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Birds of Madurai
Birdbaths in urban gardens
North Cachar Hills

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- To publish a newsletter that will provide a platform to birdwatchers for publishing notes and observations primarily on birds of South Asia.
- To promote awareness of birdwatching amongst the general public.
- To establish and maintain links/liaison with other associations or organized bodies in India or abroad whose objectives are in keeping with the objectives of the Trust (i.e. to support amateur birdwatchers with cash / kind for projects in ornithology).

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Photographer: Kallol Mukherjee

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Artist: "The original Drawing have been executed by *Native Artists* from pencil sketches by the Author, and under his immediate superintendence."

Source: Jerdon, T. C., 1843. *Illustrations of Indian ornithology*. 1st ed. Madras: J. B. Pharaoh. Vol. I of IV vols. Pp. 1 l., 22 ll., 1 l., pll. I–XII (col.) (3 November 1843). "The accompanying figure was taken from a living bird I had for some time in my possession in Madras," –T. C. Jerdon.

The birds of Madurai city

Kumaran Sathasivam

Sathasivam, K., 2015. The birds of Madurai city. *Indian BIRDS* 10 (2): 29–34.
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History

Madurai (location ~10°N, 78°E), the well-known destination of pilgrims, and tourists, in Tamil Nadu, is one of the oldest continuously inhabited cities of India. It has also been a political capital of one dynasty or another for a period of some 18 centuries, which is a record of sorts. Notably, it was the seat of the Pandyas, who ruled from the early years of Christianity to the 14th century (Devakunjari 1979).

A thorough examination of the body of Tamil literature may provide us valuable information about the bird life of Madurai in historic times. In support of this statement, I provide you excerpts from M. Krishnan's translation of a work by the poet of Sathimutham village, near Thanjavur (Theodore Baskaran's e-mail of 19 January 2007; https://in.groups.yahoo.com/neo/groups/Tamilbirds/conversations/topics/190). The poem was written in the 3rd or 4th century AD, and it begins thus:

> O stork, O stork, O red-legged stork
> With coral-red beak, sharp tapered
> Like the split tuber of the sprouting palmyra,
> Should you and your spouse turn northward
> From sojourning at the southern
> Waters of Kanyakumari…

The birds addressed by the poet have been identified as White Storks (Guha 2000). The poet goes on to request these storks to inform his wife, who is in his village, that they

> …Saw this wretch
> In Madurai, city of our Pandya king…

…thereby providing us a putative early record of the species from Madurai—this species, it might be mentioned, is not seen over the city now.

Both, Madurai, and descriptions of nature, appear prominently in classical Tamil literature. Madurai city, for example, features in Ilango Adigal's *Silapatikaram*, one of the Tamil epics. And, in the words of Baskaran (2009), 'The poets of ancient Tamil Nadu documented their external world with great detail. In describing backdrops to their narration they wrote about birds, mammals and plants.' There are innumerable references to nature in the Sangam literature (Varadarajan 1957), a body of Tamil works from ***c.*** 2000 years ago. Indeed, nature is an important element of Sangam literature. Unfortunately, an analysis of these works is beyond the scope of this paper.

One speculates simply, however, that the avifauna of Madurai was very different in ancient times and that it has seen many changes over the long history of the city. After all, even the Meenakshi Amman temple [The Temple], so closely associated with the city from the earliest times (see below), has changed considerably, having been repaired and extended by various rulers.

The core area

The Temple is located at the centre of the oldest part of the city. It is one of the largest temple complexes in India, and it seems to have attained its present proportions and form some 300 to 400 years ago. All the main streets in the area run roughly parallel to the walls of the temple in a concentric arrangement. The streets closest to the temple walls are named the East-, West-, North-, and South- Chitrai streets. The next ring of streets is formed by the Avani Moola streets, and outside these are the Masi streets.

In 1559, Viswanatha Nayak, ruler of Madurai, built a fort around the city. The walls of the fort ran just outside the Masi streets, again parallel to the temple walls, one to each of the cardinal directions. The entire fort lay immediately to the south of the Vaigai River. (Today, water flow in the Vaigai is regulated, and is generally restricted to a few days in any year.) The walls constituted the city limits for close to three centuries, and by the 19th century, the area within had grown very crowded. In 1841, the then Collector of Madura District, John Blackburne, had the walls and the glacis and ditch outside removed to ease the congestion and to 'improve the health of the place' (Francis 1906). Soon, the historical quarter was girt with three new sets of streets comprising four streets each. The new streets were 'handsomer and broader than any others in the place', but still, they were no avenues or boulevards (Francis 1906).

The extent of this historical central part of Madurai, including the Veli streets, is around two square kilometres. This compact old quarter remains very crowded, although the city has expanded greatly since the times of Blackburne. It is heavily built up, and the buildings jostle each other. There is just one tiny park, at the junction of East and North Chitrai streets. There are practically no other open areas here. (There was one other park, also minuscule, at one end of South Avani Moola Street. It has been converted to a car park in recent years.) Around the city, there are numerous tanks, the *kanmais* of southern Tamil Nadu; but within the old town itself there are no waterbodies, unless you count the ancient pond of the golden lotus, within the temple, as one.

There continues to be a perceptible lack of trees in the old part of the city, apart from a large number of ornamental palms–*Roystonea* and *Chrysalidocarpus*–that have been planted immediately outside the temple's walls. From a rooftop, one can see the tops of only a few pipal *Ficus religiosa* trees peering over the shoulders of buildings. Walking along the streets, one finds that there *are* some trees; but these are mostly specimens of small, or badly lopped and pollarded ones—they hardly count as functional trees! In July 2013, I counted the trees (apart from the aforesaid *Roystonea* and *Chrysalidocarpus*) along the Masi and Chitrai streets, which have a combined length of some six or seven kilometers. The total was 128. I could not identify 20 of these trees. Among the rest, the neem *Azadirachta indica* was clearly the 'dominant species', numbering 49 individuals. The next most numerous trees were the pipal (15 trees), followed

by the rain tree *Albizia saman / Samanea saman* (ten trees), and *Pongamia glabra* (six trees). Among the remainder were a *Syzygium*, a banyan *F. benghalensis*, a couple of gulmohurs *Delonix regia*, several mast trees *Polyalthia longifolia*, and a few *Millingtonia*.

Clearly, the 'core area' of Madurai has few attractions for birds. From an avian perspective, the place is a stretch of bare rooftops and has no vegetation worth mentioning. It is practically sterile. Precisely for this reason, the city of Madurai represents an interesting observational experiment for the ornithologist. What bird life could be expected here? One could hypothesise that only a few species may be found here—some commensals and scavengers, apart from some granivorous birds that could eke a living out of the spilt grain of the markets. Perhaps there would be some frugivores too, exploiting the pipal trees seasonally when they fruit. It could be expected that some birds will stray into the city from the agricultural and wild areas around the city.

It may be instructive, therefore, to study this set of birds.

The birds of Madurai city

Little has been published to date on the birds of the 'fort' of Madurai. Jerdon (1839) mentions a Common Barn Owl he caught here: 'Whilst at Madura lately, one flew into my room at an open window after a rat that was running, and I secured it alive…' Nichols (1944a, 1944b, 1945), who provided an account of the avifauna of Madura District, makes hardly any references to the birds of the city proper. I have published a few notes on the birds of the old quarter (Sathasivam 1991, 1992, 1995, 1996, 1999, 2007).

I have put together the following list from my records (maintained from the late 1980s, irregularly) and memories and impressions related to earlier years. I have 'kept an eye' on the birds at least a few days each month to the present. I have incorporated some records of Dr. Badrinarayanan (*pers. comm.*), who lived in the core area for many years.

Most of my observations were from my house, which is close to the temple. Often the birds were on a few favourite perches: a television antenna that stood on my rooftop, a gulmohur or other tree that grew in my backyard, an *Aegle marmelos* that grew just outside my wall or a tall pipal that still stands on South Kaval Kooda Street. In other instances they were just flying by. Should anyone wish to spot birds at Madurai, my advice is to do so from the open terrace of a building; from ground level, your view is just too restricted.

The list

- **Cormorants [Phalacrocoracidae].** Birds seen flying overhead, singly or in groups. My records all fall between August and January, except for one record in May 2007, when a solitary bird was noted. A group of 60 birds in December 1991.
- **Egrets [Ardeidae].** Single birds or small groups seen flying past occasionally. My records are all from April to August, except for a bird seen in January 1990.
- **Indian Pond Heron *Ardeola grayii*** Individual birds and small groups seen occasionally as they fly overhead. They are seen in all months, and as far as I can see, there is no pattern to the direction in which they head.
- **Black-crowned Night Heron *Nycticorax nycticorax*** Calls heard occasionally at night. My records are from June to January.
- ***Asian Openbill Anastomus oscitans*** Two records of single birds. Dates not recorded.
- **Glossy Ibis *Plegadis falcinellus*** A single record. A group of 11 birds flying past, May 2007. Nichols (1945) recorded the species only twice (December and January), at Sholavandan. But in recent times the bird has become quite common in wetlands around Madurai. A very large number was seen at Kunnathur, about 15 km from Madurai (Narayanan & Sathasivam 2002).
- **Black Kite *Milvus migrans*** I remember that the whinnying call of this bird was regularly heard in the 1960s and 1970s. Now its numbers seem to have dropped. A group of Black Kites, ranging in number from a dozen to 50, may be seen drifting to some roost in the evenings. Evidently breeds in January. According to Nichols (1944b), the Black Kite ranked seventh among the plains-birds in his records.
- **Egyptian Vulture *Neophron percnopterus*** One record. A single bird flying above the temple. Date not recorded, but probably in the 1980s.
- **Shikra *Accipiter badius*** Calls heard regularly. Individuals or pairs seen flying overhead or perched on my TV antenna or some adjacent building. Nichols (1944b) found it fairly common on the plains, 'in light jungle or trees near houses'.
- **Booted Eagle *Hieraaetus pennatus*** One bird in the pale plumage, seen flying in the sky on Diwali day in October 1992. Nichols (1944b) considered this bird to be rare in the district. He had three records: two in the plains and one at Kodaikanal. These records fell between 13 December and 20 March.
- **Laggar Falcon *Falco jugger*** A pair took up residence in the area in August 1992. They were seen regularly, mostly in the mornings and evenings. They could have been living off the Rock Pigeons that flock at the temple *gopurams* (towers). A month after they were first seen, the falcons disappeared as abruptly as they arrived. Nichols (1944b) found this species to be uncommon in the district.
- **Shaheen Falcon *Falco p. peregrinator*** One record. A single bird flying past, July 2006 (Sathasivam 2007).
- **Indian Peafowl *Pavo cristatus*** A few instances, possibly in the 1970s. The birds involved were almost certainly semi-domestic ones. There are populations of Peafowl in areas around Madurai, such as the base of Tiruparankundram Hill and the campuses of Madurai Kamaraj University, and the Agricultural College.
- **Eurasian Thick-knee *Burhinus oedicnemus*** Calls heard in the night twice in 1992. One bird seen flying by in the daytime in August 1994. Nichols (1945) had only one record of the species, 'one bird on a dry tank-bed at Madura on June 26'.
- **Rock Pigeon *Columba livia*** Roosts on the *gopurams* of the Meenakshi Amman Temple. In the evening, dozens of them settle on a *gopuram* in a group, only to take off immediately and return, repeating the performance a number of times, reminding one of ocean waves crashing on a rock. Found by Nichols (1945) to be an uncommon bird in the district. In 2007, as noted in my diary, there may have been a significant increase in its numbers, and it became the commonest bird of the city. Individual birds and groups seen heading swiftly across the sky at any time of the day.
- **Spotted Dove *Streptopelia chinensis*** A single record. A bird on a television antenna one morning on Town Hall Road. Date not recorded, probably after 2000.
- **Rose-ringed Parakeet *Psittacula krameri*** Single birds, and occasionally small groups, fly past a few times daily, uttering their loud calls. For a month or so, I recorded the time when I heard these calls or saw the birds flying past. But no clear pattern of timing was discernible. Parakeets are regularly seen at a rain tree

near the main entrance of the temple.

• **Asian Koel *Eudynamys scolopaceus*** Nichols (1944b) found it to be 'uncommon, wandering about much, usually … in thick groves'. It was an uncommon bird in the early 1990s as well, but the Asian Koel has become a bird that is heard practically daily now. One male used to visit a papaya tree that grew in my house.

• **Pied Cuckoo *Clamator jacobinus*** Calls heard in the night in November in three consecutive years in the early 1990s. Calls possibly of this species heard in the night in August 1991 (Sathasivam 2002).

• **Collared Scops Owl *Otus bakkamoena*** One record. The calls heard in the temple precincts one night in June 1994.

• **Spotted Owlet *Athene brama*** A bird that has apparently declined. It used to be common once, guessing from the regularity with which its loud and raucous calls were heard in the night. Once I found a dead owlet on my terrace. At some point it seems that the species disappeared, and I did not hear it for many years. But in the last few years, the calls have been heard a few times.

• **Common Barn Owl *Tyto alba*** Found by Nichols (1944b) to be fairly common, 'judging from the frequency of sucking or grating calls at night'. This was my impression too. The temple *gopurams* were popular roosts, for the owls' hissing used to be heard from them. But I rarely hear the bird now. It does roost and probably nest in campuses of schools and colleges that have trees and large buildings. These campuses lie outside the fort area.

• **Indian House Swift *Apus affinis*** Nichols (1944b) found it to be 'locally common on the plains, especially in old temples and the Madura palace, in flocks of about 200 or more'. This bird is seen regularly in the sky, often in groups. It mills about, uttering its shrill cries, at times; quite silent at others. I have seen a group of around 200 only once, in August-September 1992. Nests in the Meenakshi Amman Temple. Dr. Badrinarayanan has seen nests at the Perumal Temple and at a cinema theatre, both close to the railway station (West Veli Street).

• **Alpine Swift *Tachymarptis melba*** Seen regularly in March 1992. A spread-out group of these birds flew over the city at 0800 hrs every day. The greatest number I saw at any time was five birds. Jerdon (1862) wrote this about this bird: 'I saw, on several occasions, large flocks of them flying eastward towards the sea from the rocky hills near Madura about sunset. On another occasion, I saw, at midday, an enormous flock of them flying eastwards from the same range, a little south of Madura; these, however, were probably taking their ordinary rounds of a few hundred miles, but the others flying seaward at sunset—where were they bound for?' Where were 'my' Alpine Swifts bound for, I wonder. Nichols (1944b) found the bird to be uncommon, 'sometimes solitary, sometimes as many as 20 together'. His records fall between 27 January and 10 September.

• **Asian Palm Swift *Cypsiurus balasiensis*** Single birds or pairs seen in a few instances, including once with a group of Indian House Swifts. A group seen above the railway station (West Veli Street) once.

• **Blue-tailed Bee-eater *Merops philippinus*** Seasonal visitor. Calls regularly heard in the mornings as individuals or small groups sweep large circles in the sky or fly past. My earliest record is on 15 August. I find that I do not have records after 28 January, but I would guess the birds are around even later. Nichols' (1944b) records are from 10 August to 02 April, though he found a single bird at the northern foothills of the Sirumalais (around 50 km from Madurai) on 13 June and 04 July.

• **Indian Roller *Coracias benghalensis*** Uncommon. Single birds seen flying past. There were a few instances in which single birds were seen perched on a pipal tree or on electric wires.

• **Pied Kingfisher *Ceryle rudis*** This bird was seen regularly in the evening from the end of July to mid-September in 1991. One to three birds used to fly past overhead at around sunset then, calling. These birds may be seen at the Vaigai River and at waterbodies around the city.

• **Common Kingfisher *Alcedo atthis*** Seen a few times at the golden lotus pond in the Meenakshi Amman Temple. Status not clear.

• **White-throated Kingfisher *Halcyon smyrnensis*** Seen occasionally, flying past or perched on a vantage point such as a television antenna. Heard fairly regularly.

• **Coppersmith Barbet *Psilopogon haemacephalus*** Described by Nichols (1944b) as 'common, frequenting fairly heavy trees'. Coppersmiths were resident in the area till recently. Their calls could be heard and they were seen in a pipal tree at South Kaval Kooda Street or the *Aegle marmelos*. One of the perches on which they were seen regularly was a bamboo pole erected on a rooftop. They seem to have left the area now. My last confirmed record is dated 24 May 2007.

• **Indian Pitta *Pitta brachyura*** A few records of single birds in my backyard, close to the dates when they should have been migrating to their breeding grounds. A dead bird in October 1994, which must have been a freshly arrived specimen. Badrinarayanan (verbally, 11 August 2013) has also seen the bird in the city, at Nanmai Tharuvar Koil Street. Nichols (1944a) found the species to be rare in the district, 'on the ground near thick trees', and describes it as a winter visitor to the region, found between 10 October and 10 April.

