

Transect stop counts of birds along the paddy fields, canals, and village at west Arpookara, Kerala, India

Wetlands and the backwaters of Kerala once harboured a rich bird fauna according to early records (Ali 1999). In recent years there is an increasing awareness on protecting the backwaters which is ecologically and economically important (Schreiter 2014). Preliminary surveys conducted on the wetland birds in Kerala (Gaston 1978; Zacharias & Gaston 2004) presented the current status of wetland birds in the state. A decline in the number and diversity of wetland birds was noted in Kerala in recent years (Sreekumar 2002; Laxmi 2014; VJZ pers. obs.).

The reasons for this trend are lowering water levels in lakes and drying up of wetlands due to illegal sand mining, dredging, reclamation, pollution and indiscriminate developmental activities around. However, species like the Great Cormorant, *Phalacrocorax carbo*, Asian Openbill *Anastomus oscitans*,



A view of the study area - coconut palm rows on the man-made bunds.

and Black-headed Ibis *Threskiornis melanocephala* were found to be increasing in numbers in Kerala. This conclusion is based on random observations and not based on a systematic study. In fact, few systematic studies on the population of wetland birds have been carried out in Kerala.

We conducted a population estimation of birds on fixed routes with limited stop counts in the Arpookara Village, adjoining the Vembanad Lake, to determine

the current status of the avifauna of the region. We hope that the data presented here could be compared with a future data to determine the changes which are likely to occur over the years.

Study area: Arpookara Village, adjoining the Vembanad Lake (9.632°N, 76.480°E) is situated in the Kottayam District of Kerala. The area is characterized by open paddy fields and canals flanked with coconut palms, which are used for boat traffic. Adjacent villages are

Table 1. Stops and characteristics of the 4.8–5 km line transect near west Arpookara.

| Stop no. | Description of the areas |
|----------|--|
| 1 | End of rickshaw route, open paddy fields with a main irrigation ditch, side canals and bordering pools. |
| 2 | Pump station flanked by stone walls, coconut palm rows and a cattle rest area. |
| 3 | Iron foot bridge over the canal, with access to agricultural land across. |
| 4 | Lake shore 440 m westwards, lake inundated, appr. 250 acres. |
| 5 | Houses and wooden bridge over a side canal, farm with bananas, coconut palms, pepper vines, vegetables, etc. |
| 6 | Rest/storage hut right to the canal near the day roost of Night Herons in a thicket. |
| 7 | Opening of the canal, fishing and bathing site, breast deep water. Local ferry station, few houses across with partly flooded paddy fields behind. |
| 8 | From stop 8 about 500 m along the southern side of the canal; row of tall coconut palms with cultivation of bananas, vegetables, pepper vines. |
| 9 | Back in the direction to stop 3 about 500m: Palm trees, marked at breast height (dbh), nearby a circular widening of the canal, exit to the paddy fields. |
| 10 | From stop 7, along the canal, about 500m to the beginning of the village Arpookara, palm rows with a marked tree, on the open area to the right and left; open paddy fields with irrigation system, few houses. |
| 11 | Inside the village, across the canal a house, with cattle, sheep, ducks, and chicken. A small trail along the canal side used by, motor bikers, and rickshaws construction equipments transported by boat. |
| 12 | Westwards about 500m, a turn at the canal, across a pump station, two shops at the turn, palm trees, rubber trees, teak trees, bananas, and open paddy fields. |
| 13 | End of the transect: 300m along the left side of the canal up to a brick bridge, at the other side a parking lot for rickshaws and a road to the centre of the village with the bus station and rickshaw stands. |

connected by canals which run through the paddy fields. The land adjoining the paddy fields has scattered shrubs and coconut palms with cultivation of bananas and various types of vegetables and harbours land birds such as babblers, bulbuls and wren-warblers.

