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On Sálim Ali's trail
Steppe Buzzard
The Unfeathered Bird

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On Sálim Ali's trail: A comparative assessment of southern Kerala's avifauna after 75 years

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Abstract: Seventy-five years after Sálim Ali conducted the ornithological survey in Travancore and Cochin, the localities he visited in 1933 were re-surveyed in 2009. Data on birds, and habitat, were recorded using standard methodology. 338 species of birds were encountered; densities of 49 species and abundance rates of 186 species were estimated. Changes in the status of some species were observed, as were changes in the habitat.

Introduction

Sálim Ali conducted an ornithological survey in the erstwhile Princely States of Travancore, and Cochin, of southern Kerala, in 1933, covering 19 different localities (Fig. 1). This was the first, and perhaps the only, systematic bird survey ever done in Kerala, apart from the isolated efforts of British naturalists in the nineteenth and early twentieth centuries (Ferguson & Bourdillon 1903, 1904a,b, 1904; Kinloch 1921a,b, 1923a,b). Though Ali's survey consisted mainly of collecting bird specimens, he gathered as much information as he could on the ecology and behavior of the bird life he encountered. He published his findings of the survey as a paper in eight parts entitled "The ornithology of Travancore and Cochin" (Ali & Whistler 1935a,b,c, 1936a,b,c, 1937a,b). Based on this survey he also wrote a book, *Birds of Travancore and Cochin* (Ali 1953), which was subsequently revised as *Birds of Kerala* (Ali 1969).

In December 2008, 75 years after Ali's remarkable survey, the Kerala Forests and Wildlife Department decided to depute a survey team [**43**] to follow Sálim Ali's ornithological trail. The major objectives of the department's project were the collection of information on the composition of avifauna, and changes in habitat quality to enable a comparison with Sálim Ali's notes. A team of four ornithologists, a botanist, and an ecological historian was constituted for this purpose. The Survey began at Marayur (10°17'N, 77°10'E) on 3 January 2009, and concluded at Karupadna (10°16'N, 76°12'E) on 31 December 2009.

Ali's extensive field experience and deep knowledge of the birds of the Indian Subcontinent allowed him to make qualitative assessments of the relative abundance of many of the avian species he encountered. He even, specifically, recorded the absence of some species in certain areas. Comparing such information was possible, to a certain extent, with the quantitative data gathered during the present survey.

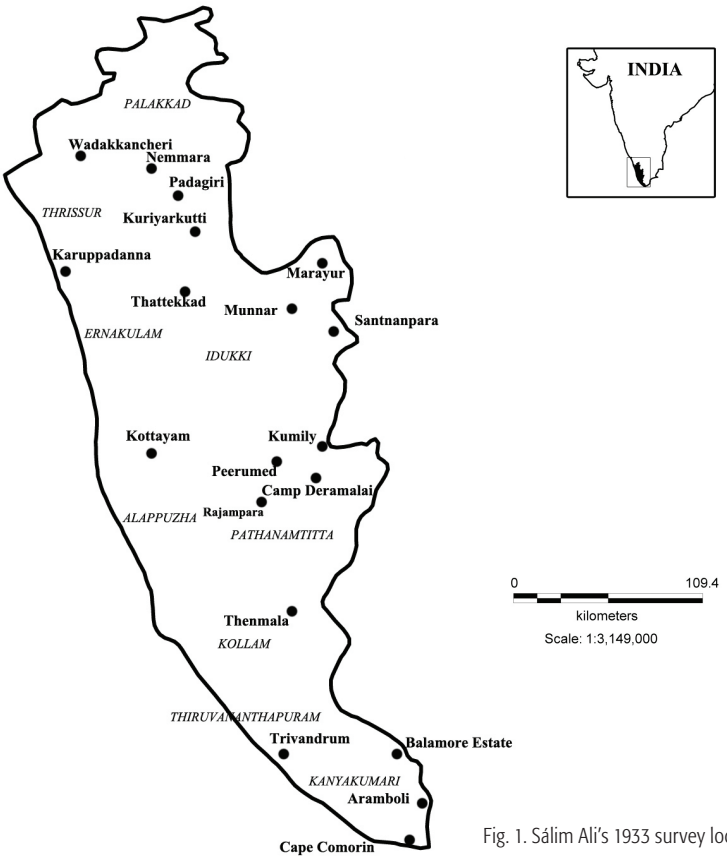

Fig. 1. Sálim Ali's 1933 survey locations in Kerala.

Photo: C. K. Vishnudas

43. Survey team at Pambamala, Periyar Tiger Reserve. L to R: S. Raju, C. Sashikumar, C. K. Vishnudas, S. Kannan and P. A. Vinayan.

