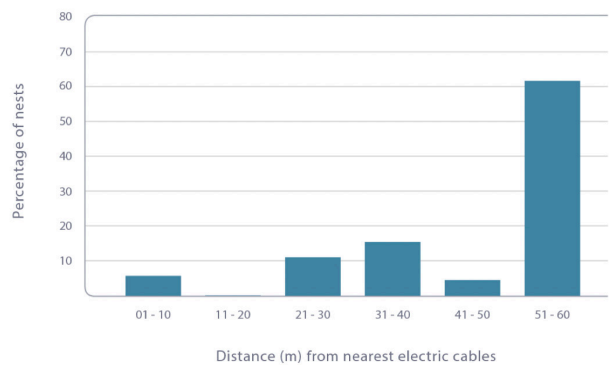
studied, 88.7% helmet stage nests ($n = 71$) had a thick layer of dung on their inner walls (Image 2a), whereas the remaining 11.3% nests ($n = 9$) had no deposits of cow dung. Abnormal deposits of dung were found in seven nests, where dung had been plastered on both, inner and outer surfaces. Males had deposited cow dung abnormally like horn-shaped structures on the outer walls of these nests (Image 2b). No females were observed in the vicinity of nest colonies or seen carrying cow dung to the nests.

Communal foraging

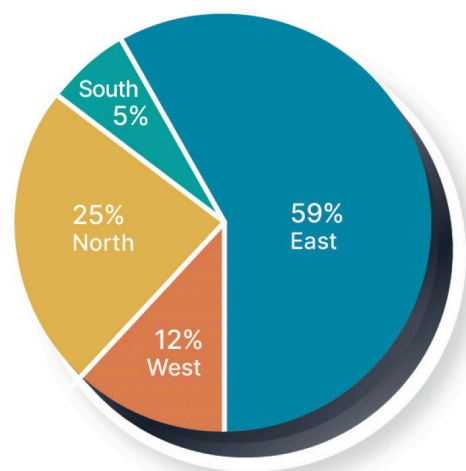
The study revealed that all the nest colonies were surrounded by paddy crops (*Oryza sativa*: Poaceae) that occurred 25–800 m distance from the nest colonies. The Streaked Weaver always moved in flocks and the flock varied in size from 50–80 birds. The flocks contained a few individuals of other species, such as Baya Weaver *P. philippinus*, Black-breasted Weaver *P. benghalensis*, Tricolored Munia *Lonchura malacca*, White-rumped Munia *L. striata*, and Indian Silverbill *Euodice malabarica*. They strictly followed communal foraging. They forage on paddy when it is at the milky and unripe seed stage. They also perched on the spikes of *T. angustifolia*, *Setaria pallide-fusca*, and *Paspalidium geminatum* and consumed their unripe seeds. The individuals of Streaked Weaver coexisted with the aforesaid other bird species without any competition over sharing of common perching sites or food grains while foraging.

Threats

The study reveals that out of c. 4 ha of reeds in the study sites, c. 700 m² reeds were harvested by local villagers during the current breeding period for making mats and ropes. It was observed that 21 nests of various developmental stages (wad stage 7, ring stage 11, and helmet stage 1) were abandoned by the birds as the nearby reeds were harvested resulting in the exposure of nests to the outside. The birds might have abandoned those nests due to apprehension of movements


Figure 5. Relationship between a selection of nest-supporting plants and nearest electric cables.
Table 3. Details of predators observed near nest colonies of Streaked Weaver.

	Name of predator	Binomials	No. of sightings
1	House Crow	<i>Corvus splendens</i>	34
2	Large-billed Crow	<i>Corvus macrorhynchos</i>	16
3	Rufous Treepie	<i>Dendrocitta vagabunda</i>	09
Total			59


Figure 6. A pie diagram showing the orientation of nests of Streaked Weaver in the study area.