The weather is tropical with high humidity and rainfall but there is little rain from December to March. There was rain shower in the area near mid-day and during night on February 15. Towards the end of February there was an increase in the cloud cover resulting in

heat and humidity. Some mornings were foggy but mostly sunny and hot. The paddy fields were harvested in January, and subsequently plowed. Most rice fields, turned from green to yellow during the study period. The harvest was conducted using modern techniques with tractors, in February (10–15). The grains gathered were stored for drying along trails in the village, easily accessible for transportation.

Method: At each stop we observed and counted birds for 10 minutes (walked a distance of appr. 500m). Observations were recorded in a field note book. We used a Swarovski binocular 7 x 50 and a Canon camera. The studies followed Bibby et al. (1995) and Oelke et al. (2008) and nomenclature followed Rasmussen & Anderton (2012). Occasional contacts were made with local farmers and elder villagers.

The counts were conducted on January 14 (09.25–13.45 h), Jan 15 (15.30–18.10 h), Jan 16 (08.10–12.30 h), Jan

Table 2. Bird species observed along the canals and paddy fields of the Arpookara Village Kottayam, Kerala, India.

| Family | English name | Scientific name | Av. no. per no. of stop points |
|-------------------|---------------------------|------------------------------------|--------------------------------|
| Podicepsidae | Little Grebe | <i>Tachybaptus ruficollis</i> | 36/9 |
| Phalacrocoracidae | Great Cormorant | <i>Phalacrocorax carbo</i> | 132/16 |
| | Little Cormorant | <i>Phalacrocorax niger</i> | 112/15 |
| Anhingidae | Darter | <i>Anhinga melanogaster</i> | 11/8 |
| Ardeidae | Intermediate Heron | <i>Egretta intermedia</i> | 937/23 |
| | Little Egret | <i>Egretta garzetta</i> | 29/5 |
| | Cattle Egret | <i>Bulbulcus coromandus</i> | 1620/4 |
| | Purple Heron | <i>Ardea purpurea</i> | 15/11 |
| | Black-crowned Night Heron | <i>Nycticorax nycticorax</i> | 82/6 |
| | Indian Pond Heron | <i>Ardeola grayii</i> | 128/18 |
| | Great Egret | <i>Egretta alba</i> | 4/4 |
| Threskiornithidae | Black-headed Ibis | <i>Threskiornis melanocephalus</i> | 6/4 |
| Anatidae | Lesser Whistling Duck | <i>Dendrocygna javanica</i> | 7142/11 |
| | Mallard, domestic duck | <i>Anas platyrhynchos</i> | 35500/6 |
| | Cotton Teal | <i>Nettapus coromandelianus</i> | 108/9 |
| Accipitridae | Brahminy Kite | <i>Haliastur indus</i> | 12/4 |
| | Eurasian Marsh Harrier | <i>Circus aeruginosus</i> | 3/3 |
| | Montagu's Harrier | <i>Circus pygargus</i> | 2/2 |
| | Crested Serpent Eagle | <i>Spilornis cheela</i> | 2/2 |
| | Booted Eagle | <i>Hieraaetus pennatus</i> | 1/1 |
| Rallidae | White-breasted Waterhen | <i>Amaurornis phoenicurus</i> | 19/11 |
| | Purple Swampphen | <i>Porphyrio poliocephalus</i> | 1/1 |
| Jacanidae | Pheasant-tailed Jacana | <i>Hydrophasianus chirurgus</i> | 20/10 |
| Charadriidae | Red-wattled Lapwing | <i>Vanellus indicus</i> | 9/6 |
| | Kentish Plover | <i>Charadrius alexandrinus</i> | 1/1 |
| | Common Sandpiper | <i>Actitis hypoleucos</i> | 1/1 |
| | Wood Sandpiper | <i>Tringa glareola</i> | 4/1 |
| | Common Snipe | <i>Gallinago gallinago</i> | 3/2 |
| Sternidae | Great Crested Tern | <i>Thalasseus bergii</i> | 1/1 |
| | Little Tern | <i>Sterna albifrons</i> | 5/5 |
| Sternidae | Common Tern | <i>Sterna hirundo</i> | 1/1 |
| | Whiskered Tern | <i>Chlidonias hybrida</i> | 261/14 |
| | Black-bellied Tern | <i>Sterna acuticauda</i> | 23/6 |
| Columbidae | Rock Pigeon | <i>Columba livia</i> | 47/3 |
| | Spotted Dove | <i>Streptopelia chinensis</i> | 3/3 |
| | Oriental Turtle Dove | <i>Streptopelia orientalis</i> | 1/1 |