Methodology

All the 19 sites surveyed by Ali were re-surveyed on his 1933 survey dates. The survey period included the migratory season as well as the breeding season and thus there was a fair chance of encountering both the migrant as well as the resident birds. The methodology was adapted from Gibbons & Gregory (2006). A three-hour, variable length transect route was selected by the team at a site for a day. Due to practical reasons, this transect was either a forest road, or a trekker's path, or a streambed, and not necessarily a straight line. Birds that were seen or heard were assigned to four distance bands, namely, 0–5 m, 5–10 m, 10–30 m and >30 m. Birds seen overhead, like raptors, swifts, *etc*., were not assigned any distance band; just their numbers were recorded. All the details were recorded on pre-designed datasheets. The transect data was analysed using the software 'DISTANCE5.0' (Thomas *et al.* 2005), following the analysis approach, and recommendations, of Buckland *et al.* (2001), to estimate the density and encounter rates of birds. Aural and visual observations were combined for analysis.

Birds of prey (nocturnal and diurnal), swifts, swallows, nightjars, and wetland birds were excluded from DISTANCE based analysis. The data on diurnal birds of prey were compiled separately and analysed for encounter rates and species richness. Nocturnal birds of prey were included in site checklists; Jungle Owlet *Glaucidium radiatum* was detectable in sufficient numbers, even in daytime, by its behavior and vocalisation, so that its density could be estimated. Wetland birds were counted directly and analysed separately.

At the very outset we realised that comparison with the 1933 survey would be possible only to a limited extent and so we focused more on collecting data that would serve as a benchmark for future studies. Another constraint was that we were bound to follow the dates and the locations of the 1933 survey and thus had little freedom to carry out a more systematic random sampling of the habitats.

Study area

The study area comprised southern Kerala, and part of Tamil Nadu (Kanyakumari district), i.e., the Western Ghats south of the Palghat Gap, consisting of 19 locations, from Wadakkancheri (10°40'N, 76°16'E) to Cape Comorin (08°04'N, 77°32'E) (Fig. 1). A majority of the locations were along the Western Ghats [**44**], in low, as well as high, altitude forests.

Photo: C. K. Vishnudas

44. Southern Western Ghats: a view from Munnar.

Results & discussion

During the survey, we walked 131 transects altogether, covering a total distance of 282.35 km. The transect surveys were carried out in 12 habitat categories: Tropical moist-evergreen, Tropical semi-evergreen, Tropical moist-deciduous, Tropical dry-deciduous, Shola (stunted montane evergreen forests), Shola-grassland complexes, Tea-shola-grassland, Thorny scrub jungle, Cardamom-, Teak-, Coffee-, and Rubber plantations. Transect altitudes ranged from sea level (Vembanad: 09°35'N, 76°31'E) to 2530 m (Meeshapuli Mala in Munnar: 10°05'N, 77°04'E).

We counted 77,547 individual birds belonging to 338 species from the 131 line transects in terrestrial habitats, and from direct counts in 33 locations in wetlands. A checklist of the birds recorded at each of the 19 locations is given in the Appendix. Fifteen species endemic to the Western Ghats, and 19 species categorised by IUCN as Globally Threatened (BirdLife International 2014), were recorded during the survey.