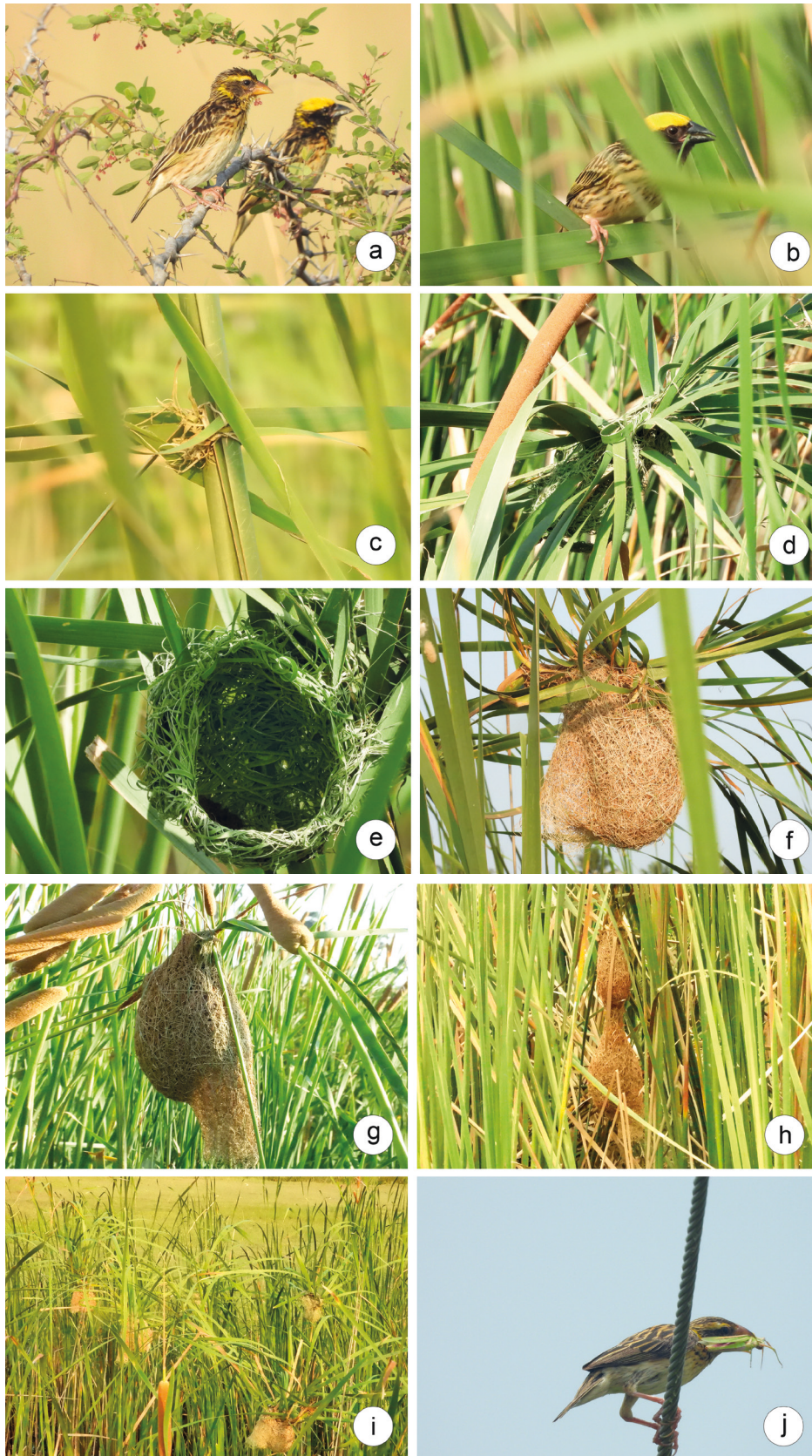


Image 1. Pictures indicating various stages of nest construction: a—A pair with breeding plumages perching on a shrub | b—Male carrying fibre for nest construction | c—Wad stage nest | d) Ring stage nest | e—Helmet stage nest | f—Egg-chamber closed stage nest | g—Complete nest with entrance tube | h—Double chambered abnormal nest | i—View of nest colony on reeds | j—Female carrying prey to chicks. © M. Pandian.