• **Larks [Alaudidae]** A single unidentified species in the backyard, one night, just after a thunderstorm. It had disappeared the next morning.

• **Barn Swallow *Hirundo rustica*** Seasonal visitor. Individuals and small groups were seen hawking insects overhead. Sometimes these birds flew low above the ground along busy streets. Seen from 28 August till 20 April. Nichols (1944a) found it to be a common visitor, from 01 September to 19 April.

• **Red-rumped Swallow *Cecropis daurica*** Two records, from March 1992, and April 1992 respectively, but I did not see the birds well enough to confirm my identification. This is not a common bird even outside the city.

• **Western Yellow Wagtail *Motacilla flava*** Seasonal visitor. The calls of the bird were heard as the birds flew past overhead. The earliest date I have for them is 21 September; the last is 01 April (but they may be seen on later dates at water tanks around the city). On more than one occasion I have seen a few of these wagtails perching on my antenna. But I have not heard or seen them for several years. Found by Nichols (1944a) to be a 'winter visitor, September 15 to April 26. Abundant in wet fields. Flocks contain up to a thousand birds.'

• **White-browed Wagtail *M. maderaspatensis*** Single birds, or pairs seen, usually on some high perch, round the year. The calls heard regularly. Found by Nichols (1944a) to be 'fairly common at tanks and ponds. When there is no water elsewhere, they enjoy even the iron water-tanks at railway stations'.

• **Red-vented Bulbul *Pycnonotus cafer*** Pairs and single birds were seen and heard regularly around my house in the early 1990s. Sometimes I saw three or four birds together, evidence, perhaps, of breeding in the locality. On one occasion there may have been a group of six birds. The bulbuls perched regularly on

my TV antenna. Then I did not note them for a period of several years. In May 2013 I heard their calls on three occasions. Nichols (1944a) ranked this bird as the fourth most abundant among the plains-birds of Madura District. He said that it was 'found wherever there are small trees and bushes'.

• **Brown Shrike *Lanius cristatus*** One record; A single bird on my TV antenna, from October 1994. Badrinarayanan has seen this species at Nanmai Tharuvar Koil Street.

• **Yellow-billed Babbler *Turdoides affinis*** Five records, including a single bird in March 1989 and a group of three birds in the backyard in October 1996. This species is not included by Nichols (1944a) in his list of birds of Madura District. He may have mis-identified it as the Jungle Babbler, which species, he says, was found in the plains, and in the hills up to 1860 m.

• **Common Tailorbird *Orthotomus sutorius*** A couple of records. A pair seen once in the backyard. In another instance, a single bird at the '*Vilvam*' tree *Aegle marmelos*.

• **Blyth's Reed Warbler *Acrocephalus dumetorum*** Two records. One from January 1990, and the other in the gulmohur tree, from November 1994.

• **Greenish Leaf Warbler *Seicercus trochiloides*** Calls heard at the temple once, in November 1994.

• **Zitting Cisticola *Cisticola juncidis*** A single, recent record (2012?). A bird that flew past high above, calling.

• **Purple Sunbird *Cinnyris asiaticus*** A male in eclipse plumage seen at the gulmohur tree once. Date not recorded.

• **House Sparrow *Passer domesticus*** Nichols (1944a) ranked it fifth in abundance among the plains birds. He found it 'about houses except when large flocks raid the grain-fields.' In my experience, it was a common bird throughout the year. At least two pairs used to nest, sometimes simultaneously, in the house. They also roosted within the house. They used to peck at mirrors and help themselves to grains of rice, scraps of food on the table, and so on. I saw 14 birds in my backyard once. But they disappeared quietly, and quickly, and my last record is from October 1994. Long after that date, I saw sparrows just once each, off South Masi Street, and near West Perumal Maistry. But I doubt that any House Sparrows are thriving in these places now.

• **Chestnut-tailed Starling *Sturnia malabarica*** Small groups seen a few times at different locations in 1992 and 1993. Nichols (1944a) records this species as a winter visitor to the plains from 06 November to 10 March. My records fall between 21 October and 03 March.

• **Brahminy Starling *S. pagodarum*** Single birds, and pairs, seen or heard, in practically all months between 1990 and 1994. The birds were fond of perching on the TV antenna. A pair was evidently nesting in a rainwater spout above a busy street in August 1992. Like the Red-vented Bulbul, this species apparently disappeared abruptly, though I found a single bird calling on East Masi Street in May 2008. For Nichols (1944a), this species was 'Fairly common in the wetter portions of the plains, sometimes near houses'. Badrinarayanan remembers that he too saw the bird in the city in the past.

• **Rosy Starling *Pastor roseus*** One record. A dozen birds seen at a pipal tree in South Kaval Kooda Street in February 1992.

• **Common Myna *Acridotheres tristis*** Resident. But not abundant. Pairs heard and seen regularly. Nichols (1944a) found it to be second only to the House Crow, in abundance, on the plains, about houses, and in remote fields.

• **Indian Golden Oriole *Oriolus kundoo*** I saw one to three of these birds regularly at a pipal tree in March and April 1992. Single birds were seen a couple of times at the same tree in February the next year. Nichols (1944a) describes the species as a winter visitor in the district, found from October 24 to April 13.

• **Ashy Drongo *Dicrurus leucophaeus*** One record; a single bird on my TV antenna, 03 January 1990. Nichols (1944a) recorded it as uncommon in Madura District. He said it was found in mango groves, scrub jungle, and forests.

• **Drongos [Dicruridae]** Unidentified drongos were spotted at a distance (perched on a pipal tree or flying high above) in a few instances between 1991 and 1994. These birds, single on each occasion, were probably Black Drongos *D. macrocercus*, ranked third in abundance in the plains by Nichols (1944a), but my records are from September to January, and so there is a possibility of these being drongos.

• **Rufous Treepie *Dendrocitt vagabunda*** Two records. Single birds flying past.

• **House Crow *Corvus splendens*** I remember this was a very common bird in the 1970s. Crows would be seen resting in the shade of a parapet wall in the afternoon. It was easy to excite them by imitating their calls or pretending to throw something at them, and soon a number of their conspecifics would gather and circle above, cawing loudly as they checked what the agitation was about. Nichols ranked the House Crow first in abundance among the plains-birds. It does not occupy that position in the city now. But its calls are heard regularly, betraying its presence in the area.

• **Large-billed Crow *C. macrorhynchos*** The bird could be resident in the area because single birds are seen occasionally, in most months. But it is far less common than the House Crow. Pairs seen on two occasions, three birds once. Nichols (1944a) stated, 'It ranks 8th in abundance among the plains-birds, and is about one-fourth as numerous in my records as the House Crow. It avoids dense jungle, but is more a bird of the open country and the edge of the village.'

Understanding them

In the event my Madurai checklist contains more than just the few opportunistic birds—commensals, and granivores—that could have been anticipated from a description of the 'habitat'. The birds of this list constitute a mixed bag. Nevertheless, I find that the birds can be grouped thus:

1. **Overflyers.** The cormorants, egrets, Black-crowned Night Heron, Yellow Wagtail, Indian Pond Heron and Pied Kingfisher. These are birds that do not 'belong' to the city. They are really birds of the numerous wetlands around Madurai, and they are seen (or have been seen) occasionally when they use the Madurai airspace to move from one place to another.
2. **Birds of uncertain status.** This group includes birds that were once found, some were even common, but now seem to have disappeared (House Sparrow, Red-vented Bulbul, Brahminy Starling, and Coppersmith Barbet), or have become much less common (Spotted Owlet, Common Barn Owl); those that have never been common (Large-billed Crow, and Common Kingfisher); and those that were seen in only one or two seasons or instances (Rosy Starling, Chestnut-tailed Starling, Red-rumped Swallow, Indian Golden Oriole, and Indian Peafowl). It is not clear if the species that were present continuously still persist in smaller numbers. It is also not clear what led to the disappearance of these, and whether they will re-establish themselves in the city. I include the Alpine Swift, and the Laggar Falcon in this group as the nature of their occurrence is unusual. I also include

the Collared Scops Owl because there is a possibility that it leads a discreet existence in the city; perhaps roosting in a tree in the temple. These uncertainties and the unpredictable manner in which some species seem to have declined raise concerns about the group as a whole.

3. **Vagrants.** This is the largest group, with some 20 species. It is a particularly motley collection, and the occurrence of most of these species in the area is incongruous. The group includes the Blyth's Reed Warbler, Indian Roller, Rufous Treepie, Pied Cuckoo, Yellow-billed Babbler, Asian Palm Swift, Eurasian Thick-knee, Common Tailorbird, Booted Eagle, Brown Shrike, Indian Pitta, Greenish Leaf Warbler, Glossy Ibis, Asian Openbill, Shaheen Falcon, and Purple Sunbird, apart from the unidentified lark, and the drongos. The only explanation that can be offered for the records of these species is that they wandered by from outside the city. This group emphasises the point that birds disperse constantly. Are the specific birds on my list particularly good dispersers, or are they random? More than 300 species have been recorded by Nichols in Madurai District. Presumably, if one waits for a sufficiently long period, eventually all of them will be seen at Madurai city!
4. **Residents.** Here finally is the group of true Madurai birds. They actually live in the city, evidently obtaining food here. These are the ones you may expect to see or hear on a regular basis. The group includes the Black Kite, Shikra, Rock Pigeon, Rose-ringed Parakeet, Asian Koel, Indian House Swift, White-throated Kingfisher, White-browed Wagtail, Common Myna, House Crow, Blue-tailed Bee-eater, and Barn Swallow. With the exception of the last two species, the birds in this group probably also breed within the city, or in its immediate outskirts.

Sorting the birds into groups permits a glimmer of understanding—perhaps simplified—of their occurrence to be gained. Likewise, listing the birds of the last group, the resident species, in a more orderly fashion, namely with the names of the families and orders, offers insights:

Falconiformes: Accipitridae: Black Kite; Shikra.
Columbiformes: Columbidae: Rock Pigeon.
Psittaciformes: Psittacidae: Rose-ringed Parakeet.
Cuculiformes: Cuculidae: Asian Koel.
Apodiformes: Apodidae: Indian House Swift.
Coraciiformes: Coraciidae: Blue-tailed Bee-eater; Alcedinidae: White-throated Kingfisher.
Passeriformes: Hirundinidae: Barn Swallow; Motacillidae: White-browed Wagtail; Sturnidae: Common Myna; Corvidae: House Crow.

Two aspects of this list are very striking: One, the list is quite short. A typical nature walk may produce many more species. The shortness of the list supports the hypothesis with which we began our examination: Madurai city, as we saw, offers few incentives for birds to linger in, and the dozen species that are found are ones that can thrive in a human landscape. But I wonder if the list could have been predicted *ab initio*.

Two, the distribution of species in the higher taxa is very uniform (even): there is exactly one species in each family that is represented in the city (except the family Accipitridae, which has two members) and just one to four species in each of the orders. This, we can see intuitively, is in contrast with the pattern of birds in other checklists. This is readily verified by considering Nichols' Madura District list—there are 323 species falling in 61 families in 19 orders. Since the numbers involved are so different, to compare the two areas, we could take the ratio of the number of species to number to families and the ratio of the number of species to number of orders. The values of these ratios are 1.1 and 1.7, respectively, for the city, and 5.3 and 17 for the district. Out of curiosity, I took two other lists (a list of the birds of Periyar Tiger Reserve (Robertson & Jackson 1992), and a list of the birds of India (http://en.wikipedia.org/wiki/List_of_birds_of_India; accessed on 15 August, 2013), choosing them purely on the basis of ready availability, and determined the corresponding numbers. I have presented the figures in Table 1, and there seems to be a trend of higher values of the species : families, and species : orders, ratios as you consider larger areas. However, rather than extent, *per se*, it is clearly an ecological basis that accounts for the difference in the values—Periyar is rich bird country, but it is homogeneous, compared with Madura District, which is a mosaic of habitats. India on the whole, of course, has far more habitats. You could extend the exercise to the ultimate limit by working out the ratios and numbers for all the birds of the entire world. As we know, the distribution of bird species across orders is lopsided, with a heavy list towards the order Passeriformes. But working in the reverse direction is more intriguing. What would happen to the ratios if progressively *smaller* areas were considered? Will not the manner in which the ratios diminish depend on the habitat? If you restrict yourself to a heavily built-up area in another city, what will your set of birds be? At the end of all this reflection, we only have more questions! And we have not explained why the distribution of species in the higher taxa is so even! If the distribution had been asymmetric in any way, the skew could have been explained away as a quirk of the 'habitat'.

Speaking of comparing the diversities of different places, there are measures of biodiversity that are reckoned using taxonomic information, apart from the number of species and proportions of species in a community. Quadratic entropy is one such

Table 1. Bird diversity (species and higher taxa) of four areas that differ in extent by orders of magnitude (increasing from top to bottom). The number of species per higher taxon—in terms of the range or the average—increases greatly as the area increases. This is understandable since the inclusion of more habitats brings the numbers of the taxa closer to the all-India figures. But the even distribution of species in the families and orders in Madurai city is not as easily explained.

Area	Number of species	Number of families	Number of orders	Species per family (range)	Species per order (range)	Species per family (average)	Species per order (average)	Source of data
Madurai city	12	11	7	1–2	1–4	1.1	1.7	This work
Periyar	281	57	18	1–29	1–125	4.9	15.6	Robertson & Jackson (1992)
Madurai District	323	61	19	1–29	1–145	5.3	17	Nichols (1944a, 1944b, 1945)
All India	1301	106	23	1–117	1–709	12.3	56.6	http://en.wikipedia.org/wiki/List_of_birds_of_India

measure (Desrochers & Anand 2004). Taxonomic information is involved in the calculation of quadratic entropy through the use of 'taxonomical distances'. Here is an example to illustrate the meaning of the term: The taxonomical distance between two kingfishers (same family) would be shorter than that between a kingfisher and a woodpecker (even the Orders are different).

Using a taxonomic diversity index, you could compare one set of bird species with another, and determine quantitatively which of those was more diverse. It is intuitively clear that a set of five species including a crow, a woodpecker, a pigeon, a parakeet, and a hawk, is more diverse than another set of five species, all of which are bulbuls. But real-life bird communities are more complex, and so the advantages of using a sophisticated measure of biodiversity are evident.

Given a certain species count, the quadratic entropy would be greatest when the species are taxonomically spread out (and when they are found in equal proportions—but this is not relevant here). As we have seen in the foregoing, the birds of Madurai are indeed taxonomically spread out.

Taxonomic diversity indices have been developed not just to determine which of two groups of birds is more closely related (or more unrelated—it all amounts to the same question). These indices include taxonomic information because of the premise that a more dissimilar assemblage of taxa is found in a habitat that is ecologically more varied. In other words, you can draw conclusions about habitats from these indices.

Could we apply the concept of quadratic entropy (or any taxonomic diversity index) to comparisons of cities in terms of their 'ecology'? I suppose not. They are not natural habitats. And I have not come across any publication in which values of quadratic entropy for bird assemblages have been published. But the idea is fascinating.

It is true that the higher-level taxonomic diversity of Madurai city is high, but the fact remains that the species list is very short. The reasons for this are also evident—the city does not provide the vegetation, water, food, and nesting sites that other species need. And from those reasons, birdwatchers, and naturalists, can make recommendations to improve the number and variety of birds in the middle of Madurai city:

- Grow roadside trees.
- Implement changes in the power distribution system in the city. Badrinarayanan pointed out to me that the trees in the city are lopped regularly because they come into contact with the overhead power lines when they grow. If electricity is distributed through underground cables, as is done is some other cities, branches will not have to be cut periodically.
- Grow plants on rooftops and in backyards.
- Set water out for birds.
- Provide open spaces wherever possible, including in areas that are being developed in the outskirts. Restore open spaces that have been lost.
- Provide perches on rooftops for birds.
- Provide nesting boxes and build bird-friendly constructions to permit birds to breed.

The number of overflyers and vagrants gives hope that the birds will respond to these measures.

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Birdbaths: Attracting birds to an urban home garden

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Abstract

The present article describes how placing birdbaths, in an urban home garden, can provide a critical resource for the local avifauna. Between 2009 and 2014, two earthen-, and three cement birdbaths, of various sizes, were placed in an urban home garden. In addition, two sprinklers were set-up to drench the leaves of two bushes to encourage birds to bathe in the water-droplets collected on the leaves. A total of 47 species of birds comprising both residents, and migrants visited the birdbaths for drinking and bathing. The number of species visiting the birdbaths over the years, increased steadily from a mere eight species in the first year. Conservation implications of providing birdbaths in residential urban gardens, and the resulting opportunities for studying bird behavior, are discussed.

