



Nesting patterns of some terrestrial birds in Danta Forest Range, northern Gujarat, India

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The nesting of terrestrial birds in Gujarat has not been documented in detail, and information for northern Gujarat (71°59'–73°58'E & 23°26'–24°39'N) is especially scattered. The few reports that exist (Ali 1945; Abdulali 1962; Himmatsinhji 1968; Parasharya 1984; Pailmes & Briggs 1986) are chiefly related to population and distribution of wetland birds in Gujarat. Barring a few observations on nesting of terrestrial birds (e.g., Soni et al. 2004 in Rajkot city), there are no reported attempts to study their nesting patterns in northern Gujarat. In fact, there is no detailed checklist of the region's avifauna. We present in this paper a concise account of our observations on distribution and nesting patterns of the terrestrial birds in Danta Forest Range in northern Gujarat.

Study Area

The Danta Forest Range is located between 24°1'24''–24°37'30''N & 72°15'45''–73°1'30''E in Danta taluka in Banaskantha district of Gujarat (Fig. 1). The fact that the Danta FR is situated at the tail end of the Aravalli range and connects both the Jessore and Balaram Ambaji wildlife sanctuaries makes it an important site for long-term conservation of the region's wildlife. The dry deciduous and thorn forest (Sub type: 5A/C₃ Southern Dry Mixed Deciduous Forest of Champion & Seth 1968) is spread over 47,941ha with hilly terrain and characterized by steep slopes. Most of the rivers are annual, originating from the Aravalli hills especially the Abu mountain. Notable among them are Banas, Sirinala, Arjuni, Saraswati, and Selvani. According to the biogeographic

classification of Rodgers & Panwar (1988), the forest range of Danta hills falls under the Aravalli biogeographic region of Province 4B of Gujarat Rajwara in the semi-arid zone.

The climate is typically tropical with three main seasons. Summer ranges from March to June (with mean maximum temperature of 40°C), followed by a rainy season heralded by the south-west monsoon between July and September. The cold season starts in December and may last until February, with a mean minimum temperature of 9°C. May is the hottest month and January is the coldest; relative humidity during the monsoon may range from 60% to 85%.

Methods

Fieldwork was carried out during the summer (i.e. March–June) 2006, when most land birds breed. Birds were observed using a pair of 10 x 50 binoculars, and were identified using standard field guides, e.g. 'The Book of Indian Birds' (Ali 1996). Nests were located and data on nest characteristics and nest-sites were collected using established methodologies (Soni et al. 2004). The plant species on which nests were placed were also identified and recorded.

Results and Discussion

In total, 103 terrestrial bird species belonging to 30 families were recorded during the study period (Table 1). Of these, 31 species belonging to 16 families were observed nesting in the area (Table 2, 3). In total, 101 nests were recorded during the study period (Fig. 2). The highest number of nests were made by Baya Weavers (16), followed by House Crows (14) and Green Bee-eaters (12). Thirty-seven nests were of hole-nesting birds, while the remaining were of non-hole nesters. Baya Weaver nests were observed mainly along streams and around check dams. Green Bee-eaters made their nests on roadside burrows, allowing for easy observation and recorded during fieldwork.

Table 4 lists nest host plant species. Of the 13 tree species recorded, *Azadirachta indica* was found to be used by four bird species, while *Celastrus paniculatus*, *Butea monosperma* and *Acacia nilotica* were each used by three species. A preliminary analysis of host-plant characteristics showed that tree species with either thorny branches or large, dense canopies were preferred by birds for placing their nests. Among the grasses and sedges, *Pennisetum typhoides* and *Typha angustifolia* were the predominant hosts of Plain Prinia and Black-breasted Weaver, respectively. Bank Myna, which usually nest in burrows excavated in earth-cuttings, were often observed to appropriate old nests of Common Mynas placed in tree-holes.