| Family | English name | Scientific name | Av. no. per no. of stop points |
|---------------|---------------------------|--------------------------------|--------------------------------|
| Psittacidae | Rose-ringed Parakeet | <i>Psittacula krameri</i> | 9/6 |
| Cuculidae | Common Hawk Cuckoo | <i>Hierococcys varius</i> | 1/1 |
| | Jacobin Cuckoo | <i>Clamator jacobinus</i> | 1/1 |
| | Asian Koel | <i>Eudynamus scolopaceus</i> | 2/2 |
| | Southern Coucal | <i>Centropus parotti</i> | 2/2 |
| Apodidae | Asian Palm Swift | <i>Cypsiurus balasiensis</i> | 4/2 |
| Alcedinidae | White-throated Kingfisher | <i>Halcyon smyrnensis</i> | 5/4 |
| | Common Kingfisher | <i>Alcedo atthis</i> | 1/1 |
| Meropidae | Little Green Bee-eater | <i>Merops orientalis</i> | 14/3 |
| Coraciidae | Indian Roller | <i>Coracias benghalensis</i> | 2/1 |
| Picidae | Black-rumped Flame-back | <i>Dinopium benghalense</i> | 3/3 |
| Hirundinidae | Barn Swallow | <i>Hirundo rustica</i> | 150/3 |
| | Wire-tailed Swallow | <i>Hirundo smithii</i> | 8/1 |
| Pycnonotidae | Red-vented Bulbul | <i>Pycnonotus cafer</i> | 5/4 |
| Muscicapidae | Oriental Magpie Robin | <i>Copsychus saularis</i> | 5/4 |
| Chloropseidae | Brown Shrike | <i>Lanius cristatus</i> | 1/1 |
| Sylviidae | Zitting Cisticola | <i>Cisticola juncidis</i> | 3/1 |
| | Ashy Prinia | <i>Prinia socialis</i> | 3/3 |
| | Clamorous Reed Warbler | <i>Acrocephalus stentoreus</i> | 1/1 |
| | Blyth's Reed Warbler | <i>Acrocephalus dumetorum</i> | 1/1 |
| Nectariniidae | Purple-rumped Sunbird | <i>Nectarinia zeylanica</i> | 2/1 |
| | Purple Sunbird | <i>Cynniris asiaticus</i> | 1/1 |
| Plocidae | Yellow-throated Sparrow | <i>Petronia xanthocollis</i> | 35/4 |
| | Baya Weaver | <i>Ploceus phillippinus</i> | 29/4 6 nests, |
| Sturnidae | Common Myna | <i>Acridotheres tristis</i> | 17/4 |
| Oriolidae | Indian Golden Oriole | <i>Oriolus kundoo</i> | 8/4 |
| | Black-hooded Oriole | <i>Oriolus xanthornus</i> | 3/3 |
| Dicruridae | Black Drongo | <i>Dicrurus macrocercus</i> | 20/11 |
| Corvidae | House Crow | <i>Corvus splendens</i> | 40/8 |
| | Indian Jungle Crow | <i>Corvus macrorhynchos</i> | 17/7 |

17 (08.20–11.30 h), Jan 18 (08.25–12.50 h), Jan 29 (07.25–10.45 h), Jan 30 (14.30–17.50 h), Jan 31 (07.25–11.00 h), February 1 (07.50–11.00 h), Feb 15 (08.20–12.30 h). A total of about 37 hours were spent in the field. The weather conditions favoured the counts.