Table 1. Density estimate of birds during 2009, from 19 study sites

Species	Status	Density of birds/km²	Standard error
Southern Hill-Myna	R	50.3 (43–57)	6.7
Red-whiskered Bulbul	R	46.8 (40–52)	6.3
White-cheeked Barbet	R	45.24 (41–49	3.5
Greenish Leaf-Warbler	M	44.8 (41–47)	3.1
Yellow-browed Bulbul	R	35.55 (31–39)	3.5
Plain Flowerpecker	R	31.7 (28–34)	3.0
Blue-winged Parakeet	R, E	31.5 (27–35)	4.4
Jungle Babbler	R	30.9 (24–36)	5.5
Plum-headed Parakeet	R	30.1 (25–35)	4.8
Oriental White-eye	R	28.3 (22–34)	6.2
Black Bulbul	R	27.2 (22–32)	4.8
Indian Hanging-Parrot	R	26.1 (23–29)	3.4
Blyths Reed-Warbler	M	25.7 (23–28)	2.4
Scarlet Minivet	R	24.1 (21–27)	3.0
Greater Racket-tailed Drongo	R	21.7 (17–25)	3.6
Small Sunbird	R,E	20.7 (18–22)	2.4
Pompadour Green-Pigeon	R	19.8 (15–23)	4.3
Large-billed Leaf-Warbler	M	15.6 (13–17)	1.9
Red-vented Bulbul	R	15.5 (11–19)	3.6
Crimson-throated Barbet	R	14.8 (11–17)	3.2
Grey Jungle fowl	R	14.3 (12–16)	1.7
Malabar Grey Hornbill	R,E	13.9 (11–15)	2.3
Ruby-throated Bulbul	R	13.8 (10–16)	3.2
Jungle Crow	R	13.6 (11–15)	2.0
Common Iora	R	13.5 (11–15)	1.5
Asian Fairy-Bluebird	R	13.2 (11–15)	1.79
Grey-breasted Laughingthrush	R,E	12.9 (8–16)	4.0
Quaker Tit-Babbler	R	12.3 (10–14)	2.0
Mountain Imperial-Pigeon	R	12.3 (10–14)	2.4
Malabar Whistling-Thrush	R	12.08 (11–13)	1.35
Indian Scimitar-Babbler	R	11.6 (9–13)	1.5
Gold-fronted Chloropsis	R	11.5 (9–13)	1.8
Bronzed Drongo	R	9.6 (8–10)	1.2
Ashy Drongo	M	9.2 (8–10)	1.2
White-browed Bulbul	R	8.9 (5–11)	2.9
Large Wood shrike	R	8.3 (7–9)	1.2
White-bellied Treepie	R,E	8.2 (7–9)	1.2
Eurasian Golden Oriole	M	8.2 (7–9)	1.1
Emerald Dove	R	7.7 (6–8)	1.3
Indian Treepie	R	7.3 (6–8)	1.3
Purple Sunbird	R	7.1 (6–8)	1.2
Spotted Dove	R	6.8 (5–7)	1.2
Asian Paradise-Flycatcher	M	6.8 (5–7)	1.04
Black-naped Monarch–Flycatcher	R	6.3 (5-7)	1
Little Spiderhunter	R	6.1 (5–7)	1.1
Tickells Blue-Flycatcher	R	5.9 (5–6)	1
Common Tailorbird	R	5.9 (5–6)	0.11
Greater Coucal	R	5.7 (5–6)	0.83
Grey Wagtail	M	5.2 (5–6)	0.76

Abbreviations: E=Endemic; M=Migrant; R=Resident

Density estimates

Densities of 49 species, which had more than 60 detections, were estimated (Table 1); these included five Western Ghats endemics, and seven migrants. Southern Hill Myna *Gracula indica* had the highest density of 50.3 birds/km^2. Out of the 49 species, 69% were habitat generalists, whereas 31% were habitat specialists. We could estimate the density of six, of the eight, species of bulbuls that occur in Kerala; among which, the generalist Red-whiskered Bulbul *Pycnonotus jocosus* had the highest density of 46.8 birds/ km^2.

Abundance of birds

Of the 338 species of birds recorded during the survey, 186 were forest birds. We calculated the encounter rate of these forest birds by dividing the total number of birds of each species encountered by the total field hours and then converting the value to birds per 100 hrs. Based on the encounter rates, we classified birds into different ordinal scales of abundance (Bibby *et al.* 1998). According to this, 12 species were found to be abundant, 31 were uncommon, and 11 species were found to be rare. A list of the most abundant birds is given in Table 2. A perceived drawback of such a methodology is that encounter rate is related to the detectability of the species and may be biased towards vocal and spectacular species; leaving the cryptic, silent, and skulking species under-recorded. Season too is a factor affecting the detectability of birds. If the abundance scales produced during this survey are compared with those generated in future surveys, this should be bourn in mind.

Endemic Species

Density estimates of the Western Ghats endemics that we encountered revealed that Blue-winged Parakeet *Psittacula columboides* was the most abundant, followed by Small Sunbird *Nectarinia minima*, Malabar Grey Hornbill *Ocyceros griseus*, Grey-breasted Laughingthrush *Garrulax jerdoni*, and White-bellied Treepie *Dendrocitta leucogastra* (Fig. 2). However, other Western Ghats endemics, such as Rufous Babbler *Turdoides subrufus*, Wynaad Laughingthrush *G. delesserti*, Grey-headed Bulbul *P. priocephalus*, Black-and-Orange Flycatcher *Ficedula nigrorufa* [**45**], Nilgiri Flycatcher *Eumuias albicaudata*, and White-bellied Shortwing *Brachypteryx major* were not encountered in sufficient numbers (i.e., a minimum of 60 detections) for estimating the density, though their abundance was assessed based on the encounter rates. Nilgiri Wood-Pigeon *Columba elphinstonii* (IUCN Redlist Category: Vulnerable) had an encounter rate of