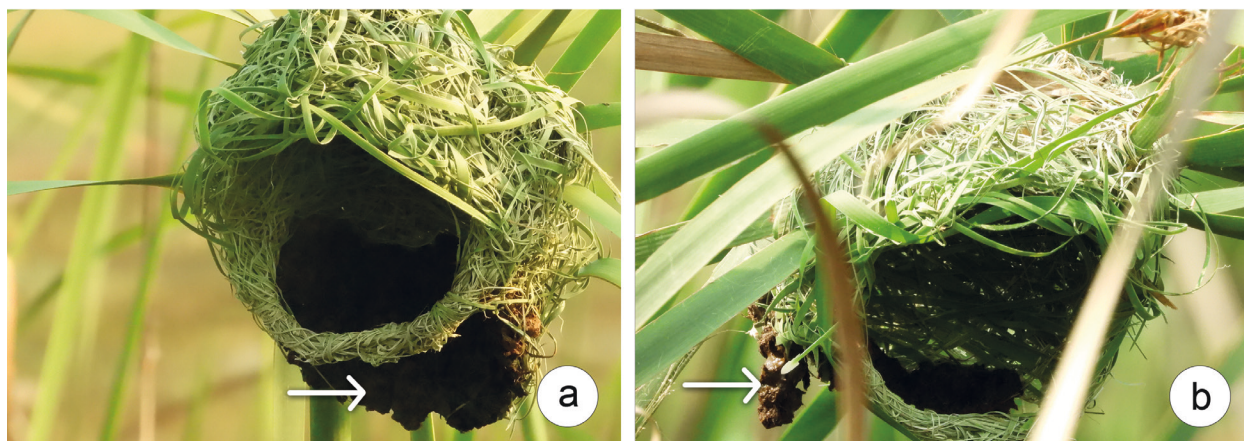


Image 2 . Pictures showing deposits of cow dung: a—Helmet stage nest contains a deposit of dung on the inner wall | b—Abnormal deposition of dung on the outer wall of the helmet stage. © M. Pandian.

of human beings, cattle, and exposure of nests to outside/predators. Birds had abandoned 12 nests (wad 8 and helmets 6) which were found enmeshed in the angiosperm climber *Oxystelma esculentum* and angiosperm parasite *Cassytha filiformis* which thickly covered and caused fallen down of *T. angustifolia* reeds. One complete nest was found torn probably due to the predators. Predatory birds, such as House Crow *Corvus splendens*, Large-billed Crow *Corvus macrorhynchos*, and Rufous Treepie *Dendrocitta vagabunda* were sighted (n = 59) in the vicinity of nesting colonies during the study period (Image 3; Table 3).

DISCUSSION

Many authors had previously studied the breeding periods of the Streaked Weaver. The breeding period was completed by the end of May in Dharmapuri District (Vasanth 1990), between February and June in Viluppuram, Tamil Nadu (Pandian 2022), and between May and July 2012 in Wazirabad (Prakash et al. 2020). But in the present study, breeding occurred between February and July as stated by Prakash et al. (2020) and Pandian (2022). Streaked Weavers used fibres from *Phragmites*, *Typha*, and *Vetiveria* in Wazirabad (Prakash et al. 2020). In the present study, the birds used fibres from leaves of *T. angustifolia* only, and not of *Phragmites* spp. or *Vetiveria* spp., as stated by Prakash et al. (2020). Though *Chrysopogon* (= *Vetiveria*) *zizanioides* and *Phragmites* spp. occur abundantly in the study sites, the birds did not pluck fibres from these plants, and the reasons for not selecting these plant species are not known and hence, it requires further studies. They

attached many leaves of *T. angustifolia* with an initial knot (wad stage) and formed a strong roof/ceiling of the nests (Ambedkar 1972; Prakash et al. 2020; Pandian 2022). The present study revealed that a minimum of 30 and a maximum of 55 leaves including peduncle of the inflorescence of *T. angustifolia* were found attached to the base of the nest, corroborating the findings of Ambedkar (1972), and Prakash et al. (2020), and Pandian (2022). In Gadharpur, Uttarakhand, the number of nests per colony varied from 12–20 nests, and the largest colony contained 60 nests (Ambedkar 1972). But Prakash et al. (2020) recorded only a maximum of 11 nests per colony in Wazirabad. The present study revealed that the nest colonies contained 4–43 nests, partly corroborating the observations of Ambedkar (1972). The study revealed that maximum nest colonies occurred close to roads, buildings, and overhead power cables.

Usually, females of *Ploceus* spp. do not participate in nest construction activities (Crook 1963; Quader 2006). Ambedkar (1972) reported that the male Streaked Weaver alone build nests in the Kumaon Terai. But Prakash et al. (2020) later observed that females also participated in the nest constructions in Wazirabad. Similarly, I have also recorded that after pairing, females were also involved in nest construction.