Introduction

Water forms an important daily requirement of birds, and is essential for their survival, as they need to replenish what's lost through excretion, and evaporation through respiration, and skin (Welty 1982). Birds need to drink water frequently to compensate this loss. Birds also use water to bathe in, to clean their feathers, and to get rid of avian parasites (Anonymous 2004).

In the past few years, the demand for water has been growing exponentially, especially in urban areas. The unpredictable monsoons, the depleting ground water due to the uncontrolled sinking of bore-wells, and the urban planners' lack of clarity regarding the recharging of ground water, have only worsened the situation. Given this backdrop, it is becoming increasingly difficult for birds to satisfy their basic need for water in urban areas. The city of Bangalore is no exception to this.

Through this article I wish to report the effect of placing birdbaths in an urban home garden, and how, over time, it has attracted a large number of bird species. Since childhood I have always loved nature—trees, animals, birds— and as part of this experiment, I wished to observe birds, without disturbing them.

Methodology

This study was carried out in my home garden, in the new housing colony inside the Indian Institute of Science (IISc) Campus in Bengaluru (Karnataka, India). Although the IISc campus is blessed with reasonably dense vegetation, and has a relatively diverse birdlife (Shyamal 1994) for an urban area, the bird population is very sparse in its residential areas. A reasonable variety of bird species is seen at a couple of select places on the campus, such as the Jubilee Garden, and the Water Pond areas.

For my project I selected a small area in my garden, of about six square meters, which is clearly visible from my kitchen window. Most of my observations of the activity around the birdbaths were made through the kitchen window, more particularly while I was cooking. A camera was kept within reach to photograph, and videograph the birds visiting the birdbaths.

A total of five birdbaths, comprising earthen- and cement pots of various sizes, were placed, and replenished with water (Table 1). In addition, mechanical sprinklers were used to spray the leaves of Ixora *Ixora coccinea*, and Hibiscus *Hibiscus rosa-sinensis* bushes in the birdbath area, thus providing water droplets on the leaves for birds.

Results

Initially, in September 2009, I placed a small, shallow pot (28 cm dia. x 10 cm depth) in the selected space. To prevent mosquitoes breeding in the pot, I changed the water once in three days. After a couple of weeks, dogs started visiting the spot to drink water from it. After another two weeks, a Large-billed Crow got the distinction of being the first bird visitor to frequent the birdbath. Then, over the next few days, the location started to become more interesting, with the appearance of a variety of birds, including Common Myna, Jungle Myna, Rock Pigeon, Spotted Dove, Oriental Magpie Robin, Asian Koel, and Red-whiskered Bulbul. By the end of the first year I had recorded eight different species of birds, and it was a joyous experience to see the birds playfully bathe in, and drink the water.

Then I decided to increase the number of birdbaths during 2010–2011. I kept two bigger, and deeper cement tanks (122 x 43 cm; 122 x 35 cm), and a smaller one (63 x 25 cm), next to the first pot (Table 1). To eradicate mosquito larvae, I released fishes (guppies, kois, and mollies) into the water, and also grew water plants such as lotus *Nelumbo nucifera*, star water lily *Nymphaea nouchali, etc.* I was happy that my little corner was increasing in natural diversity. Because of this, I did not have to change the water in these larger tanks. I also hung a small, and shallow pot (25 x 10 cm), from the branch of a nearby champaka *Magnolia champaka* tree. After a few days, I was surprised to see a White-throated Kingfisher parking in a tree nearby, possibly eyeing my fishes! One fine day I saw it diving into the pond and catching a molly! Occasionally, it would also dive into the water to take a dip and go back on the tree branch and shake its feathers vigorously (Bhat 2011). This kingfisher visited for about a year (2010–2011), and presumably stopped, once I stopped adding new mollies to the birdbath. I inferred that guppies were too small for the kingfisher. The kois were always deep inside the pond, and hence the birdbath, without food, was unattractive to the kingfisher! Another special visitor in the second year was a Black Kite. It was an amusing site to see this big bird perching on the edge of the pond, drinking water occasionally, and bathing by taking a gentle plunge into the pot, and then climbing onto the rim of the pot (Bhat 2013e).

From 2010–2011, through 2013–2014, I started noticing interesting behavioral patterns in different birds. Among various birds visiting the site, the Greater Coucal appeared to be shy. It

would survey the area for a long time, and then sit on one end of the pot. It would slowly jump into the pot, swim across, and come out on the other side. If it wished to take another dip, it would walk along the rim of the pot, to reach its original perch and dip into the water to come out on the other end to dry its feathers. It would run away, before any other birds visited the spot. The Asian Koel had an elaborate procedure for drinking water. It would first perch on different branches of trees near the pond, and would appear to do neck exercise, by tilting its neck in different directions, obviously surveying for lurking danger. Then it would sit on the rim of the birdbath and take five to ten minutes to drink a few sips of water. Spotted Doves, typically, came in pairs, and unlike the Asian Koel, they did not believe in wasting time. First, they ensured that nobody was around the birdbaths, then quickly flew to the pond, sipped, and flew away, into nearby bushes, to dry and clean their feathers. They rarely took a dip in the water. Rock Pigeons seemed to have a perception that they were under threat, and would fly in and out of the patch in no time, and sometimes it was difficult to tell whether they really drank any water at all. Red-whiskered Bulbuls appeared to really like water sports! They spent a lot of time plunging into the water, and splashing the water all around. The Oriental Magpie Robin liked to mark its territory around the birdbath, only during the nesting period. It would drive away other birds, and then drink, lifting its tail, and spreading it few times; a beautiful sight. The male sang all the time during its breeding season. Both, the male and the female really liked to drench their feathers fully in the birdbath. The Cinereous Tit avoided the birdbaths on the ground, but instead preferred to sit on the small pot hung on the champaka tree. This led me realise that some birds might prefer greater safety while drinking water and bathing; so I pushed the hanging pot closer to the bark of the champaka tree, and also camouflaged the area by tying a green creeper near the pot. After a few days, a pair of White-cheeked Barbets found this to be very safe and ventured to sit on the small pot. The two barbets would sit on opposite sides of the small pot and engage in synchronized drinking and bathing activity (Bhat 2013a). This was a splendid sight to watch. Sometime in February 2013, this branch fell down due to heavy wind and rain. I moved the hanging pot to an upper branch, but the barbets stopped their visits, may be because they did not feel secure with this new position.

While all these birds were visiting the birdbaths and the pots, I wondered about the absence of smaller birds such as sunbirds and tailorbirds. One afternoon, while watching my birdbath patch on a typically hot day, it suddenly rained for about ten minutes. After the rain stopped, I noticed a lot of water drops on the leaves of an ixora bush across the pond. I spotted a Common Tailorbird bathing by fluttering on the wet leaves, and then drying its feathers. Subsequently I started spraying water on the leaves of the ixora and hibiscus plants near the birdbaths, every morning and afternoon, hoping that would attract smaller birds. I was not disappointed. I was in for a treat with many small birds bathing on these leaves using the water drops. My bird list started growing slowly: Loten's Sunbird, Purple-rumped Sunbird, Oriental White-eye, and a flowerpecker. I had never seen the small birds at such proximity, giving me new opportunity to study them in detail. This also meant more work for me. Though the birdbaths required to be refilled once in a fortnight, water had to be sprayed on leaves twice a day, and sometime three to four times a day on hot days. These birds would typically be around from 0630 hrs to 0800 hrs, and 1500 hrs to 1600 hrs. I finally installed a mechanical sprinkler during 2012–2013 to extend the spraying of water more efficiently. I could do this because the IISc administration set-up a Sewage Water Treatment Plant, and began supplying recycled water from it to the campus community for gardening.

During 2011–2012, and 2012–2013 I noticed a steady increase in the population of different species of warblers. About nine species of warblers became frequent visitors, and each one of them had an unique way of using the water. The Booted Warbler would wake me up at 0600 hrs with its call. As soon as I would complete watering the bushes, this warbler would stay in the lower branches of a Hibiscus plant and jump from one branch to the other, bathing in the shower of droplets that ensued. The Greenish Warbler was observed to hit the leaves from below, while flying, and get wet in the process. The Tickell's Leaf-, and the Western Crowned- Warbler preferred to get fully drenched by sitting in the path of a sprinkler. The Blyth's Reed-, Sykes's-, and Clamorous Reed- Warblers were the only warblers that liked to bathe in the pond, but in their own distinct way. I had put a small twig, with a few branches, in the middle of the pond, to help the small birds sit on it before jumping in the pond. These Warblers exploited this, and would sit on the twig, very close to the water surface. Then they would only dip their head in the water, and shake the neck vigorously to wet their body.

Among smaller birds, only the Oriental White-eyes ventured to bathe in the large birdbath, but were observed to do so, only once. This was a group of 10–15 birds. It appeared that this group had decided to take over the entire pond on that occasion, also getting drenched in the water on the leaves of Star water lily (Bhat 2013b). It remains a mystery to me what attracted them to the big pond. Otherwise they always preferred the branches of the Ixora. Typically, they always came in a group of 15 to 20 birds, and appeared to take over the Ixora plant to get wet. They also liked to get drenched by directly aligning to the jet of water, from the sprinkler, falling on the Hibiscus bush.

After I started using the sprinkler, I noticed that some of the birds, which came to the pond, preferred to go to wet bushes near the birdbath. Black-naped Monarch **[34]**, and Asian Paradise Flycatcher **[35]**, which started visiting the garden in the second and third years were seen to dive into the birdbaths. However, since 2012–2013, they were observed bathing, and drinking water, in the bushes. Recently, the bulbul has also preferred the bushes.

Another interesting observation was that some species of birds did not mind sharing the water, and tolerated the presence of other birds on the birdbaths and in the bushes. I've seen Jungle Mynas, Oriental White-eyes, sunbirds, and Oriental Magpie Robins share the birdbaths **[36]**. On the Ixora plant, a large variety of birds including sunbirds, white-eyes, flowerpeckers, tailorbirds, Red-whiskered Bulbuls, warblers, and flycatchers co-existed (Bhat 2013c, 2013d).

Photo: S. Bhat

34. Black-naped Monarch.

35. Indian Paradise-flycatcher.

Photos: S. Bhat

36. Birdbath: Oriental Magpie Robin and Oriental White-eyes.

2013 has been eventful, with the appearance of rare birds in my garden. On 08 February 2013, at 0830 hrs, while I was observing the birdbaths from my kitchen window, I heard the call of a bird I did not recognise, and started tracking that voice under the bushes near the ponds. I spotted the bird, drinking water from the leaves and walking around, maybe hunting for food. I photographed it, and was later able to identify it as a Tickell's Thrush **[37]** (Grimmett *et al.* 2011; Bhat 2013g). This was only the second recorded sighting of the bird from Bengaluru city; the first being in Lalbagh (Prashant 2005). On 09 March 2013, I spotted a warbler, which looked quite different from other warblers that I had identified. I went through two field guides carefully (Ali 2009; Grimmett *et al.* 2011), and was able to confirm it as the Green Leaf Warbler, which was again a very rare bird in Bengaluru. I was also rewarded with a visit of the Forest Wagtail **[38]**, which liked to get drenched by standing against a

37. Tickell's Thrush.

38. Forest Wagtail.

jet of water from the sprinkler. Then on 10 October 2013, I had the best reward of sighting Kashmir Flycatcher, the first record for Karnataka state (Bhat 2014).

A total of 47 species of birds were recorded visiting the garden, and using the birdbaths (Table 2). 36 of these used the birdbaths for both, drinking, and bathing, while the remaining eleven species only drank from them (Table 1).

Over the years, there was a steady increase in the number of bird species visiting the birdbaths in the garden. From a mere eight species recorded during the first year, the number increased to 47, during 2013-14 (Fig. 1). Of these, 46.8% were migrants, visiting the garden during winter, and early summer (Table 1). In addition, the birds visiting the birdbaths differed in their body-sizes, ranging from a size larger than a crow, to that smaller than

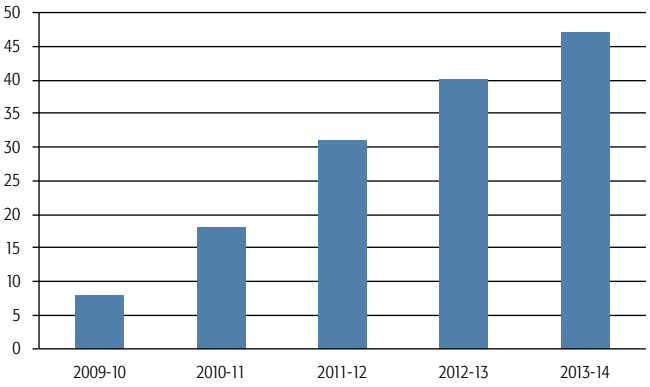

Fig. 1. Increase in the number of bird species visiting birdbaths.

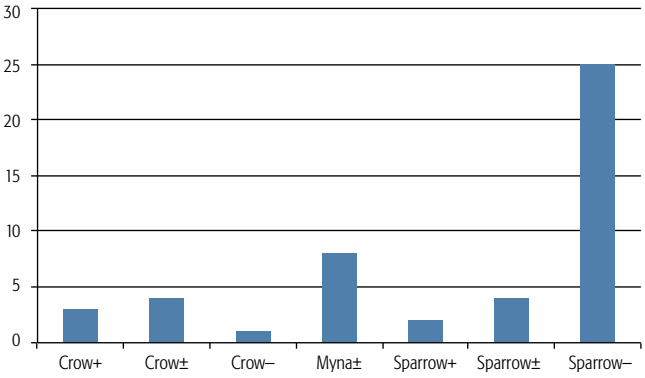

Fig. 2. Size distribution amongst birds visiting the birdbaths.

a sparrow. However, smaller-sized birds were the more frequent visitors (Fig. 2), with over 50% of the birds visiting the birdbaths being smaller than a sparrow; possibly indicating that the demand for water is greater among small birds rather than in larger ones (Bartholomew & Cade 1963).

In summary, these five years have been extremely rewarding, enabling me to watch and study the birds of my home garden. It is amazing how birdbaths can transform an urban garden into habitat that attracts birds, increasing their diversity from eight to 47 species (Table 1). This has enthused some of my friends to put out birdbaths in their gardens. I have also begun creating a bi-lingual blogspot, to share my thoughts on birdbaths (Bhat 2013f). I sincerely hope this would encourage a large number of people in the urban areas, to do their bit in reviving the avifauna in the urban areas.

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Table 1. Details of the birdbaths, their usage and the visiting bird species

Type of pot used	Dimensions (Cm) Diameter	Depth	Depth of water	Height of the rim from ground	No.	Usage	Bird species observed using the baths/plants*
Birdbaths							
Earthen pot	28	10	5	10	1	Drinking and Bathing	1, 3, 12, 13, 14, 24, 25, 26, 28, 29, 33, 34, 36
						Drinking	2, 4
Earthen pot	25	10	5	160 (hanging)	1	Drinking and Bathing	13
						Drinking	2, 7, 27
Cement pond	122	43	38	38	1	Drinking and Bathing	1, 5, 6, 10, 17, 20, 24, 36
						Drinking	2, 3, 4, 12, 32, 46, 47
Cement Pond	122	35	30	30	1	Bathing and Drinking	10, 11, 20, 24
Cement Pond	63	25	22	22	1	Bathing and Drinking	24, 26, 36,
Sprinkler water on plants							
Hibiscus Plant area	Occupies an area of 180 cm x 100 cm	130 (Plant height)			1	Bathing and Drinking	9, 10, 15, 16, 17, 18, 19, 21, 22, 23, 24, 28, 31, 33, 35, 36, 38, 39, 40, 41, 42, 43, 44, 45
						Drinking	30
Ixora Plant area	Occupies an area of 210 cm x 152 cm	125 (Plant height)			1	Bathing and Drinking	8, 9, 10, 11, 15, 17, 18, 19, 21, 22, 24, 28, 33, 35, 36, 37, 38

*The numbers correspond to the list of species in Table 2.