Table 2. The most abundant birds

Species	Status	Count	Encounter Rate birds/100 hour
Southern Hill-Myna	R	704	203.76
Red-whiskered Bulbul	R	667	193.05
Greenish Leaf-Warbler	M	659	190.73
White-cheeked Barbet	R	641	185.52
Yellow-browed Bulbul	R	497	143.84
Blue-winged Parakeet	R,E	449	129.95
Jungle Babbler	R	440	127.35
Plum-headed Parakeet	R	413	119.53
Oriental White-eye	R	404	116.93
Black Bulbul	R	388	112.30
Indian Hanging-Parrot	R	368	106.51
Blyth's Reed-Warbler	M	363	105.06

Abbreviations: E=Endemic; M=Migrant; R=Resident

Fig. 2. Density estimates of endemic birds.

Photo: C. K. Vishnudas

45. 1-Black-and-Orange Flycather bathing in a stream.

6.36 birds/100 h. Ali (1937a) stated that this species was, "… not uncommon in the evergreen forest tracts of Travancore, chiefly in the hills but also lower down … Ferguson (*J.B.N.H.S.*, xvi, 3) found it common at the summits of the hills in South Travancore and at Peermade …" We suspect that the population of this species has declined during the past seven decades. We did not record it below 770 m.

Grey-breasted Laughingthrush has two races, south of the Palghat Gap, in the southern Western Ghats. *G. j. fairbanki* [**46**] occurs north of the Achankovil Gap up to the Kannan Devan Hills in Munnar, Kerala. We saw this species up to Kumarikkal, north-west of Marayur (10°17'N, 77°10'E). But it was not seen in Padagiri, Nelliampathies (10°30'N, 76°41'E), closer to the northern edge of the Palghat Gap. The southern race *G. j. merdionale* was seen at Pandimotta (08°52'N, 77°07'E) in Shendurney Wildlife Sanctuary, probably the northern-most limit in the range of *merdionale*. Further south, we observed this race in good numbers in Upper Kodayar, Kalakkad–Mundanthurai Tiger Reserve (08°30'N, 77°21'E). In their typical Shola-grassland habitat, the density estimate of this species was 114 birds/ km^2. Ali had described the close association of the species with *Rubus ellipticus*, a wild raspberry; we also found this to be true.

46. Grey-breasted Laughingthrush *Garrulax jerdoni fairbanki.*

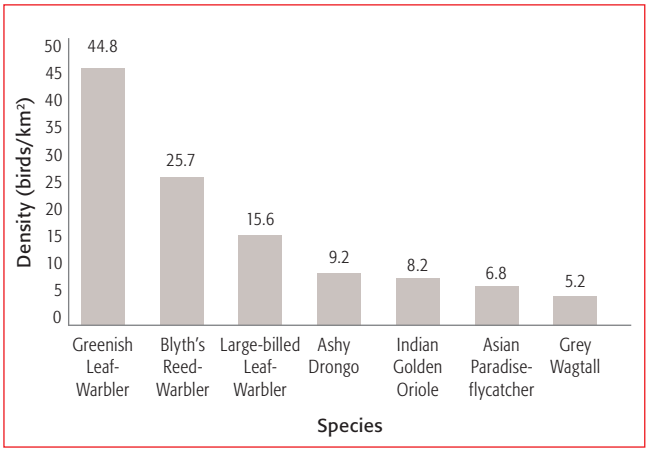

Fig. 3. Density of migrant birds.

Density of migrant birds

A comparison of the density estimates of the seven species of migrants (Fig. 3) showed that Greenish Leaf-Warbler *Phylloscopus trochiloides* was the most abundant migratory bird, followed by Blyth's Reed-Warbler *Acrocephalus dumetorum*, Large-billed Leaf-Warbler *P. magnirostris*, Ashy Drongo *Dicrurus leucophaeus*, Indian Golden Oriole *Oriolus kundoo*, and Asian Paradise Flycatcher *Terpsiphone paradise*. Interestingly, all these birds are mainly insectivorous.