With respect to nest location, 18 bird species were found nesting near human habitation and 13 species near water sources, while seven species were observed nesting near the road (Fig. 3). It was also found that 16 species placed their nests on trees and five were using tree-holes; in addition, five species were nesting in earth-burrows and two species built mud-nests either on rock crevices or on the wall just under the eaves of buildings. Rose-ringed Parakeet were observed nesting in both natural tree holes and crevices on walls of buildings. Nests of Blue Rock Pigeon and Rose-ringed Parakeet were generally found in human settlements, showing their association with humans. In general, the nesting behaviour of

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Table 1. Checklist of birds recorded in the Danta Forest Range with their residential status

Bird Species	Scientific Name	Residential Status	Bird Species	Scientific Name	Residential Status
Accipitridae			52	Crested Lark <i>Galerida cristata</i>	RB
1	Black-shouldered Kite <i>Elanus caeruleus</i>	RB	Hirundinidae		
2	Brahminy Kite <i>Haliastur indus</i>	RB	53	Dusky Crag Martin <i>Hirundo concolor</i>	RB
3	Honey Buzzard <i>Pernis ptilorhynchus</i>	RB	54	Red-rumped Swallow <i>Hirundo daurica</i>	BSV
4	Shikra <i>Accipter badius</i>	RB	55	Streak-throated Swallow <i>Hirundo fluvicola</i>	RB
5	Tawny Eagle <i>Aquila rapax</i>	RB	56	Wire-tailed Swallow <i>Hirundo smithii</i>	RB
6	White-backed Vulture <i>Gyps bengalensis</i>	RB	Laniidae		
Phasianidae			57	Southern Grey Shrike <i>Lanius meridionalis</i>	RB
7	Common Quail <i>Coturnix coturnix</i>	R,M	58	Bay-backed Shrike <i>Lanius vittatus</i>	RB
8	Grey Francolin <i>Francolinus pondicerianus</i>	RB	59	Long-tailed Shrike <i>Lanius schach</i>	M
9	Indian Peafowl <i>Pavo cristatus</i>	RB	Dicruridae		
10	Painted Francolin <i>Francolinus pictus</i>	RB	60	Black Drongo <i>Dicrurus macrocercus</i>	RB
11	Rain Quail <i>Coturnix coromandelica</i>	R	61	Ashy Drongo <i>Dicrurus leucophaeus</i>	M
12	Jungle Bush Quail <i>Perdica asiatica</i>	R	Oriolidae		
Charadriidae			62	Black-headed Oriole <i>Oriolus xanthornus</i>	RB
13	Red-wattled Lapwing <i>Vanellus indicus</i>	RB	63	Golden Oriole <i>Oriolus oriolus</i>	RB,M
14	Yellow-wattled Lapwing <i>Vanellus malabaricus</i>	RB	Corvidae		
Columbidae			64	House Crow <i>Corvus splendens</i>	RB
15	Blue Rock Pigeon <i>Columba livia</i>	RB	65	Jungle Crow <i>Corvus macrorhynchos</i>	RB
16	Green Pigeon <i>Treron phoenicoptera</i>	RB	66	Rufous Treepie <i>Dendrocitta vagabunda</i>	R
17	Little Brown Dove <i>Streptopelia senegalensis</i>	RB	Sturnidae		
18	Red turtle dove <i>Streptopelia tranquebarica</i>	RB	67	Bank Myna <i>Acridotheres ginginianus</i>	RB
19	Ring Dove <i>Streptopelia decaocto</i>	RB	68	Common Myna <i>Acridotheres tristis</i>	RB
Psittacidae			69	Brahminy Starling <i>Sturnus pagodarum</i>	RB
20	Rose-ringed Parakeet <i>Psittacula krameri</i>	RB	Irenidae		
Cuculidae			70	Blue-winged Leafbird <i>Chloropsis cochinchinensis</i>	RB
21	Pied Cuckoo <i>Clamator jacobinus</i>	BSV	71	Common Iora <i>Aegithina tiphia</i>	RB
22	Common Hawk Cuckoo <i>Cuculus varius</i>	RB	Pycnonotidae		