Table 2. List of birds visiting the birdbaths in the home garden

	Name	Status
1	Black Kite *Milvus migrans*	R
2	Rock Pigeon *Columba livia*	R
3	Spotted Dove *Streptopelia chinensis*	R
4	Asian Koel *Eudynamys scolopaceus*	R
5	Greater Coucal *Centropus sinensis*	R
6	White-throated Kingfisher *Halcyon smyrnensis*	R
7	White-cheeked Barbet *Psilopogoen viridis*	R
8	Indian Golden Oriole *Oriolus kundoo*	M
9	Black-naped Oriole *O. chinensis*	M
10	Black-naped Monarch *Hypothymis azurea*	M

11	Indian Paradise-flycatcher *Terpsiphone paradisi*	R
12	Large-billed Crow *Corvus macrorhynchos*	R
13	Cinereous Tit *Parus cinereus*	R
14	Red-whiskered Bulbul *Pycnonotus jocosus*	R
15	Tickell's Leaf Warbler *Phylloscopus affinis*	M
16	Sulphur bellied Warbler *P. griseolus*	M
17	Greenish Leaf Warbler *Seicercus trochiloides*	M
18	Green Leaf Warbler *S. nitidus*	M
19	Western Crowned Leaf Warbler *S. occipitalis*	M
20	Clamorous Reed Warbler *Acrocephalus stentoreus*	M
21	Blyth's Reed Warbler *A. dumetorum*	M
22	Booted Warbler *Iduna caligata*	M
23	Sykes's Warbler *I. rama*	M
24	Common Tailorbird *Orthotomus sutorius*	R
25	Yellow-billed Babbler *Turdoides affinis*	R
26	Oriental White-eye *Zosterops palpebrosus*	R
27	Common Myna *Acridotheres tristis*	R
28	Jungle Myna *A. fuscus*	R
29	Blue-capped Rock Thrush *Monticola cinclorhyncha* **[39]**	M

[39] Blue-capped Rock Thrush

30	Tickell's Thrush *Turdus unicolor*	M
31	Oriental Magpie Robin *Copsychus saularis*	R
32	Indian Blue Robin *Luscinia brunnea*	R
33	Asian Brown Flycatcher *Muscicapa dauurica*	M
34	Brown-breasted Flycatcher *M. muttui*	M
35	Taiga Flycatcher *Ficedula albicilla*	M
36	Kashmir Flycatcher *F. subrubra*	M
37	Verditer Flycatcher *Eumyias thalassinus* **[40]**	M

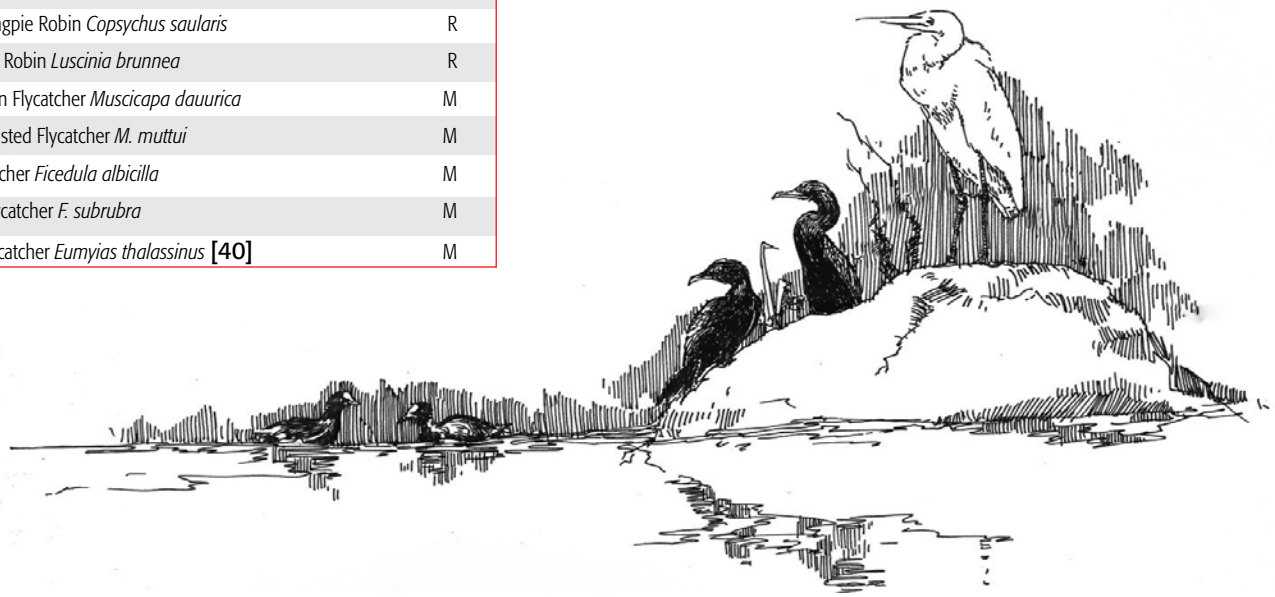
[40] Verditer Flycatcher.

38	Blue-throated Blue Flycatcher *Cyornis rubeculoides* **[41]**	M

[41] Blue-throated Blue Flycatcher.

39	Tickell's Blue Flycatcher *C. tickelliae*	R
40	Pale-billed Flowerpecker *Dicaeum erythrorhynchos*	R
41	Purple-rumped Sunbird *Leptocoma zeylonica*	R
42	Purple Sunbird *Cinnyris asiaticus*	R
43	Loten's Sunbird *C. lotenius*	R
44	Forest Wagtail *Dendronanthus indicus*	M
45	Grey Wagtail *Motacilla cinerea*	M
46	Indian Pond *Heron Ardeola grayii*	R
47	Cattle Egret *Bubulcus ibis*	R

Photos: S. Bhat



Art: Hemant Kumar

Population trend of the common birds in a residential area of Thiruvananthapuram city, Kerala

Raju S.

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Abstract

The status and distribution of birds in Jawahar Nagar, a residential area in Thiruvananthapuram, Kerala were studied from March 2005 to March 2010. Bird diversity, and abundance, were assessed through systematic, regular, and repeated surveys. Seventy-seven species of birds were identified during the study period, represented 34 families, of which one is categorised as Near Threatened, four are in Schedule I of the Wildlife Act, 14 are migrants, 62 residents, and two, habitat specialists. 213 field hours were spent in the field. House Sparrows *Passer domesticus,* which were abundant during the 1990s, were totally absent during the study period. An analysis of the data showed a gradual increase in the diversity, and abundance, of birds in the initial years, followed by a decrease in the last year. Incidentally, the study area was under a lot of disturbance during the study, caused by construction activity, habitat destruction, *etc.* An increase in the numbers of some species, especially Rock Pigeon *Columba livia,* was noticed, along with the increased number of large apartment blocks in the area. 40 species of birds were recorded breeding in the area, using 31 trees of different species; more than ten other nesting sites were observed. . One large roost was also observed, with 10,000+ birds comprising nine species. The guild structure analysis of the birds showed an equal representation of insectivores and carnivores (20 species each). As birds are indicators of the health and quality of their environment, fixing priorities, and developing strategies, for their conservation is inevitable for a healthy urban agglomeration.

Introduction

Birds are amongst the most visible forms of Earth's biodiversity. They are good indicators of environmental change. They occupy a range of habitats, and are responsive and sensitive to environmental change. Public planners can use the changes in their populations in a habitat, for strategic conservation planning for the wider environment. Birds are excellent barometers of the health of the environment, and of the sustainability of human activities (Bibby 1999; Niemi *et al.* 1997). Urban habitats are continuously exposed to alterations, unpredictable anthropogenic disturbances, and other developmental activities. Effects of these disturbances are reflected in urban bird populations. This paper presents the population trends of urban birds from an urban, residential area in Thiruvananthapuram, Kerala.

Study area

The study was carried out in Jawahar Nagar (N 8.56 E 76.97), a residential colony located in the heart of Thiruvananthapuram, the capital of Kerala, India. It is one of the oldest residential areas of the city near the Raj Bhavan, the residence of the Governor of Kerala. The elderly residents of this colony recall that the area was a well-wooded hillock during the 1950s, had many fresh water ponds, and vast lush green paddy fields on its eastern side. The Tapioca Research Station under the Kerala Agricultural University functioned here during that time, and the area was known as '*Maracheenivila*' (=the locality of tapioca). After the formation of the State of Kerala in 1956, the area was converted to residential plots, paving the way for hundreds of buildings, bungalows, and dwelling quarters for government officials. The thickets and patches of groves were cleared off, and the ponds and marshes filled up. Instead of the old indigenous trees, new exotic tree species and garden plants were introduced. By 1970 the area had been totally transformed into a residential area. The real estate boom, which reached its peak during the study period, changed the landscape of Jawahar Nagar. More than 200 new buildings and 11 large apartment complexes rose during the study period, and destroyed the remaining trees, open lands, and marshy areas.

Methodology

The study tried to understand the status, and distribution, of the common bird population of this urban locality. The birds of the residential colony were regularly monitored for a period of five years, from March 2005 to March 2010. A 1.4 km transect was selected along the main road passing through the center of the residential colony. This was traversed in one hour, in the morning, between 0630–0930 hrs. All the birds that were either seen, or heard, on either side of the road, were recorded. Surveys were carried out once every week, in the first four years, and once a month, during the last year. Birds that were observed incidentally in the area, outside the study time, also were noted, and added to the species list. Biological activities of birds, like feeding, displays, nesting *etc.*, were recorded whenever I happened to observe them.

Results and discussions

I observed 77 species during the study period, out of which 67 were observed while walking transects. A total of 213 field hours were spent on transect walks in these five years. The average count of birds observed per transect was 153.6, while the average number of species was 23.7. The minimum number of species observed in a survey was 18, the maximum, 36. Species diversity was greater in winter. The maximum count of birds was 251, and the minimum, 87. The total number of species per year increased till the third year, after which it decreased (Fig. 1). In the last year the number of species was only 45. But this year surveys were done once in a month.

Fig. 1. Total number of species

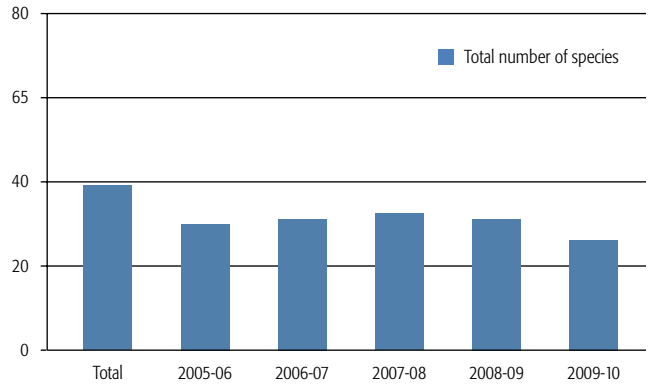
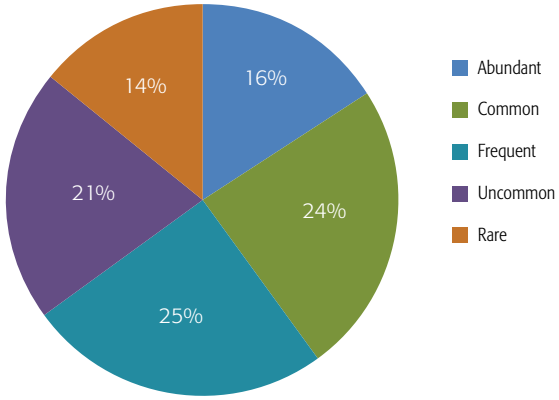


Fig. 2. Abundance



Encounter rate

The encounter rate[1] of the 67 species per ten hours was calculated, and birds were classified into different ordinal scales to assess abundance (Table 1, Fig. 2).

Table 1. Ordinal scales of abundance

Ordinal scale	Category	No. of species
>60	Abundant	11
6–60	Common	16
0.4-6	Frequent	17
0.1-0.4	Uncommon	14
<0.1	Rare	9

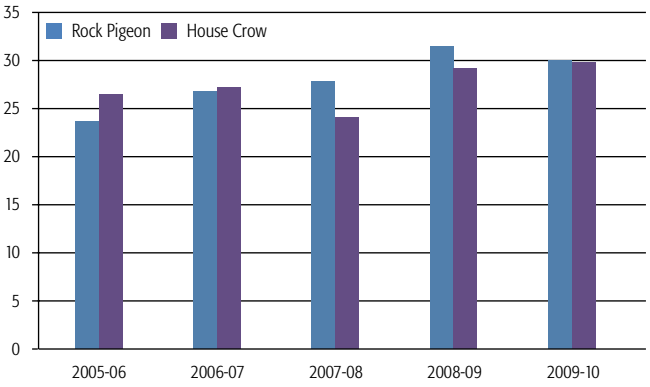
Eleven species of birds were found to be abundant; they were present on almost every day of the survey. These species are listed here in a descending order of abundance. Rock Pigeon *Columba livia*, House Crow *Corvus splendens,* Common Myna *Acridotheres tristis*, Asian Koel *Eudynamys scolopaceus*, Black Kite *Milvus migrans*, Common Tailorbird *Orthotomus sutorius*, Large-billed Crow *C. macrorhynchos*, Purple-rumped Sunbird *Leptocoma zeylonica*, Rose-ringed Parakeet *Psittacula krameri*, Pale-billed Flowerpecker *Dicaeum erythrorhynchos*, and White-cheeked Barbet *Psilopogon viridis*. The Rock Pigeon (ER=283.62) was the most abundant bird, followed by the House Crow (ER=276.24). In the first two years, House Crows were the most abundant birds, but from the third year onwards, Rock Doves' numbers overtook them (Fig. 3). Incidentally, this was the period when the study area suffered increased levels of construction activities, in the form of huge buildings, and apartment blocks. Rock Pigeons exploited new nesting spaces; atop air conditioners projecting outside the buildings, inside air holes, and ventilators, of these huge buildings, *etc*.

Eight birds were found to be 'rare' by the survey. These were Ashy Woodswallow *Artamus fuscus*, Asian Openbill *Anastomus oscitans*, Bronze-winged Jacana *Metopidius indicus*, Brown Hawk Owl *Ninox scutulata*, Indian Roller *Coracias benghalensis*, Cinnamon Bittern *Ixobrychus cinnamomeus*, Oriental Honey Buzzard *Pernis ptilorhynchus*, Plum-headed Parakeet *P. cyanocephala*, and Rosy Starling *Pastor roseus*.

16 species were found to be' common', 17 were under the 'frequent' category, and 14 belonged to the 'uncommon' category. The Yellow-legged Green Pigeon *Treron phoenicopterus* was sighted from the study area, though outside it, and has been listed under the 'uncommon' category.

[1] Encounter Rate (ER) = Total count /Total No. Of Field hours spent x 10

Fig. 3. Average numbers: House Crows vs. Rock Pigeons



Migratory status

Twenty-one species of birds observed from the area were migrants (Table 9), out of which fourteen observed during the study period.

An interesting observation was that the migrants—Greenish Leaf Warbler *Seicercus trochiloides,* Forest Wagtail *Dendronanthus indicus*, Cattle Egret *Bubulcus ibis*, and Indian Golden Oriole *Oriolus kundoo*—were all in the 'common' category (encounter rate between 6–60). Greenish Warblers, and Forest Wagtails are the earliest migrants to Jawahar Nagar. Both of them, along with the Indian Golden Oriole, retained a consistent population in the area, during the study period, spending almost seven months in the study area. They also maintained a remarkable consistency in the timings of their arrivals in winter, and their return journeys (Table 2).

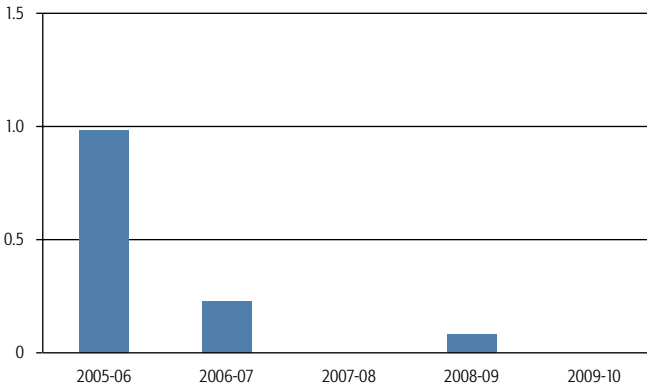
Decline in the population of White-breasted Waterhen

The White-breasted Waterhen *Amaurornis phoenicurus* is a common species of wetlands and marshes. It belongs to the guild category 'Carnivore Aquatic'. I recorded a decline in its population during my study (Fig. 4). The species was totally absent in the last year. The reason for its decline, and absence, in the last year, maybe due to the loss of its habitats—wetlands, marshes, and open lands.

Table 2. Arrival and departure dates of three species of migrants

Year	Greenish Warbler		Forest Wagtail		Indian Golden Oriole	
	Last sighting: summer	First sighting: winter	Last sighting: summer	First sighting: winter	Last sighting: summer	First sighting: winter
2005	30 April	14 October	03 April	14 October	20 April	24 November
2006	07 April	26 September	28 March	27 October	07 April	16 November
2007	04 April	16 October	28 March	23 October	04 April	05 November
2008	07 April	30 October	07 April	01 October	15 April	15 November
2009	06 April	30 October	06 April	26 September	06 April	30 October

Fig. 4. Average number of White-breasted Waterhen per day



Breeding records

Breeding activities of 40 species were recorded from the study area. These included observations of nests, nest building, birds with nesting material, birds feeding chicks, sightings of chicks, juveniles, immatures, and sub adults, courtship displays, breeding songs, *etc*. 620 nests, of 33 species, were noted, upon 31 species of trees, and shrubs, included exotic (14), as well as indigenous (17) species (Table 3). 142 species of trees and shrubs were identified from the residential area through a separate survey.