The majority of the nests of Baya Weavers are usually oriented towards the east direction (Ambedkar 1964; Davis 1971; Quader 2006). About 87% of nests in Chorao Island in Goa (Borges et al. 2002) and 88% of nests in Vellore district, Tamil Nadu were oriented towards the east (Pandian 2021). The present study revealed that 59% of the nests of Streaked Weaver also face toward the east as in the case of Baya Weavers. The probable



Image 3. Various threats to nests of Streaked Weaver: a—Partly harvested vegetation of *T. angustifolia* | b—A torn and abandoned nest | c—Stunted *T. angustifolia* vegetation covered by an angiosperm parasite *Cassytha filiformis* | d—*T. angustifolia* vegetation covered by climber *Oxystelma esculentum*. © M. Pandian.

reasons for birds constructing many nests with entrance tubes orienting towards the east would be to protect their nests from south-west monsoon winds.

The mixed communal roosting and foraging, consisting of different species, serves as a centre for the exchange of information regarding the location of food sources and receives warning about the approach of predators (Zahavi 1971; Gadgil 1972; Ward & Zahavi 1973; Gadgil & Ali 1976). In the present study, flocks containing individuals of Streaked Weaver, Baya Weaver, Black-breasted Weaver, Tricolored Munia, White-rumped Munia, and Indian Silverbill moved collectively for foraging without any interspecific competition over sharing of food.

Abnormal nesting behaviours occur in other species of the genus *Ploceus*, such as *P. philippinus* (Sharma 1995; Pandian 2021), *P. benghalensis* (Mishra 2004), *P. manyar* (Delacour 1947; Pandian 2022), *P. ocularis* (Maclean 1985), *P. velatus*, and *P. cucullatus* (Collias & Collias 1962; Crook 1963). In the present study, only two abnormal complete nests (1+1 type) were recorded. This

corroborates the findings of (Delacour 1947), Collias & Collias (1962), Crook (1963), Maclean (1985), Sharma (1995), Mishra (2004), and Pandian (2021, 2022).

The habits of smudging mud/dung on the inner walls of helmet stage nests are prevalent among Streaked Weaver, Baya Weaver, and Black-breasted Weaver when the nest reaches the helmet stage (Crook 1963; Ambedkar 1969; Borkar & Komarpant 2003). Individuals of male Streaked Weaver placed mud and cow dung on the inner wall of helmet stage nests in Wazirabad (Prakash et al. 2020) and cow dung in Viluppuram, Tamil Nadu (Pandian 2022). Similarly, in the present study, I have recorded the males smudging cow dung on the inner wall when the nest construction reached the helmet stage, and before pairing with a female. An abnormal deposition of dung on the outer wall was also recorded. The exact reasons for plastering of dung in helmet stage nests require further studies.

Incident of Rufous Treepie damaging nests of Baya Weaver was recorded in Arakkonam Taluk, Tamil Nadu (Pandian 2021). In reed beds, many nests are

destroyed by grazing cattle and people harvesting reeds (<https://weavers.adu.org.za>; Pandian 2022). The harvesting of *T. angustifolia* vegetation in c. 700 sq. m and the subsequent abandoning of 21 nests at various developmental stages by birds in the present study sites deprives their potential breeding ground, corroborating the views of Pandian (2021, 2022). House Crows, Large-billed Crows, and Shikras are the major nest predators of Streaked Weaver (Oschadleus 2021; Pandian 2022). In the present survey House Crows, Large-billed Crows, and Rufous Treepie were observed in the vicinity of nest colonies corroborating the observations of Oschadleus (2021) and Pandian (2022). The impact of these avian predators in large geographical areas requires further studies.

CONCLUSION

The present study sites containing c. 4 ha of *T. angustifolia* reeds harbour 536 individuals of Streaked Weaver and 349 nests in various stages of development. Birds built nests using fibres of *T. angustifolia* as nest materials and followed a seemingly strict mixed communal foraging. Females also participated in nest constructions. The entrance tubes of maximum nests were found oriented towards the east. Males had the habit of plastering cow dung on the inner, or both walls, of helmet stage nests. Harvesting of nest-supporting reeds would cause not only habitat loss to this species but also the abandoning of nests due to their exposure. Avian predators such as House Crow, Large-billed Crow, and Rufous Treepie were sighted in the vicinity of nesting colonies. Despite rapid urbanization, industrialization, population increase, habitat destruction, and decreasing areas of cultivation of grains, considerable populations of the Streaked Weaver exist in the agrarian landscape of the three studied districts. A special management plan could be devised for the area, considering the anthropogenic and natural stresses that the habitat is currently subjected to.

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