23	Greater Coucal <i>Centropus sinensis</i>	RB	72	Red-vented Bulbul <i>Pycnonotus cafer</i>	RB
24	Koel <i>Eudynamis scolopaceus</i>	RB	73	Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	RB
Strigidae			74	White-cheeked Bulbul <i>Pycnonotus leucogenys</i>	RB
25	Spotted Owlet <i>Athene brama</i>	RB	Paridae		
Campephagidae			75	Great Tit <i>Parus major</i>	R
26	Common Woodshrike <i>Tephrodornis pondicerianus</i>	RB	76	White-naped Tit <i>Parus nuchalis</i>	R
27	Small Minivet <i>Pericrocotus cinnamomeus</i>	RB	Muscicapidae		
28	Indian Nightjar <i>Caprimulgus indicus</i>	RB	77	Common Babbler <i>Turdoides caudata</i>	RB
29	Asian Palm Swift <i>Cypsiurus balasensis</i>	RB	78	Yellow-eyed Babbler <i>Chrysomma sinense</i>	RB
30	House Swift <i>Apus affinis</i>	RB	79	Large Grey Babbler <i>Turdoides malcolmi</i>	RB
Alcedinidae			80	Jungle Babbler <i>Turdoides striata</i>	RB
31	Common Kingfisher <i>Alcedo atthis</i>	RB	81	Brown Rock Chat <i>Cercomela fusca</i>	RB,M
32	Pied Kingfisher <i>Ceryle rudis</i>	RB	82	Indian Robin <i>Saxicoloides fulvicata</i>	RB
33	White-breasted Kingfisher <i>Halcyon smyrnensis</i>	RB	83	Magpie Robin <i>Copsychus saularis</i>	RB
34	Blue-tailed Bee-eater <i>Merops philippinus</i>	BSV	84	Ashy Prinia <i>Prinia socialis</i>	RB
35	Blue-cheeked Bee-eater <i>Merops superciliosus</i>	BSV	85	Plain Prinia <i>Prinia inornata</i>	RB
36	Green Bee-eater <i>Merops orientalis</i>	RB	86	Rufous-fronted Prinia <i>Prinia buchanani</i>	RB
Coraciidae			87	Common Tailorbird <i>Orthotomus sutorius</i>	RB
37	European Roller <i>Coracias garrulus</i>	PM	88	Asian Paradise-flycatcher <i>Terpsiphone paradisi</i>	BSV
38	Indian Roller <i>Coracias benghalensis</i>	RB	89	White-browed Fantail <i>Rhipidura aureola</i>	RB
Upupidae			Zosteropidae		
39	Common Hoopoe <i>Upupa epops</i>	RB,M	90	Oriental White-eye <i>Zosterops palpebrosus</i>	R
Bucerotidae			Nectariniidae		
40	Indian Grey Hornbill <i>Ocyrceros birostris</i>	RB	91	Crimson Sunbird <i>Aethopyga siparaja</i>	R
Capitonidae			92	Purple Sunbird <i>Nectarinia asiatica</i>	RB
41	Coppersmith Barbet <i>Megalaima haemacephala</i>	RB	Passeridae		
42	Brown-headed Barbet <i>Megalaima zeylanica</i>	RB	93	House Sparrow <i>Passer domesticus</i>	RB
Picidae			94	Baya Weaver <i>Ploceus philippinus</i>	RB
43	Black-rumped Flameback <i>Dinopium benghalense</i>	RB	95	Black-breasted Weaver <i>Ploceus benghalensis</i>	RB
44	Yellow-fronted Pied Woodpecker <i>Dendrocopos maharattensis</i>	RB	96	White-throated Munia <i>Lonchura malabarica</i>	RB
45	White-naped Woodpecker <i>Chrysocolaptes festivus</i>	RB	97	Red Munia <i>Amandava amandava</i>	RB
Pittidae			Motacillidae		
46	Indian Pitta <i>Pitta brachyura</i>	M	98	Indian Tree Pipit <i>Anthus hodgsoni</i>	M
Alaudidae			99	Yellow Wagtail <i>Motacilla flava</i>	M
47	Ashy-crowned Finch Lark <i>Eremopterix grisea</i>	RB	Emberizidae		
48	Hoopoe Lark <i>Alaemon alaudipes</i>	R	100	Crested Bunting <i>Melophus lathamii</i>	RB
49	Red-winged Bush Lark <i>Mirafra erythroptera</i>	RB	101	Red-headed Bunting <i>Emberiza brunnicaps</i>	M
50	Singing Bush Lark <i>Mirafra cantillans</i>	R			
51	Syke's Crested Lark <i>Galerida deva</i>	RB			