Coconut palms were the most favoured nesting tree; they were used by 13 species of birds, which constructed 213 nests on them. Spathodea was the next most favoured nesting tree (135 nests belonging to eight species). Birds used several artificial nesting sites, including sodium vapour lamps, lamp shades of street lights, ventilation holes and ventilators of buildings, tops of the air conditioner boxes, telephone and electric posts, drainage pipes, mud walls of old houses, crevices between roof tiles, mud pots, hanging ropes, etc. Oriental Magpie Robin *Copsychus saularis*, a hole nester, used several of these artificial nesting sites. This is an example of successful adaptation of a bird to an urban environment. A list of the breeding birds, their nesting months, and the nesting stratum used, are given in the Table 4.

Table 3. List of trees, plants, and shrubs used by birds for nesting

Coconut Palm *Cocos nucifera*	Divi-divi tree *Caesalpinia coriaria*
Spathodea *Spathodea campanulata*	Bauhinia *Bauhinia acuminata*
Gulmohar *Delonix regia*	Tamarind Tree *Tamarindus indica*
Kassoda Tree (Manja Konna) *Cassia siamea*	Kilimaram *Commiphora caudata*
Jackfruit Tree *Artocarpus heterophyllus*	Amla *Emblica officinalis*
Mango Tree *Mangifera indica*	Rain tree *Samanea saman*
Aini Tree *Artocarpus hirsutus*	Bird Cherry *Prunus padus*
Indian Banyan Tree *Ficus benghalensis*	Kasi (Mulluvenga) *Bridelia retusa*
Arecanut Palm *Areca catechu*	Neem tree *Azhadirachta indica*
Nutmeg Tree *Myristica fragrans*	Ixora *Ixora coccinea*
Banana (Plantain) *Musa* sp.	Poomaruthu *Lagerstroemia reginae*
Garlic climber *Adenocalymma alliaceum*	Palmyrah palm *Borassus flabellifer*
Teak *Tectona grandis*	Ornamental palm *Arecaceae* sp.
Hibiscus (red and white) *Hibiscus rosa-sinensis*	Croton plant *Euphorbiaceae* sp.
Bougainvillea (paper plant) *Bougainvillea glabra*	Unknown grass *Gramineae* sp.
	Unknown wild plant

The maximum numbers of nests recorded during the study period were those of the Rock Pigeon (296), followed by the House Crow (120). Table 5 shows the number of nests, in each month, made by Rock Pigeons, and House Crows.

The peak breeding seasons for both the species were March and April. No active nests of Rock Pigeon were observed in June and July. Similarly, I couldn't find any House Crow nest in November. White-cheeked Barbet, Common Myna, Red-whiskered Bulbul *Pycnonotus jocosus*, and Large-billed Crow were the next most frequent breeding species. Their breeding periods were from September to April every year. House Crows constructed nests in eight different species of trees, Large-billed Crows in five, and Red-whiskered Bulbul in five different trees, and shrubs.

It was noticed that the number of trees used for nesting, and the number of nests constructed each year were decreasing over the years (Table 6). The number of trees used for nesting decreased from 19 to nine, and the number of nests from 144 to 98. Seven trees out of the 19 were cut down.

A large roosting site with more than 10,000 birds, belonging to nine species, was observed in the study area. The species were House Crow, Large-billed Crow, Common Myna, Rufous Treepie *Dendrocitta vagabunda*, White-cheeked Barbet, Red-whiskered Bulbul, Indian Pond Heron *Ardeola grayii*, Eastern Cattle Egret, and Little Egret *Egretta garzetta*. The main roosting trees here were the Kassoda tree *Cassia siamea* (8), and the Rain tree *Samanea saman* (4).

A comparison of bird life of Jawahar Nagar in 1996–2004 and 2005–2010

Though regular surveys were done only from 2005, observations on the birds of Jawahar Nagar were done from 1996 onwards. Comparing the observations from 1996 to 2004, with those from the study period, gives interesting data related to the habitat loss and decline in bird population. A total of 104 species, representing 44 families and subfamilies, were observed from the study area in 1996–2004. Checklists of birds observed in the study area during the regular survey period, and the total checklist of birds since 1996 are given in the Table 9. 27 species of birds, representing ten families, were totally missing during 2005–

Table 4. Nesting periods of birds and plants preferred for nesting

Species	Months of nesting records	Nesting trees, and other nesting sites
Shikra *Accipiter badius*	December, February, April	Coconut palm, Aini tree
Black Kite *Milvus migrans*	October, January, February, April	Coconut palm, Aini tree, Tamarind tree
Brahminy Kite *Haliastur indus*	December, March	Coconut palm
White-breasted Waterhen *Amaurornis phoenicurus*	August, January, February	Arecanut palm, Vegetation near a stream
Rock Pigeon *Columba livia*	All months except June and July	Sunshades, air holes and top of a/c boxes in buildings and flats
Rose-ringed Parakeet *Psittacula krameri*	December, January, March, April	Coconut palm, Spathodea, Kassoda tree.
Greater Coucal *Centropus sinensis*	April, May	Mango tree, Nutmeg tree
Jungle Owlet *Glaucidium radiatum*	April, May	Coconut palm, Spathodea tree
Spotted Owlet *Athene brama*	April	Coconut palm, Spathodea tree
Asian Palm Swift *Cypsiurus balasiensis*	April	Palmyra Palm
Indian Roller *Coracias benghalensis*	January, March	Telephone post, Coconut palm
White-throated Kingfisher *Halcyon smyrnensis*	July	Side wall of well
White-cheeked Barbet *Psilopogon viridis*	September to March	Coconut, Spathodia, Mango, Kasssoda
Coppersmith Barbet *P. haemacephalus*	February, April	Coconut, Spathodia
Lesser Golden-backed Woodpecker *Dinopium benghalense*	December, January, February, April	Coconut
Black-hooded Oriole *Oriolus xanthornus*	October, November	Jackfruit tree, Poomaruthu
Black Drongo *Dicrurus macrocercus*	March	Jackfruit tree
Rufous Treepie *Dendrocitta vagabunda*	March, April	Tamarind tree, Jackfruit tree, Amla tree, Rain tree
House Crow *Corvus splendens*	All months except November	Coconut palm, Spathodea, Indian Banyan tree, Kassoda tree (Manja Konna), Jackfruit tree, Mango tree, Aini tree, Gulmohar
Large-billed Crow *C. macrorhynchos*	September to March	Coconut palm, Spathodea, Kassoda tree, Indian Banyan tree, Rain tree
Red-whiskered Bulbul *Pycnonotus jocosus*	December, January, June	Ornamental Palm, Croton plant, Hibiscus, Ixora, Kilimaram
Common Tailorbird *Orthotomus sutorius*	December, January, March, April	Teak, Bauhinia, Parakam (a wild plant), Garlic climber
Yellow-billed Babbler *Turdoides affinis*	September to March	Coconut, Spathodia, Mango, Kasssoda
Jungle Myna *Acridotheres fuscus*	December, January, February,	Coconut palm, Sodium vapour lamp
Common Myna *A. tristis*	September to March	Arecanut palm, Coconut palm, Spathodea, Lamp shade, Telephone post, Sodium vapour lamp
Oriental Magpie Robin *Copsychus saularis*	February, March, April	Teak, Mud wall, lamp shades, sodium vapour lamp, telephone post, Electric posts, air holes, space between the tiles of roofs, drainage pipes, mud pots
Pale-billed Flowerpecker *Dicaeum erythrorhynchos*	December, January, April	Mango tree, Bird cherry
Purple-rumped Sunbird *Leptocoma zeylonica*	December, January, April	Hibiscus, Bougainvillea
Purple Sunbird *Cinnyris asiaticus*	September, November, April	Hibiscus
Loten's Sunbird *C. lotenius*	January, April	Hanging ropes and abandoned wires, Hibiscus
White-rumped Munia *Lonchura striata*	November, January, February	Dividivi, Croton plant, Bauhinia, Neem tree
Scaly-breasted Munia *L. punctulata*	March	Lampshade of a streetlight.
White-browed Wagtail *Motacilla maderaspatensis*	June	Side wall of a Water Tank

Table 5. Number of House Crow and Rock Pigeon nests constructed per month

Year	March		April		May		June		July		August		September		October		November		December		January		February	
	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C
2005–2006	10	6	11	7	4	2	–	1	–	–	–	–	2	–	5	2	4	–	5	3	4	5	6	6
2006–2007	8	5	13	5	5	1	–	–	–	–	2	2	2	1	6	–	–	–	9	4	5	3	7	7
2007–2008	10	4	9	8	8	2	–	–	–	–	5	–	4	2	–	1	6	–	7		4	1	9	9
2008–2009	8	7	11	5	7	1	–	2	–	–		–	9	1	–	2	–	–	6	2	7	4	7	7
2009–2010	15	5	21	4	7	1	–	–	–	1	3	–	–	1	–	–	4	–	5	2	5		11	11
Total	51	27	65	29	31	7	–	3	–	1	10	2	17	5	11	5	14	–	32	11	25	13	40	40

Note: C=House Crow; D=Rock Pigeon

Table 6.

Year	Number of trees used for nesting	Number of nests
2005–2006	19	144
2006–2007	17	136
2007–2008	12	125
2008–2009	10	117
2009–2010	9	98

Table 7. Species categories

	1996–2004	2005–2010
Total bird species	104	77
Waterbirds	21	14
Migrants	18	15
Residents	86	62
Specialist birds	4	2
Generalists	100	75
Schedule I species	7	4
Threatened species	2	1

Table 8. Guilds and species

Feeding Guild Category [Period]	Number of species 1996–2004	2005–2010
Insectivore	35	20
Carnivore	27	20
Frugivore	16	17
Omnivore	9	7
Granivore	7	4
Picivore	5	4
Nectarivore	3	3
Scavenger	2	2

2010. Most of these latter were woodland birds (16 species), and waterbirds (seven species). The decline of these bird species from the area is a clear sign of habitat degradation, with the loss of trees, marshes, and ponds. The House Sparrow, which was very common during 1996–2000, was absent during the survey period. The period from 1996 to 2004 witnessed a gradual decline in the House Sparrow population, and by 2005 the bird became locally extinct. Black-headed Munia *Lonchura malacca*, and Bronzed Drongo *Dicrurus aeneus* also disappeared from the locality. Black-headed Ibis *Threskiornis melanocephalus*, which was the only Near-threatened species in the list, was absent during 2005–2010. Indian Swiftlet *Aerodramus unicolor*, Booted Eagle *Hieraaetus pennatus*, and Crested Serpent Eagle *Spilornis cheela*, all under the Scheduled 1 category of Wildlife Protection Act, 1972, also disappeared. On the other hand, Blyth's Reed-Warbler *Acrocephalus dumetorum*, Rosy Starling, and Forest Wagtail (all migrants) were the species observed only in 2005–2010 period.

The numbers of species observed during the two periods, categorised under different groups, are given in the Table 7.

Guild structure

Feeding guilds of all the species were classified into eight main categories based on their food habits, habitat association, habitat selection, resource use, niche requirements, foraging methods, and behaviour. When the two data sets on feeding guild, from the two periods, were compared, there were considerable differences in the number of species, especially in insectivore, and carnivore guilds. Insectivores were lower in diversity; 20 in 2005–2010 compared to 37 in 1996. And carnivores stood at 20, compared to 27. Some of the canopy foliage feeding birds, and insectivore under storey birds disappeared from the area during this period. Since the guild classification is based on the above-mentioned factors, changes in the habitat have a direct influence on the population decline. Guild classification and the difference in number of species in each guild in the two periods are given in the Table 8.

Conclusion

The presence of 77 species of birds in a crowded residential area, located in the heart of the city, reveals the relevance of such areas, now being continuously subjected to developmental and anthropogenic interventions. The population trends during the study period, of certain species of birds, showed alarming decline. Parks in residential areas act as lungs in an urban ecosystem. They control the microclimate of the region, and help purify the environment. Such areas in the cities are the remaining pockets that birds utilize for feeding, nesting, and roosting. To preserve the biodiversity of such places, it is of utmost importance to retain appropriate habitats. This should be an important component of town planning, and urban development policies. In order to

Table 9. Checklists of birds of Jawahar Nagar

Species recorded	1996–2004	2005–2010	Migrants
Lesser Whistling Duck *Dendrocygna javanica*	X		
Little Grebe *Tachybaptus ruficollis*	X		
Asian Openbill *Anastomus oscitans*	X	X	
Black-headed Ibis *Threskiornis melanocephalus*	X		
Cinnamon Bittern *Ixobrychus cinnamomeus*	X	X	
Black-crowned Night Heron *Nycticorax nycticorax*	X	X	
Indian Pond Heron *Ardeola grayii*	X	X	
Cattle Egret *Bubulcus ibis*	X	X	M
Intermediate Egret *Ardea intermedia*	X	X	
Little Egret *Egretta garzetta*	X	X	
Little Cormorant *Microcarbo niger*	X	X	
Indian Cormorant *Phalacrocorax fuscicollis*	X		
Oriental Darter *Anhinga melanogaster*	X	X	
Oriental Honey Buzzard *Pernis ptilorhynchus*	X	X	
Crested Serpent Eagle *Spilornis cheela*	X		
Booted Eagle *Hieraaetus pennatus*	X		M
Shikra *Accipiter badius*	X	X	
Black Kite *Milvus migrans*	X	X	
Brahminy Kite *Haliastur indus*	X	X	
White-breasted Waterhen *Amaurornis phoenicurus*	X	X	
Red-wattled Lapwing *Vanellus indicus*	X		
Bronze-winged Jacana *Metopidius indicus*	X	X	
Common Sandpiper *Actitis hypoleucos*	X		M
Rock Pigeon *Columba livia*	X	X	
Spotted Dove *Spilopelia chinensis*	X	X	
Emerald Dove *Chalcophaps indica*	X	X	
Yellow-legged Green Pigeon *Treron phoenicopterus*	X	X	
Vernal Hanging Parrot *Loriculus vernalis*	X	X	
Rose-ringed Parakeet *Psittacula krameri*	X	X	

Table 9. Checklists of Birds of Jawahar Nagar

Species recorded	1996–2004	2005–2010	Migrants
Plum-headed Parakeet *P. cyanocephala*	X	X	
Greater Coucal *Centropus sinensis*	X	X	
Asian Koel *Eudynamys scolopaceus*	X	X	
Common Hawk Cuckoo *Hierococcyx varius*	X		
Common Barn Owl *Tyto alba*	X	X	
Collared Scops Owl *Otus bakkamoena*	X	X	
Mottled Wood Owl *Strix ocellata*	X		
Jungle Owlet *Glaucidium radiatum*	X	X	
Spotted Owlet *Athene brama*	X	X	
Brown Hawk Owl *Ninox scutulata*	X	X	
Indian Swiftlet *Aerodramus unicolor*	X		
Asian Palm Swift *Cypsiurus balasiensis*	X	X	
Alpine Swift *Tachymarptis melba*	X	X	M
Indian House Swift *Apus affinis*	X	X	
Indian Roller *Coracias benghalensis*	X	X	
Stork-billed Kingfisher *Pelargopsis capensis*	X	X	
White-throated Kingfisher *Halcyon smyrnensis*	X	X	
Common Kingfisher *Alcedo atthis*	X	X	
Green Bee-eater *Merops orientalis*	X	X	
Blue-tailed Bee-eater *M. philippinus*	X	X	M
White-cheeked Barbet *Psilopogon viridis*	X	X	
Coppersmith Barbet *P. haemacephalus*	X	X	
Common Golden-backed Woodpecker *Dinopium javanense*	X		
Lesser Golden-backed Woodpecker *D. benghalense*	X	X	
Indian Pitta *Pitta brachyura*	X		M
Common Woodshrike *Tephrodornis pondicerianus*	X		
Ashy Woodswallow *Artamus fuscus*	X	X	
Common Iora *Aegithina tiphia*	X		
Large Cuckooshrike *Coracina javensis*	X		
Black-headed Cuckooshrike *Lalage melanoptera*	X		
Brown Shrike *Lanius cristatus*	X		M
Indian Golden Oriole *Oriolus kundoo*	X	X	M
Black-naped Oriole *O. chinensis*	X	X	M
Black-hooded Oriole *O. xanthornus*	X	X	
Black Drongo *Dicrurus macrocercus*	X	X	
Ashy Drongo *D. leucophaeus*	X	X	M
Bronzed Drongo *D. aeneus*	X		
Greater Racket-tailed Drongo *D. paradiseus*	X	X	
Indian Paradise-flycatcher *Terpsiphone paradisi*	X	X	M
Rufous Treepie *Dendrocitta vagabunda*	X	X	
House Crow *Corvus splendens*	X	X	
Large-billed Crow *C. macrorhynchos*	X	X	
Red-whiskered Bulbul *Pycnonotus jocosus*	X	X	
Red-vented Bulbul *Pycnonotus cafer*	X		