Results: Altogether 66 species of birds were recorded in the stop count at Arpookara. This included 32 species of water/wetland birds, terns and plovers and 34 species of land birds. Of these, only 10 species of water/wading birds were found in good

Table 3. The most abundant water bird species in the transect Jan–Feb 2014. Base: average number (= minimum) during multiple visits, maxima, calculated pairs in colonies.

| | Species | App. Number |
|----|---------------------------|-------------------------|
| 1 | Mallard domestic. | > 30,500 |
| 2 | Lesser Whistling duck | > 7100 |
| 3 | Cattle Egret | > 1620 |
| 4 | Intermediate Heron | > 717 |
| 5 | Whiskered Tern | > 219 |
| 6 | Indian Pond Heron | 106 |
| 7 | Little Cormorant | 98 + 1 nesting colony |
| 8 | Cotton Teal | 98 |
| 9 | Great Cormorant | 96 + 2 nesting colonies |
| 10 | Black-crowned Night Heron | 77 + 1 nesting colony |

numbers (Table 3). Domestic ducks and the Lesser Whistling-Ducks constituted the largest portion of the water bird population in the area. We found very few birds in the canals. Pond Heron, Little Egret, and Purple Swamphen, which are common in most of the wetland habitats in the state, were seen in lesser numbers which was unusual. The land birds were found in smaller numbers probably due to the edge effect and/or poor-quality habitat. Migrants included the Barn Swallow, four species of terns and three species of plovers, arriving after the rice harvest.

The number of bird species recorded (66) at Arpookara village during this study is probably under-represented as some species might have been overlooked. The bird numbers varied within the transects. Both wild and domesticated, ducks were observed in large numbers in February. During this time, the domestic duck herds were driven through the wider canals mostly

by a person at the front and another one at the rare end (in a boat). Some herds stayed overnight (Prabhu 2014) in the nearby, empty paddy fields, and guarded by dogs. When the herds passed through the canals, the vegetation was destroyed and the clear water got muddy. This disrupted the breeding and feeding facilities of the wild birds such as waterhens, herons, and kingfishers. The duck herds driven into the lake during the day time passed through the resting sites of the large flocks of Lesser Whistling Ducks and Cotton Teals and disturbed them.

These species used the lake as a feeding/roost site at night. Occurrence of a healthy population of the Lesser Whistling Ducks shows that the species is habituated to the frequent disturbances. The capability of waterfowl for habituating frequent and regular disturbances was reported. (Mahaulipatha et al. 2000) However, the conflicts between wild birds and the domestic duck population as well as the predator protection on the wild birds are worth investigating.

During the study, we witnessed the starting and ending of the rice harvest. We observed the departure of Barn Swallows feeding over the fields and herons dispersing along the canals. We witnessed an increase in the number of cattle egrets and an influx of Rock Pigeons.

Very few birds were found breeding during the study period. We found eight pairs of Rock Pigeons nesting under a bridge

(stop 13) and several males displaying around. Two colonies of Baya Weavers were detected, one in the center of Arpookara and another near stop 2. Several fresh broken Heron eggs were found between stop 2 and 5. The breeders were not confirmed. Little and Great Cormorants were nesting at stop 5 and inside the village in a palm grove, behind the houses. The occurrence of the large number of Cormorants, Grebes and Kingfishers along the canals indicated good fish resource.

About 75% of the species encountered (Table 3); were represented by smaller numbers with less than 10 birds/species. This included the Roller, Black-rumped Flame back, Bee-eaters, Parrots, Drongos, Southern Coucal, Oriental Magpie Robin, Red-vented Bulbul, Mynas, and Cisticolas.

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Acknowledgements: We thank Teresa Zacharias, A.P. Thomas, G. Christopher, Tom Augustine, and Prasanth Narayanan for their help throughout this study; Mahatma Gandhi University for our accommodation, A.R. Rahmani for suggesting logistics and Jafer Palot of ZSI, WGRS, Kozhikode, for his comments on an early draft of this paper. We are grateful to the anonymous reviewer for the comments.

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Citation: Oelke, H., H. Oelke & V.J. Zacharias (2021). Transect stop counts of birds along the paddy fields, canals, and village at west Arpookara, Kerala, India. *Bird-o-soar* #87, In: *Zoo's Print* 36(5): 45–50.