R - Residents; RB - Resident Breeding (Breeding recorded in Gujarat); M - Migratory; BSV - Breeding summer visitor

Table 2. Number of bird species recorded per family

Family	# Species Recorded	Family	# Species Recorded
1 Accipitridae	6	17 Hirundinidae	4
2 Phasianidae	7	18 Laniidae	3
3 Charadriidae	2	19 Dicruridae	2
4 Columbidae	5	20 Oriolidae	2
5 Psittacidae	1	21 Corvidae	3
6 Cuculidae	4	22 Sturnidae	3
7 Strigidae	1	23 Irenidae	2
8 Campephagidae	5	24 Pycnonotidae	3
9 Alcedinidae	6	25 Paridae	2
10 Coraciidae	2	26 Muscicapidae	13
11 Upupidae	1	27 Zosteropidae	1
12 Bucerotidae	1	28 Nectariniidae	2
13 Capitonidae	2	29 Passeridae	5
14 Picidae	3	30 Motacillidae	2
15 Pittidae	1	31 Emberizidae	2
16 Alaudidae	6		

Table 3. List of nesting bird species, number of nests and nest type observed

Bird Species	Scientific Name	# Nest	Non-Hole Nest	Hole Nest
Charadriidae				
1 Red-wattled Lapwing	<i>Vanellus indicus</i>	1	+	
Columbidae				
2 Blue Rock Pigeon	<i>Columba livia</i>	3	+	
3 Ring Dove	<i>Streptopelia decaocto</i>	2	+	
Psittacidae				
4 Rose-ringed Parakeet	<i>Psittacula krameri</i>	2		+
Strigidae				
5 Spotted Owllet	<i>Athene brama</i>	1		+
Campephagidae				
6 Small Minivet	<i>Pericrocotus cinnamomeus</i>	1	+	
Alcedinidae				
7 White-breasted Kingfisher	<i>Halcyon smymensis</i>	4		+
8 Blue-cheeked Bee-eater	<i>Merops superciliosus</i>	8		+
9 Green Bee-eater	<i>Merops orientalis</i>	12		+
Picidae				
10 Black-rumped Flameback	<i>Dinopium benghalense</i>	1		+
Hirundinidae				
11 Red-rumped Swallow	<i>Hirundo daurica</i>	3	+	
12 Wire-tailed Swallow	<i>Hirundo smithii</i>	2	+	
Laniidae				
13 Bay-backed Shrike	<i>Lanius vittatus</i>	1	+	
Dicruridae				
14 Black Drongo	<i>Dicrurus adsimilis</i>	1	+	
Oriolidae				
15 Golden Oriole	<i>Oriolus oriolus</i>	1	+	
Corvidae				
16 House Crow	<i>Corvus splendens</i>	14	+	
Sturnidae				
17 Bank Myna	<i>Acridotheres ginginianus</i>	2		+
18 Common Myna	<i>Acridotheres tristis</i>	1		+
19 Brahminy Starling	<i>Sturnus pagodarum</i>	3		+
Pycnonotidae				
20 Red-vented Bulbul	<i>Pycnonotus cafer</i>	4	+	
Muscicapidae				
21 Common Babbler	<i>Turdoides caudata</i>	2	+	
22 Large Grey Babbler	<i>Turdoides malcolmi</i>	1	+	
Muscicapidae				
23 Asian Paradise-flycatcher	<i>Terpsiphone paradisi</i>	1	+	
24 Indian Robin	<i>Saxicoloides fulicata</i>	2		+
25 Magpie Robin	<i>Copsychus saularis</i>	1		+
26 Plain Prinia	<i>Prinia inornata</i>	1	+	
27 Common Tailorbird	<i>Orthotomus sutorius</i>	3	+	
Nectariniidae				
28 Purple Sunbird	<i>Nectarinia asiatica</i>	4	+	
Passeridae				
29 Baya Weaver	<i>Ploceus philippinus</i>	16	+	
30 Black-breasted Weaver	<i>Ploceus benghalensis</i>	5	+	
31 White-throated Munia	<i>Lonchura malabarica</i>	3	+	
Total		101	+ = 20	+ = 11

+ - Present

Table 4. Nesting of different bird species observed on various trees

Tree species	# bird species	Bird species nesting
1 <i>Azadirachta indica</i> (Limdo)	4	Common Myna, Blue Rock Pigeon, White-throated Munia, Small Minivet
2 <i>Derris indica</i> (Karani)	1	Golden Oriole
3 <i>Ficus benghalensis</i> (Vadalo)	2	Ring Dove, Large Grey Babbler
4 <i>Syzygium cumini</i> (Jambu)	1	Common Babbler
5 <i>Adhatoda vasica</i> (Araduso)	2	House Crow, Rose-ringed Parakeet
6 <i>Terminalia catappa</i> (Badam)	1	Common Tailorbird
7 <i>Celastrus paniculatus</i> (Kanaji)	3	Brahminy Myna, Spotted Owllet
8 <i>Butea monosperma</i> (Khakharo)	3	Bay-backed Shrike, Black-rumped Flameback, Black Drongo
9 <i>Acacia farnesiana</i> (Talaval)	2	Purple Sunbird, Common Babbler
10 <i>Acacia nilotica</i> (Rambaval)	3	Red-vented Bulbul, Paradise Flycatcher, White-throated Munia
11 <i>Prosopis juliflora</i> (Gandobaval)	1	Baya Weaver
12 <i>Pennisetum typhoides</i> (Bajaro)	1	Plain Prinia
13 <i>Typha angustifolia</i>	1	Black-breasted Weaver