Table 9. Checklists of Birds of Jawahar Nagar

Species recorded	1996–2004	2005–2010	Migrants
Barn Swallow *Hirundo rustica*	X	X	M
Red-rumped Swallow *Cecropis daurica*	X	X	
Greenish Leaf Warbler *Seicercus trochiloides*	X	X	M
Blyth's Reed Warbler *Acrocephalus dumetorum*		X	M
Ashy Prinia *Prinia socialis*	X		
Plain Prinia *P. inornata*	X		
Common Tailorbird *Orthotomus sutorius*	X	X	
Jungle Babbler *Turdoides striata*	X	X	
Yellow-billed Babbler *T. affinis*	X	X	
Jungle Myna *Acridotheres fuscus*	X	X	
Common Myna *A. tristis*	X	X	
Chestnut-tailed Starling *Sturnia malabarica*	X	X	M
Malabar Starling *S. blythii*	X	X	
Rosy Starling *Pastor roseus*		X	M
Orange-headed Thrush *Geokichla citrina*	X		
Oriental Magpie Robin *Copsychus saularis*	X	X	
Indian Robin *Saxicoloides fulicatus*	X	X	
Asian Brown Flycatcher *Muscicapa dauurica*	X		M
Brown-breasted Flycatcher *M. muttui*	X	X	M
Rusty-tailed Flycatcher *M. ruficauda*	X		M
Blue-winged Leafbird *Chloropsis cochinchinensis*	X		
Pale-billed Flowerpecker *Dicaeum erythrorhynchos*	X	X	
Purple-rumped Sunbird *Leptocoma zeylonica*	X	X	
Purple Sunbird *Cinnyris asiaticus*	X	X	
Loten's Sunbird *C. lotenius*	X	X	
House Sparrow *Passer domesticus*	X		
Yellow-throated Sparrow *Gymnoris xanthocollis*	X		
White-rumped Munia *Lonchura striata*	X	X	
Scaly-breasted Munia *L. punctulata*	X	X	
Black-headed Munia *L. malacca*	X		
Forest Wagtail *Dendronanthus indicus*		X	M
Grey Wagtail *Motacilla cinerea*	X	X	M
White-browed Wagtail *M. maderaspatensis*	X	X	

develop conservation strategies and fixing priorities, a thorough understanding of biodiversity is essential, and can be better understood if areas are regularly monitored. Activities like planting more fruit trees, providing bird baths, and artificial nest boxes, in different places of the locality, *etc.,* should be promoted.

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Birding in the North Cachar Hills of Assam

Pritam Baruah

Baruah, P., 2015. Birding in the North Cachar Hills of Assam. *Indian BIRDS* 10 (2): 46–50.
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The Barail Hill Range in the Dima Hasao District (=North Cachar Hills District) of Assam is one of the several hill ranges that make up the north-eastern hill states south of the Brahmaputra, such as Naga Hills, Patkai Hills, and Chin-Lushai Hills (Fig. 1). These ranges are sometimes grouped together in ornithological literature (Rasmussen 2012) as the 'South Assam Hills' (=hills south of the Brahmaputra: HSB). The region's avifauna was initially surveyed in the late nineteenth century by Godwin-Austen (1870a,b), Hume (1877), and Baker (1893–1901). Koelz's work (1954), in the mid-twentieth century, made the distributions of species clearer, and many new sub-species came to light (Choudhury 2000; Rasmussen 2012). Modern birdwatching started in the Barails, particularly hills south of Jatinga village, in the mid-1980s, but insurgency in the state of Assam prevented it from becoming mainstream. In fact, problems of safety, and inaccessibility have largely prevented birdwatching in this ornithological hotspot for the last fifteen years.

I had always wanted to go birding there, but never did because of these issues. However, the 08 March 2015 pan-India event, Big Bird Day 2015 (BBD), a citizen science effort with the goal to record as many species as possible in a specific area within a day, became the perfect excuse to reconsider my apprehensions. So on a last minute whim that is where I decided to go, with no prior planning to boot.

The Barail Range is considered by BirdLife International to be an Important Bird Area (IBA-IN367) (Islam & Rahmani 2004). It is the highest range in Assam (100–1,960 m asl). Above 1,000 m the range is cloaked in evergreen forest, with oak forest along the ridge line. Below 1000 m is semi-evergreen forest with plenty of bamboo, as well as patches of natural grasses,

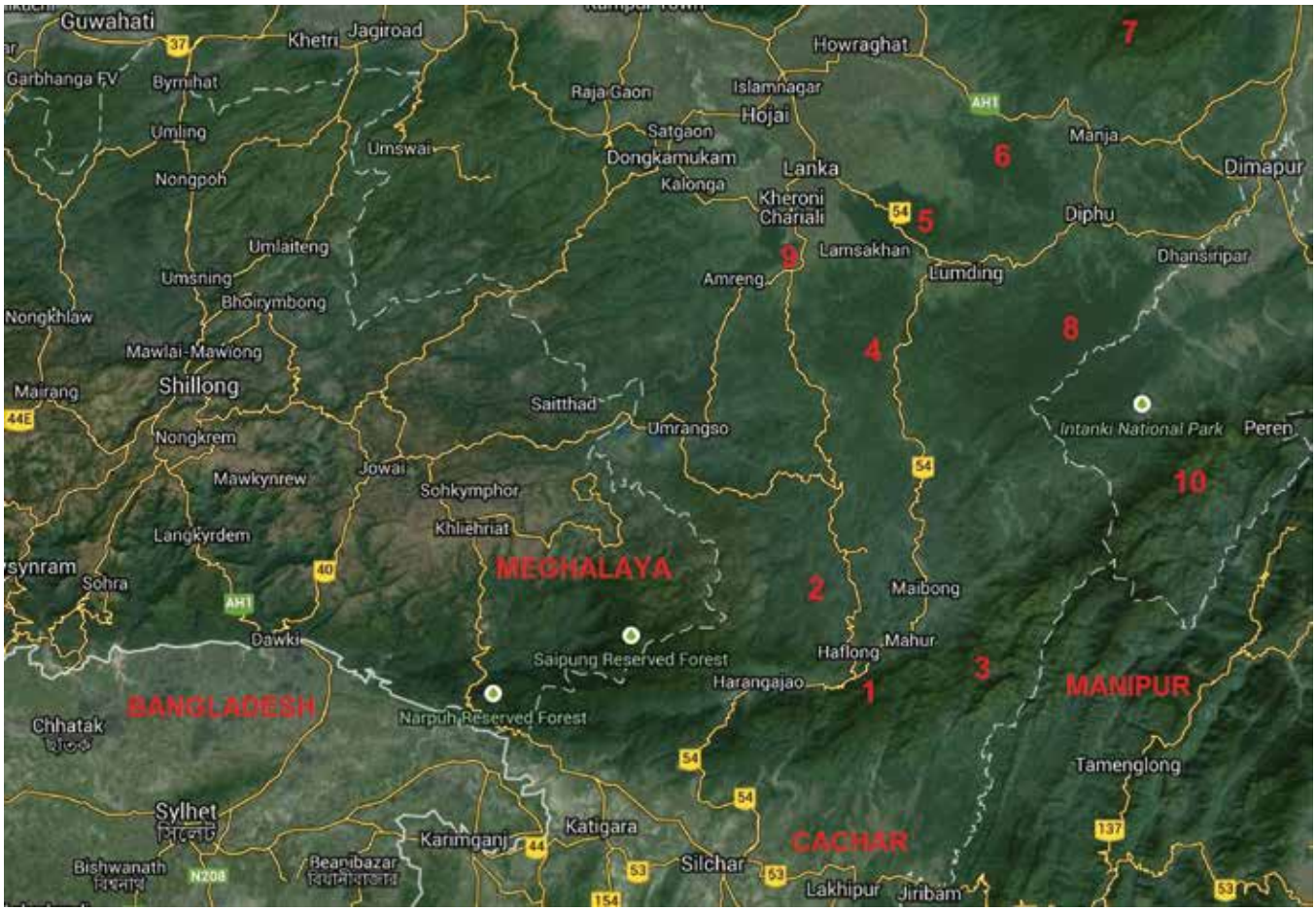

Fig. 1. Map of the region, covering an area of *c.* 226 x 155 km. Source: Google, AutoNavi.
1. Haflong–Jatinga–Hempeupet area (Fig. 2); 2. Dry forest and jhum in undulating terrain; 3. Barail Range (S Assam, SW Nagaland, NW Manipur); 4. Langting-Mupa Reserved Forest; 5. Lumding Reserved Forest; 6. Marat-Longri Wildlife Sanctuary; 7. Karbi Anglong Hills; 8. Dhansiri Reserved Forest; 9. Dayangmukh; 10. Nagaland State

orchards (orange, pineapple, banana, and coffee), and jhum (forests cleared in patches for shifting cultivation, and patches where natural vegetation is re-growing). The northern face of the range rises abruptly from undulating terrain, which tops up at about 700 m asl (at Haflong). This undulating terrain, all in the Dima Hasao District, is very dry because it falls in the rain shadow area of the monsoons. Most of it is covered by jhum cultivation or regenerating jhum fields. I didn't bird there as I didn't have time, but focused on the Barail Range, where higher elevations are accessible.

Fig. 2. Map of the Haflong–Jatinga–Hempeupet area area, covering an area of 10.5 x 8.7 km. Source: Google, AutoNavi.

The Jatinga–Haflong settlement offers the best point of access to the Barail Range in Assam (Fig. 2). I used a car to drive to Haflong, where I stayed for two nights. I didn't birdwatch in the dry habitat along the way, due to lack of time, but it could be interesting to explore: I found some Spot-winged Starlings *Saroglossa spilopterus* at a brief stop. Once there, I started looking for good habitat, and it appeared that the northern slope of the Barail Range was covered in good forest, except at its base (700 m asl) near Jatinga. Even the Hempeupet Peak (25.106ºN, 93.063ºE; 1,750 m asl), tallest in the region, was covered in forest. But it was rather difficult finding how to access it, and it took me the entire second half of 07 March to confirm a reasonable plan for the BBD next day. Basically, my intention was to hike up the range, but on asking around how I should go about it, I received bizarre statements such as, 'no use going up there because no birds', 'we can only walk up at night, light a bonfire and return in the morning', 'best to go half way up, have a picnic and return', 'no going up on Sunday because everyone goes to church', and, most interestingly, 'no birds here at all except in September/October'. This last bit of gratuitous wisdom, no doubt, related to the practice of killing, and consuming exhausted passage migrants in September/October by disorienting them with bright lights on foggy and windy nights. Unfortunately, this practice is widely popular as the 'mysterious bird suicide of Jatinga', an ironic description indeed. It has since been discredited (Choudhury 2000), but the legend continues, as does the hunting. It has shown some decline, but it is unclear if that is attributable to increased awareness about conservation, or simply a decrease in the volume of migrating birds.

Towards late evening I learnt that a trail to the very top of Hempeupet starts at Leikul, a village of the Kuki tribe, situated 2.5 km east of Jatinga. So I went there hoping to find someone to show me the way up the next morning. Almost immediately, I found a young man named Lena who volunteered to accompany me, and unlike others, did not make suggestions. Instead, he listened, and told me that he would simply accompany me; I could do what I wanted, and come down at any time I wanted to. That was a relief, and I asked him to be ready at 0600 hrs the next day. A little earlier I had scoped out the habitat along the road from Jatinga to Retzawl, but decided to exclude it from the BBD on 08 March, and instead spend some time there on the morning of 09 March, before heading back to Guwahati. So the confirmed plan for BBD was a full day birding hike, from Leikul village (700 m asl), on the trail leading up to the Hempeupet peak (1,750 m asl). Hempeupet, also called Barail Peak, is the third-highest in Assam, after Laike (1,959 m asl), and Thumjang (1,866 m asl), both of which are also in the Barail range.

We started the next morning from Leikul at 0600 hrs. On our way up, the abundant Ashy Bulbul *Hemixos flavala* was easily the most vocal species. It seemed to be in view almost constantly till about 1,200 m. There were large flocks of Striated-*Yuhina castaniceps*, and Black-chinned Yuhina *Y. nigrimenta*. We had breakfast at a small shed along the trail that seemed to function as a scenic overlook. An area of grass at 1,400 m held promise of Manipur Bush Quail *Perdicula manipurensis*, and Spot-breasted Parrotbill *Paradoxornis guttaticollis* but we failed to find either. The best birds started appearing after we crossed 1,400 m, and excellent birding continued till we reached the very top of Hempeupet. Notable was a massive feeding flock of at least 16 species, just below the top, at about 1,700 m. Among a total of 95 species for the BBD, highlights included Beautiful Nuthatch *Sitta formosa*, Rufous-backed Sibia *Leioptila annectens*, Grey Sibia *Heterophasia gracilis*, Spot-breasted Laughingthrush *Garrulax merulinus*, Blue-winged Laughingthrush *Trochalopteron squamatum*, Assam Laughingthrush *T. chrysopterum*, Red-faced Liocichla *Liocichla phoenicea*, Rusty-fronted Barwing *Actinodura egertoni*, Streak-throated Barwing *A. waldeni*, Black-headed Shrike-Babbler *Pteruthius rufiventer*, Blyth's Shrike-Babbler *P. aeralatus*, Black-eared Shrike-Babbler *P. melanotis*, White-naped Yuhina *Y. bakeri*, Whiskered Yuhina *Y. flavicollis*, Coral-billed Scimitar Babbler *Pomatorhinus ferruginosus*, Streak-breasted Scimitar Babbler *P. ruficollis*, Streaked Wren Babbler *Turdinus brevicaudatus*, Flavescent Bulbul *Pycnonotus flavescens,* Crimson-breasted Woodpecker *Dendrocopos cathpharius*, Purple Cochoa *Cochoa purpurea*, Mrs Gould's Sunbird *Aethopyga gouldiae*, Green-tailed Sunbird *A. nipalensis*, Sapphire Flycatcher *Ficedula sapphira*, Russet Bush Warbler *Locustella mandelli*, and Collared Owlet *Glaucidium brodiei*. There were also many *Phylloscopus* and *Seicercus* warblers. By the time we descended to Leikul, it was 1830 hrs, so I decided to search for Hodgson's Frogmouth *Batrachostomus hodgsoni* in suitable areas near the village. But speculative playback failed to reveal its presence. Next morning, a short birding session along the Jatinga–Retzawl road, an eight kilometer stretch, yielded 37 species, among which was an Asian Stubtail *Urosphena squameiceps*, possibly a first for Assam.

I returned to Guwahati by the highway-under-construction (Haflong–Maibong–Lumding–Nagaon–Guwahati), a journey that took me five hours and forty-five minutes to complete. I

hoped to spend some time birding on the way back, and even though the road passed through good wilderness areas (dry forest in Langting-Mupa Reserved Forest, and deciduous forest in Lumding Reserved Forest), I decided against stopping because of heavy disturbance and dust from highway construction.

Although this was a very short trip, I found enough evidence that continues to justify its reputation as an area of very high bird diversity. But several factors may warrant further studies: bird distributions change; hunting has intensified due to increased human population and introduction of guns; and further studies are required to fully document the area's avifauna. I feel that the area is safe enough now to conduct such long term studies. While local people are aware that the area is famous for birds, it appears to be only in context of the inexplicably labeled 'mass bird suicides of Jatinga'. Furthermore, this awareness has not prevented hunting, as it was found, from several interactions, that bird, and mammal hunting pressures are still quite severe throughout the year, including during fall migration (August–October). There is an urgent need to spread awareness locally, about the biodiversity of the region, and its conservation. And along with the continually improving security situation, and better connectivity through new highways, this area can reclaim its status as a birding hotspot.

Notes on some selected species

Flavescent Bulbul *Pycnonotus flavescens*

Many in drier forest on the way up to Hempeupet at 1,000 m. In India, found only in HSB.

Beautiful Nuthatch *Sitta formosa*

Top bird of the trip. This bulky nuthatch is considered rare across its range (Rasmussen & Anderton 2012). It was nice to confirm its continued presence in Assam, and the Barail Range. Seen at 1,450 m in a mixed flock, with Rufous-backed Sibia, Nepal Fulvetta, White-naped Yuhina, Black-chinned Yuhina, and Whiskered Yuhina.

Rufous-backed Sibia *Leioptila annectens*

Two seen in a flock, with Beautiful Nuthatch, and then many more seen in a large flock near the top of Hempeupet. It is quite uncommon across its range, and it was great to confirm its continued presence in Assam, and the Barail Range.

Grey Sibia *Heterophasia gracilis*

Surprisingly, only one individual of this range-restricted HSB-specialty was recorded. It was seen associating with a mixed bulbul party at the edge of a forest at ***c.*** 1,200 m.

Spot-breasted Laughingthrush *Garrulax merulinus*

One calling from a densely vegetated gully close to the 1,550 m mark. It was firmly unresponsive to playback. But higher up, near the top, I got lucky when, while watching a Red-faced Liocichla along a descending slope, a rampaging Blue-winged Laughingthrush suddenly appeared, and flushed one Spot-breasted Laughingthrush, and one Assam Laughingthrush; both must have been feeding on the ground out of view. In India it is found only in the HSB region.

Chestnut-crowned Laughingthrush *Trochalopteron erythrocephalum*

A few of these range-restricted HSB-specialty were seen on the ground below the Hempeupet peak. The race *godwini* found in the hills is considered part of a distinct species restricted to HSB and called Assam Laughingthrush *Trochalopteron chrysopterum* (Rasmussen & Anderton 2012).

Black-headed Shrike-Babbler *Pteruthius rufiventer*

Seen in a massive mixed flock just below the Hempeupet peak, which also contained Blyth's-, and Black-eared Shrike-Babblers.

Asian Stubtail *Urosphena squameiceps*

Good sighting of one bird that was hopping on the ground under dense roadside vegetation: very short tail, bold long black eye-stripe, long eye-brow, horizontal stance, very light buff underparts, and brown upperparts. First seen in a shallow gully parallel to the road, with little vegetation. 'Ran' to cover under vegetation above the gully almost as soon as I detected it, but continued to walk on the ground below the vegetation, in clear view, for about 20 sec. Did not fly, but hopped out of sight. This sighting is not entirely unexpected as it has been recorded several times in the past from elsewhere in the subcontinent, notably from eastern Bangaladesh (1997, 1999, 2011), south-eastern Nepal (1993), and West Bengal (2013) (Lewis 1994; Das 2014). Its status in the Indian Subcontinent remains unclear, and understudied.

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Table 1. List of birds

Emerald Dove *Chalcophaps indica*
Asian Palm Swift *Cypsiurus balasiensis*
Green-billed Malkoha *Phaenicophaeus tristis*
Black Eagle *Ictinaetus malaiensis*
Collared Owlet *Glaucidium brodiei*
Asian Barred Owlet *G. cuculoides*
White-browed Piculet *Sasia ochracea*
Speckled Piculet *Picumnus innominatus*
Crimson-breasted Woodpecker *Dendrocopos cathpharius*
Great Barbet *Psilopogon virens*
Lineated Barbet *P. lineatus*
Golden-throated Barbet *P. franklinii*
Blue-throated Barbet *P. asiaticus*
Coppersmith Barbet *P. haemacephalus*
Common Kestrel *Falco tinnunculus*
Vernal Hanging Parrot *Loriculus vernalis*
Short-billed Minivet *Pericrocotus brevirostris*
Scarlet Minivet *P. flammeus*
Black-winged Cuckooshrike *Lalage melaschistos*
Black-headed Shrike-babbler *Pteruthius rufiventer*
Blyth's Shrike-babbler *Pteruthius aeralatus*
Black-eared Shrike-babbler *P. melanotis*
White-bellied Erpornis *Erpornis zantholeuca*
Black Drongo *Dicrurus macrocercus*
Bronzed Drongo *D. aeneus*
Lesser Racket-tailed Drongo *D. remifer*
Hair-crested Drongo *D. hottentottus*
Greater Racket-tailed Drongo *D. paradiseus*
Plain Flowerpecker *Dicaeum concolor*
Fire-breasted Flowerpecker *D. ignipectus*
Little Spiderhunter *Arachnothera longirostra*
Green-tailed Sunbird *Aethopyga nipalensis*
Mrs. Gould's Sunbird *A. gouldiae*
Orange-bellied Leafbird *Chloropsis hardwickii*
House Sparrow *Passer domesticus*
Olive-backed Pipit *Anthus hodgsoni*
White Wagtail *Motacilla alba*
Grey-headed Canary-flycatcher *Culicicapa ceylonensis*
Rufescent Prinia *Prinia rufescens*
Grey-breasted Prinia *P. hodgsonii*
Common Tailorbird *Orthotomus sutorius*
Dark-necked Tailorbird *O. atrogularis*
Russet Bush Warbler *Locustella mandelli*
Pygmy Wren Babbler *Pnoepyga pusilla*
Striated Swallow *Cecropis striolata*
White-throated Bulbul *Alophoixus flaveolus*
Ashy Bulbul *Hemixos flavala*
Mountain Bulbul *Ixos mcclellandii*
Black Bulbul *Hypsipetes leucocephalus*
Striated Bulbul *Pycnonotus striatus*
Black-crested Bulbul *P. melanicterus*
Red-vented Bulbul *P. cafer*
Flavescent Bulbul *P. flavescens*
Yellow-browed Warbler *Abrornis inornata*
Hume's Leaf Warbler *A. humei*
Buff-barred Warbler *A. pulchra*
Dusky Warbler *Phylloscopus fuscatus*
White-spectacled Leaf Warbler *Seicercus affinis*
Grey-cheeked Leaf Warbler *S. poliogenys*
Whistler's Leaf Warbler *S. whistleri*
Greenish Leaf Warbler *S. trochiloides*
Blyth's Leaf Warbler *S. reguloides*
Grey-hooded Leaf Warbler *S. xanthoschistos*
Slaty-bellied Tesia *Tesia olivea*
Grey-bellied Tesia *T. cyaniventer*
Asian Stubtail *Urosphena squameiceps*
Mountain Tailorbird *Phyllergates cucullatus*
Striated Yuhina *Yuhina castaniceps*
Black-chinned Yuhina *Y. nigrimenta*
Whiskered Yuhina *Y. flavicollis*
White-naped Yuhina *Y. bakeri*
Oriental White-eye *Zosterops palpebrosus*
Coral-billed Scimitar Babbler *Pomatorhinus ferruginosus*
White-browed Scimitar Babbler *P. schisticeps*
Streak-breasted Scimitar Babbler *P. ruficollis*
Grey-throated Babbler *Stachyris nigriceps*
Striped Tit Babbler *Mixornis gularis*
Golden Babbler *Cyanoderma chrysaeum*
Rufous-capped Babbler *C. ruficeps*
Rufous-winged Fulvetta *Schoeniparus castaneceps*
Puff-throated Babbler *Pellorneum ruficeps*

Streaked Wren Babbler *Turdinus brevicaudatus*	Chestnut-tailed Starling *Sturnia malabarica*
Nepal Tit Babbler *Alcippe nipalensis*	Common Myna *Acridotheres tristis*
Spot-breasted Laughing-thrush *Garrulax merulinus*	Oriental Magpie Robin *Copsychus saularis*
White-crested Laughing-thrush *G. leucolophus*	White-rumped Shama *Kittacincla malabarica*
Blue-winged Laughing-thrush *Trochalopteron squamatum*	Pale-chinned Blue Flycatcher *Cyornis poliogenys*
Chestnut-crowned Laughing-thrush *T. erythrocephalum*	Rufous-bellied Niltava *Niltava sundara*
Grey Sibia *Heterophasia gracilis*	Lesser Shortwing *Brachypteryx leucophris*
Silver-eared Mesia *Leiothrix argentauris*	White-tailed Robin *Myiomela leucura*
Rufous-backed Sibia *Leioptila annectens*	Golden Bush Robin *Tarsiger chrysaeus*
Red-faced Liocichla *Liocichla phoenicea*	Taiga Flycatcher *Ficedula albicilla*
Streak-throated Barwing *Sibia waldeni*	Snowy-browed Flycatcher *F. hyperythra*
Blue-winged Minla *Siva cyanouroptera*	Rufous-gorgetted Flycatcher *F. strophiata*
Rusty-fronted Barwing *Actinodura egertoni*	Sapphire Flycatcher *F. sapphira*
Beautiful Nuthatch *Sitta formosa*	Purple Cochoa *Cochoa purpurea*

Lesser Florican *Sypheotides indica* in Warora (Chandrapur, Maharashtra, India): Conservation requirements

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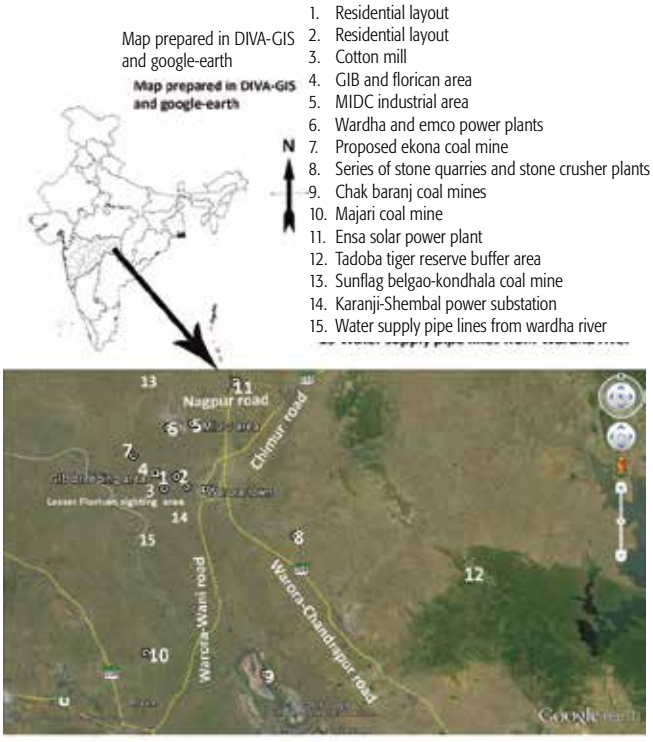
The Lesser Florican *Sypheotides indica* (Otididae: Bustards) is endemic to the Indian Subcontinent. It is known for its irregular local movements in its non–breeding season (Sanakaran 1990). It was once widespread, and common, but now breeds in a few areas in Gujarat, south-eastern Rajasthan (Bhardwaj *et al.* 2011), north-western Maharashtra, and western Madhya Pradesh (Dutta *et al.* 2013). It was also once common in the Terai region of Nepal, but is now rare. India plays a major role in the protection of the 'Endangered' Lesser Florican as 90% of its global population is found in India (Sankaran *et al.* 1992). Due to the loss of its potential habitat, the mosaic of grasslands, and traditional croplands, its population is declining (BirdLife International 2014). In India, the pressure on the remaining grasslands will only increase in the future, and thus the species will struggle for its survival (Rahmani 2012).

The Lesser Florican has been recorded from Pune, and its adjoining areas, such as the Sinhagad Hills, Mulshi Hills, and the Saswad–Dive Ghats (Mahabal & Lamba 1987; Kalpavriksh 2001). It was mentioned as 'rare' in Mumbai (Anonymous 1909). A bird was shot near Pen, in Raigad District, in November 1896 (Anonymous 1898). It was reported from Nannaj Bustard Sanctuary in Sholapur District (Islam & Rahmani 2002), and a chick was rescued in year 2006 from the Karmala area of Solapur (Rahmani *et al.* 2014). It was common in Nashik-, and Ahmednagar Districts (Hume & Marshall 1879), and sighted in the Gangapur and Hosor grasslands in Nashik District in 1998 (Pittie 1998; Raha & Prakash 2001). A female of the species was rescued by a local person in October 2002 at Ambap village, 20 km off the Pune–Bengaluru highway (Rahmani *et al.* 2014). In the Vidarbha region of Maharashtra, which is part of Central India, the Lesser Florican has been recorded from Borgao Manju, Akola, and Darwha, in Yavatmal District (Kasambe & Gahale 2010). Mr.

Kaustubh Pandharipande from Akola, Maharashtra is successfully working with *phase pardhis*, a tribal community known for their wildlife hunting skills, is now involved in monitoring programme for protection of Lesser Florican in Washim-, and Akola Districts (Pallavi 2014).

We have been visiting the Chandrapur area since January 2012 to monitor the 'Critically Endangered' Great Indian Bustard *Aredotis nigriceps* (GIB), which is endemic to India, and Pakistan (BirdLife International 2014). We recorded five to six GIB in the Warora tehsil of Chandrapur (Fig. 1). These birds were using an area between Wanoja and Marda villages (20.25144ºN, 78.95265ºE) for breeding and an area, *c.* 15 km in radius, for ground (Rahmani *et al.* 2014). We visited the area on 22 March 2013 before the harvesting season. In a fallow area near Wanoja village, 2 km from Warora, we flushed one Lesser Florican from 1.2 m tall grass at 1415 hrs. Because of poor light we could not get a proper photograph of the bird but based on its size, flight pattern, and wing clapping noise we assumed it as a Lesser Florican. After ten minutes another bird was flushed from the grasses, and we were able to photograph it. Unfortunately after that we could not make frequent visits to the study area.

Map showing existing and proposed developments in bustard area of Chandrapur district, Maharashtra



Photos: Sujit Narwade

Fig. 1. Map of study area Warora-Chandrapur.

Mr. B. T. Lalsare, Round Officer, Range Forest Office, Warora, and Mr. Vipin Fulzele, local volunteer for the Bharat Natural History Society (BNHS), are monitoring the area for the last two years. They spotted two Lesser Floricans on 20 November 2014 near the Maharashtra Industrial Development Corporation (MIDC) campus of Mohbala, Warora, which is a straightline-distance of 3 km from the Marda-Wanoja villages, where we had sighted these birds earlier. When we visited this site, it was a piece of fallow land, sandwiched between a water canal, and the concrete boundary wall of an industrial unit. The grass here was 0.9–1.2 m high, and the area was inaccessible because of the high water level in the channel.

Bustard habitat in agriculture landscape of the study area

In the study area farmers take two crops in the two seasons; these vary from year to year depend on the rainfall. One is the *kharif* or monsoon crop, which is harvested at the end of the monsoon, and gathered mostly at the beginning of the cold weather. The major kharif crops are rice, jowar, tur, and cotton. The other is the *rabi* or winter crop, harvested usually from January to March. In the Warora, and Bhadravati areas of Chandrapur, where we sighted Great Indian Bustard as well as Lesser Florican, *rabi* crops like wheat, jowar, gram, linseed, and some pulses are grown on a large scale. As Lesser Florican is known to use a mosaic of grassland, and cropland in human dominated landscape, its breeding activity gets influenced by the grazing pattern of cattle, and quantity of rainfall in a particular area, during a given period (Sankaran 1997). For example, bustards and floricans usually avoid overgrazed areas, and are known to follow rain during their breeding seasons. Thus, traditional crop cycles play an important role in providing a condusive habitat for bustards. The Lesser

42. Pockets of fallow lands provide habitat for the Lesser Florican and GIB in croplands of Warora, Chandrapur.

Florican was found using such suitable areas during winter, when height of the crop as well as grass in fallow lands reaches 0.9–1.2 m **[42]**.

Threats to the habitat

The area used by the two bustard species, is a private holding that is under tremendous pressure from the development lobby, as stated below (Fig. 1).

1. Settlements: As the area is just 3 km from Warora town, there is great pressure on it by people, to change its land use category, and use it for, say, brick cilns, the numbers of which have increased in the last two years.
2. Roads: The Nagpur–Chandrapur highway is being developed with new diversions, and is also being widening. This process necessitates the extraction of soil from adjacent areas for land filling. It also increases the chances of wildlife suffering road kills from construction activities. The widened roads will further endanger wildlife and restrict their free movement.

3. Industrialisation: The major crop in our study area being cotton, there is an increase in the number of cotton spinning mills in bustard habitats. We have also seen the land use categories of open lands being converted to set up ginning mills at Marda and Vanoja.
4. Quarries and crushers: Increased infrastructural activities have ensured an escalation of illegal stone quarries, and stone crushers in the grassland areas. These are adversely affecting the flora, and fauna, because of the atmospheric, and noise pollution they produce.
5. Invasive species: Exotic plant species, such as *Prosopis juliflora*, are spreading across the fallow lands, and they dominate the native species leading to reduction in potential habitat for birds like the florican.
6. Electrocution: Increasing numbers of power lines result in deaths of large birds due to collision against the overhead cables. For example, a Mottled Wood Owl *Strix ocellata* was found electrocuted on 31 July 2012, within three months of the installation of a power line for Vardha power at Wanoja village.
7. Poaching: The possibility of poaching by the large work force required by these development projects will be difficult to monitor.
8. Coal mines: An opencast coal mine known as Ekona mine, is proposed to come up right in the area where floricans have been sighted, and which is a breeding site for the Great Indian Bustard. There is great threat to the habitat from this mine and related infrastructure developments **[43]**.