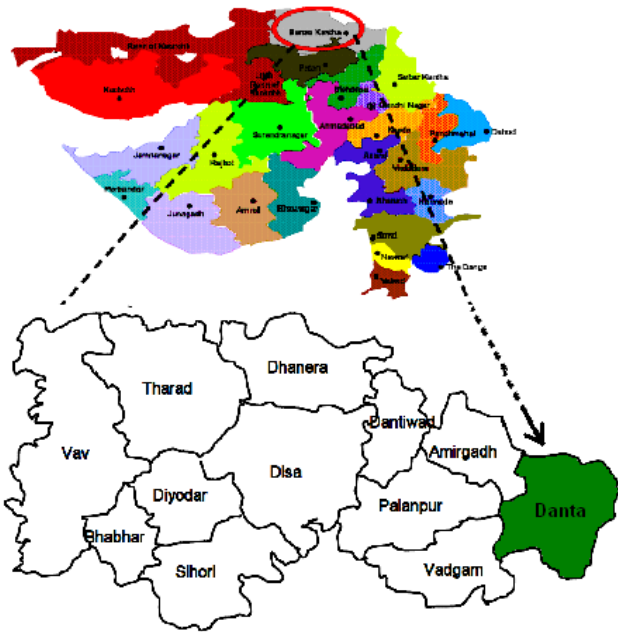


Figure 1. Study area: Danta Taluka of Banaskantha district, Gujarat

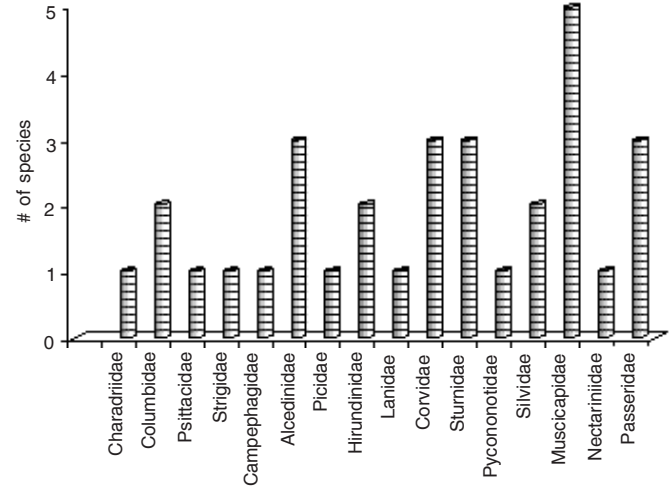


Figure 2. Family-wise number of species nesting in the Danta Forest Range, Gujarat

the birds in the Danta FR indicates that most of the terrestrial birds prefer either large canopy trees or thorny bushes for nesting, probably to avoid predation.

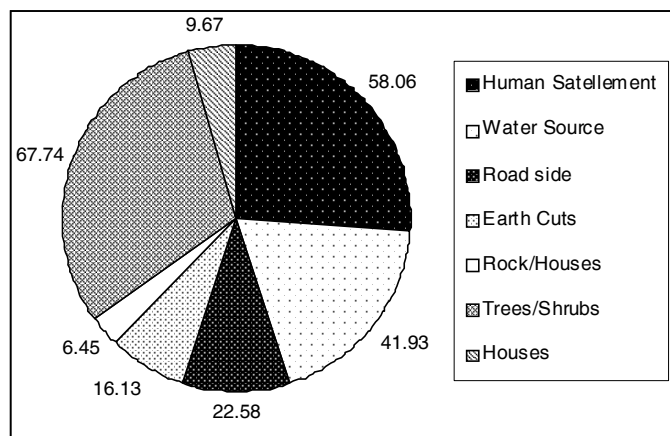


Figure 3. Proportion of nesting sites as observed among the breeding birds of Danta Forest Range, Gujarat (n=31)

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