Conservation requirements

Wildlife management consists of habitat evaluation, assessment, and periodic monitoring. Participation of, and support from the local public is essential for a conservation plan to work, and its outcome become sustainable. We need growth and development, but in a sustainable way, as we are dependent on nature in direct, or indirect ways (Fig. 1). Below are some suggestions:

1. Development of alternative habitat: Almost all the habitat suitable for floricans and bustards is generally privately held, and not controlled by the state forest department. According to current and future land use scenario, soon there will be no open land available in entire Warora tehsil of Chandrapur. Therefore, plantation patches of a few hectares from the areas can be cleared for development of grasslands. For example, clearing of 300 ha of forest near Temurda village has been started under species recovery plan by the forest department.
2. Instead of monetary rewards, additional benefits should be given to local villagers at the gram panchayat level, so that people have a sense of pride in the occurrence of a Critically Endangered-, and habitat specialist bird in their surroundings. One needs to encourage traditional agricultural practices under special schemes, if necessary, or explore the possibility of selling bustard-friendly crop at higher prices, under the banner of bustard conservation.
3. Promotion of organic farming for long term benefit to the bustard conservation programme. Rampant use of pesticides affects birds, and their foodchain, directly, and indirectly. Therefore, it is essential to promote organic farming in bustard areas to reduce chemical contamination in their foodchain.
4. Satellite tracking of Lesser Florican for study of their seasonal and local movement.

Photo: Sujit Narwade

43. Florican habitat is surrounded by a number of coal mines in Chandrapur area (September 2012).

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Breeding status of Indian Skimmer *Rynchops albicollis* in the National Chambal Sanctuary, India

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Abstract

Even though the Indian Skimmer *Rynchops albicollis* is listed as a 'Vulnerable' species, and its population is declining rapidly as a result of widespread degradation and disturbance of lowland rivers and lakes, it is one of the least studied species in India. India holds the only known remaining breeding grounds for this species. Its best-known nesting site is the National Chambal Sanctuary, India, where I conducted a survey from 17 to 30 May 2013 with the aim of identifying and collecting information on its breeding colonies. A total of ten breeding sites were identified, and 92 nests recorded, during the survey, from six localities. The maximum number of nests was recorded from a small island in Ater, Etawah. Intensive sand mining is a threat that directly affects nesting.

Introduction

The population of the Indian Skimmer *Rynchops albicollis* is declining rapidly as a result of widespread degradation, and disturbance, of lowland rivers and lakes, and therefore it is listed as Vulnerable (BirdLife International 2014). Its present global population is estimated at 6,000–10,000 mature individuals. It was formerly widely distributed across the Indian Subcontinent, along the major rivers of Myanmar, and along the Mekong in Indo-China. Today, small numbers are present in Pakistan, it is known from only three localities in Myanmar, and the species is extinct in the Mekong Delta (Sundar 2004). It is a rare visitor to Nepal. At present, the last strongholds of the Indian Skimmer are India, and Bangladesh. Bangladesh has an important role in its conservation, as a large population of skimmers winters on its coast (Mohsanin 2014). India holds the only remaining breeding grounds for this species. In India it is mainly confined to the major river systems of northern India, notably the Chambal-, and Ganges Rivers (Ali & Ripley 1987; Grimmett *et al.* 1998; Rasmussen & Anderton 2012.). It is one of the least studied species in India (Rahmani 2012). Detailed information on its ecology, breeding biology, and local movements are lacking.

Narora (28.24ºN, 78.26ºE), in Uttar Pradesh, India, is a known nesting site (Siddiqui *et al.* 2007), and Raja Mandal, an employee of the Narora Atomic Plant, informed me that he observed 12 Indian Skimmer nests there in 2013 (Raja Mandal, *pers. comm.*, 2013). However, the best-known nesting site is the National Chambal Sanctuary (NCS) (Sundar 2004) where I conducted a survey from 17 to 30 May 2013 with the aim of identifying and collecting information on breeding colonies of Indian Skimmer. NCS is a 5,400 km^2 tri-state protected area in northern India that was mainly established to protect the critically endangered gharial *Gavialis gangeticus*, red-crowned roof turtle *Batagur kachuga*, and the endangered Ganges River dolphin *Platanista gangetica* (Islam & Rahmani 2004). Within the sanctuary the pristine Chambal River cuts through a maze of ravines and hills with many sandy beaches.

Fig. 1. Showing the breeding sites of Indian Skimmer found in this study (Green flags) and previous breeding sites, which have been abandoned in recent years (Red flags). Map: Google.

Methods

I used a motorboat to search for nests, and investigated potential spots on foot, along a 10 km stretch of the river. Precautions were taken not to disturb birds, by observing them from a distance, through binoculars,

and visiting the sites infrequently. This was supplemented with a study of historical records, and by collecting recent local information from reliable sources.

Results

Breeding sites

A total of ten breeding sites were identified including a few historical records (Fig. 1). A total of 92 nests were recorded during the survey from six sites. Two historical sites, Pureni, and Barenda, have seen no breeding activities in recent years (R. K. Sharma, *pers. comm.,* 2013). Two other historical sites were recently active: 16 nests were found in Nadigaon in 2012 (R.K. Sharma *pers. comm.,* 2013), and 45–50 nests were reported at Bareh in 2000 (Sundar 2004), but both these were found to be empty during this survey.

Among the breeding sites in NCS, Rajghat is well known, and is often reported in national newspapers. The highest number of nests here was recorded from a small island in Ater, Etawah. Here 48 adult skimmers were seen, and out of 82 nest depressions there were 30 active nests containing 51 eggs, and 55 chicks on 23 May 2013. Ater is comparatively less disturbed by anthropogenic activities, and cattle grazing, because the surrounding water is deep, and the island is located far from the banks. Ussedghat is another breeding site where four nests were seen at the onset of breeding season but according to a forest official none survived.

Discussion

Breeding: Most skimmer nests were mere scoops in the sand, with eggs laid directly on the sand, as is typical for the species (Zusi 1996). I observed three skimmer nests on heavy gravel mixed with sand in Rajghat, while all other nest sites were on plain sand. Nests of Little Tern *Sterna albifrons*, and Small Pratincole *Glareola lactea* were also found near to the Indian Skimmer nests in Ater.

At Rajghat five nests were located during my survey, of which four had already been completed when found. On 25 May 2013 I watched a pair of skimmers scoop out a shallow nest in the sand by shifting it back and forth with their breasts, and sweeping side movements with their wings, thus hollowing out a cup, on a tiny island (*c.* 3x4 m) at Rajghat. On 28 May this nest had one egg. Both parents attended the nest, and frequently (*c.* 10 min. intervals) changed places to incubate the egg. The birds left the nest, skimmed over the water, and returned to it with wet breasts, perhaps to lower the temperature in the nest when they settled on the egg.

Four completed nests, each with four eggs, were found at the outset of the survey, of which one successfully hatched chicks. In that nest one egg failed to hatch. Three chicks hatched on three consecutive days (18–20 May); all three survived until the end of the survey. Two nests suffered from being trampled upon, and one was abandoned.

Threats: I found similar threats and disturbances to those mentioned by Sundar (2004), but on a larger scale. The river had dried up considerably, so nests were easily accessible to people, and domestic animals such as dogs and cattle; except at Ater, which was surrounded by deep water. I also found trampled eggs, as did Sundar (2004). Sand mining is a new threat, which has dire consequences, as it directly affects nest survival. It is crucial that sand mining ends on nesting islands, and that deep flowing water is maintained, so that these islands remain isolated by the barrier created by water, throughout the breeding season. Predation by House Crow *Corvus splendens* is another threat documented in Narora (Siddiqui *et al.* 2007).

Table 1. Breeding sites of Indian Skimmer at National Chambal Sanctuary with the number of nests recorded in 2013

Site	Co-ordinates	Status	Number of nests
Palighat	25.86°N, 76.26°E	Active	01
Nadigaon	26.18°N, 77.57°E	Active	16 were recorded in 2012 (Source: R. K. Sharma)
Tigri-Rithora	26.69°N, 77.99°E	Active	02
Ussedghat	26.86°N, 78.32°E	Active	04
Rajghat	26.66°N, 77.93°E	Active	06
Gorkha	26.66°N, 77.97°E	Active	03
Ater, Etawah	26.77°N, 78.62°E	Active	82
Bareh	26.53°N, 79.14°E	Inactive	–
Pureni	26.76° N, 78.11°E	Inactive	–
Barenda	26.82° N, 78.26°E	Inactive	–

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Nesting of the Spot-billed Duck *Anas poecilorhyncha* in Chennai city

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Introduction

The Indian Spot-billed Duck *Anas poecilorhyncha* is one of the resident species of ducks that occurs in Chennai. It is a widespread resident of India and is frequently spotted at, "freshwater marshes, lakes, irrigation tanks and pools with extensive emergent vegetation," (Grimmett *et al.* 2011). It is fairly common, and is protected under The Indian Wildlife (Protection) Act, 1972 (Rahmani & Islam 2008).

Pallikaranai is a large marsh, about 50 km² in extent (Vencatesan 2007), which was originally supplied by runoff from surrounding areas but now receives sewage and domestic waste from Chennai and its suburbs. The flora of the region is dominated by hydrophytes adapted to high levels of water, and high salt content (Patnaik & Narayanan 2007).

On 26 January 2014 **[44]**, we observed, and photographed, a female Spot-billed Duck with nine ducklings, just a few days old in the Pallikaranai Marsh on the southern fringes of Chennai city. Eleven ducklings were seen with a pair at the same site, two weeks later, on 08 February 2014 **[45]**.

44. Spot-billed Duck with nine ducklings.

Photos: Rajaram V.

45. Spot-billed Duck with eleven ducklings.

Though considered resident, records of breeding Spot-billed Ducks from Tamil Nadu are fairly scanty. None of the earlier works provide any specific details on the nesting of this species in the state (Jerdon 1864; Hume 1875; Baker 1929; Baker & Inglis 1930). Even contemporary works, such as Ali & Ripley (1983), Kazmierczak (2000), Rasmussen & Anderton (2005), and Grimmett *et al.* (1998, 2011), while treating the species as a year-round resident in the larger part of peninsular India, do not provide specific data on its breeding localities or any other related information. Rathnam (2002) laments the paucity of nesting records from the state. Grubh & Grubh (2012) too are silent about its breeding.

A brief review of nesting localities in Tamil Nadu

A detailed review of other existing literature was undertaken to locate breeding records from Tamil Nadu, particularly from the vicinity of Chennai. Dewar (1905) includes this bird in his Madras (=Chennai) list but is silent about its status and about its breeding. Santharam (*pers. comm.,* verbal, undated) never saw any signs of its breeding in the city or its environs between 1978–1998, but mentions its reported nesting in the Padappai area based on his discussions with the late E. R. C. Davidar (1922–2010). However, since 2006, there have been a few nesting reports from Chennai, which are presented in Table 1.

Elsewhere in the state, Rahmani & Islam (2008) refer to some historical nesting records from the Kodaikanal-, and Berijam Lakes in the Palni Hills. The Spot-billed Duck has been observed in, and been considered a resident of the Mudumalai Tiger Reserve, and Udhagamandalam (=Ooty), in the Nilgiris by Vasanthan & Srivatsava (undated), who do not provide any further details of the nesting. There is a recent report that it breeds in Thiruvannamalai (along with a photograph of an adult with ten ducklings), approximately 200 km south of Chennai (Anonymous 2011). Breeding has also been recorded at the Sriharikota Island, Nellore District, Andhra Pradesh (Sivakumar & Manakadan 2005; Kannan *et al.* 2009), which is less than 100 km north of Chennai.

Breeding season

Most authors mention that in southern India the Spot-billed Duck breeds during the North-eastern Monsoon, usually between November and December (Hume 1875; Baker 1929; Baker & Inglis 1930; Ali & Ripley 1983; Rasmussen & Anderton 2005; Sivakumar & Manakadan 2005; Anonymous 2011). Alternatively, Sathan & Pandi (2009) offer data that breeding occurs till June, rather than

Table 1. Breeding Records of the Spot-billed duck *Anas poecilorhyncha* in Chennai

Site of observation	Date	Details	Reference
Pallikaranai Marsh	19 October 2006	Adult pair with 3 chicks	Chandrasekar (2006)
Pallikaranai Marsh	Not Available	Female and 11 chicks	Sivakumar (2011)
Pallikaranai Marsh	15 September 2012	Pair with 5 juveniles	(Observed by Balaji Rayadurgan) - Gnanaskandan (2014)
Perumbakkam / Sholinganallur Marsh	07 April 2013	Pair with 3 juveniles	Gnanaskandan (2014)
Amarambedu Lake	19 September 2013	4 Immature/subadult	Gnanaskandan (2014)
Pallikaranai Marsh	26 January 2014	Female with 9 chicks	This study
Pallikaranai Marsh	08 February 2014	Pair with 11 chicks	This study

December. In northern India breeding coincides with the South-western Monsoons (Ali & Ripley 1983; Grimmett *et al.* 1998; Madge & Burn 1988). The sightings of ducklings in Chennai have all been between October and February (see Table 1).

The Spot-billed Duck is known to nest in marshy margins of freshwater bodies in a pad of grass and weeds. Its clutch consists of six to 12 eggs, but usually comprises seven to nine (Ali & Ripley 1983). Sivakumar's (2011), and our, records show that the number of chicks is closer to 11, but Chandrasekar's (2006), and Gnanaskandan's (2014), reports mention an average of four.

Conclusion

It is possible that the Spot-billed Duck may have historically been a regular breeder in Chennai, but has probably been noticed breeding, more frequently, in recent years due to the increase in the number of birders who also have better access to remoter areas with increased availability of private transport. New roads, laid over the last decade, have also provided better access to the Pallikaranai marshes, allowing birders to visit frequently, and note the birdlife in greater detail; perhaps another reason for the spurt in reports of new breeding records of this species at Chennai.

Based on this short study, we feel there is an urgent need to document details of breeding of common birds that are presumed to be resident in areas without substantial evidence of their breeding localities, habitats, and season. Birders in India, and particularly in Tamil Nadu, should begin to record such details of bird biology. Data collected will be useful not only to understand the biology of species, but also help in identifying, and conserving, suitable habitats needed for their survival, especially as many habitats, such as Pallikaranai, are under constant threat from rapid urbanisation, and other human activities.

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Snapshot sightings

Amur Falcon at Narsapur Forest, Telangana

Durgesh Kumar Singh


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While on a birding trip to Narsapur forest (17.73ºN, 78.29ºE), Medak district near Hyderabad, a male Amur Falcon *Falco amuernsis* was photographed on 09 May 2015. Though widespread in autumn passage, records during spring passage (Rasmussen & Anderton 2012) from the Indian subcontinent are much less and there appears to be no earlier reports from the state of Telangana state.

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Lesser Noddy on Hoogly River, West Bengal

Shakti Ranjan Banerjee & John Gomes


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On 26 May 2015, a Lesser Noddy *Anous tenuirostris* was photographed by JG from the front deck of the cruise vessel Paramhamsa, at Raichak (22.10°N, 88.07°E) on Hoogly river, West Bengal. The bird was apparently exhausted and stayed put for full 45 minutes before it took to wing. Very few records of Lesser Noddy exist from India (Praveen *et al.* 2013) and this is perhaps the first for West Bengal.

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Yellow-browed Warbler at Sinhagad valley, Maharashtra

Pratik Humnabadkar

A well-marked Warbler photographed from Sinhagad valley (18.36ºN, 73.76ºE), Pune district, Maharashtra was later identified as a Yellow-browed Warbler *Phylloscopus inornatus* based on double whitish wing-bars, yellowish wash on the flanks, pale lower mandible with a dark tip and yellowish eye-brow. This is a rare winter visitor to Maharashtra (Prasad 2006), with one specimen in BNHS (Navarro & Unnithan 1990) from Dhule district which


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requires confirmation as per Rasmussen & Anderton (2012) while the ringing records from Nasik district could also have been Hume's Warbler *P. humei*. This is the first record for Pune district and possibly the first photographic record for Maharashtra.

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Long-eared Owl from Mishmi Hills, Arunachal Pradesh

Bikash Kalita & Roon Bhuyan


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On 3 February 2015, a Long-eared Owl *Asio otus* was photographed by RB during the late hours from an open rocky stretch from Mishmi Hills, Arunachal Pradesh at an altitude of 1600 m. The bird was briefly seen at the same spot on 20 April 2015 by BK and photographed (inset) the very next day. These appears to be the first records of this Owl for Arunachal Pradesh (Choudhury 2006, Grimmett *et al.* 2011) and is in fact a rarely photographed species from the country (Deomurari 2015).

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