Raptors

Thirty-two species of diurnal raptors were encountered during the survey. Brahminy Kite *Haliastur indus*, Crested Serpent-Eagle *Spilornis cheela*, and Oriental Honey-Buzzard *Pernis ptilorhynchus* were the most common; Mountain Hawk-Eagle *Spizaetus nipalensis* was the rarest resident raptor. Shola-grassland hosted 18 species of raptors, which was the highest among the habitats; plantations were found to be generally poor in raptor diversity. The species richness of Shola-grasslands (18 species) was followed by Moist-deciduous forest (16 species), and wetlands (14 species). High species richness of raptors is related to a good prey base: in our analysis, Moist-deciduous forests had the highest bird density of 296.2 birds/km^2; this abundance of prey could be the reason for the presence of the high number of raptor species in this habitat. Compared to this, Shola-grassland had a bird density of 61.8 birds/km^2 only, but the availability of additional prey, like rodents, which we did not assess, for grassland specialists, e.g., kestrel, buzzard, harrier, *etc.,* might have accounted for the high raptor diversity of this habitat. Further, this open habitat allows the observer to have a better view of the sky to observe raptors in flight, thereby increasing the number sightings and hence the higher encounter rate. Wetlands attracted six species of migratory raptors—Western Marsh Harrier *Circus aeruginosus*, Indian Spotted Eagle *Aquila hastata,* Greater Spotted Eagle *A. clanga*, Steppe Eagle *A. nipalensis,* Osprey *Pandion haliaetus*, and Peregrine Falcon *Falco peregrinus*—constituting 40% of the raptors found in this habitat. An immature White-bellied Sea-Eagle *Haliaeetus leucogaster* was observed at Umayar in Kallada Reservoir (Shendurney Wildlife Sanctuary; 08°58'N, 76°04'E) on 27 March 2009; this spot was about 60 km away from the seacoast. There are only a few stray records from south Kerala, even along the coast (Sashikumar *et al.* 2011), though there was a previous record inland from Periyar Tiger Reserve (Robertson & Jackson 1992). The present sighting is perhaps the southern-most record of this species in Kerala. Lesser Fish-Eagle *Ichthyophaga humilis*, whose status in Kerala was uncertain, was sighted at five localities, from Parambikulam Tiger Reserve (10°25'N, 76°43'E) in the north to Shendurney Wildlife Sanctuary in the south; nine individual birds were seen. A pair of the Lesser Fish-Eagle was seen nesting at Umayar in Shendurney, proving it a breeding resident in Kerala. Interestingly, Grey-headed Fish-Eagle *I. ichthyaetus* was not seen at all during the survey, despite it being considered a resident in Kerala (Ali 1969; Naoroji 2006; Sashikumar *et al.* 2011).

Density of birds in different habitats

We analysed the density of birds in different habitats. Moist-deciduous forest had the highest density of birds (296.2/km^2) followed by Evergreen forests (163.26/km^2). The modified habitats of Tea-shola-grassland complex of the Munnar region [**47**] had more than double the density (140.3 birds/km^2) of natural habitats at the same elevation, namely, Shola, and Shola-grassland (61.8 birds/km^2), but this was primarily due to the presence of habitat generalists such as crows, bulbuls, *etc.* In spite of the high detectability of birds, the Thorny scrub jungle at Aramboli (08°15' N, 77°15'E), Kanyakumari district had an extremely low bird diversity (93 species) as well as bird density (20.27 birds/km^2). When compared to similar looking habitats at Masinagudi (Mudumalai Tiger Reserve) or Sathyamangalam Wildlife Sanctuary (Sashikumar, *pers. obs.*), this habitat had a high degree of avian species impoverishment. The cause of this deserves further investigation.

47. Grasslands at higher altitudes converted for tea and eucalyptus.

Photos: C. K. Vishnudas

Changes in the status of some birds during 1933–2009

Wetland birds

The most striking change in status is that of the Cattle Egret *Bubulcus ibis*, which was recorded by Ali as, "noted sparingly along the railway line from Shoranúr to Chálakudi and the low country of Cochin generally," (Ali & Whistler 1937b) and not seen by him in Travancore at all. Ferguson (1903, 1904a, b, c) had recorded this species as common and Ali suspected that the change in population might have been due to persecution. The 2009 survey found this species to be common, and counted as many as 3259 birds from five wetlands.

The population of Little Cormorant *Phalacrocorax niger* has increased considerably: in 1933 Ali noted it only at Shoranur, not a single bird being seen in the Vembanad backwaters. But in 2009, 2343 cormorants were counted from 12 sites. Indian Shag *P. fuscicollis* and Great Cormorant *P. carbo* were recorded in 2009, but not in 1933.

There is change in the species composition of Anatidae in 2009: Spot-billed Duck *Anas poecilorhyncha*, Northern Shoveller *A. clypeata* and Northern Pintail *A. acuta* not recorded in 1933 survey, were seen in good numbers now.

Among the Rallidae, Purple Moorhen *Porphyrio porphyrio*, Common Coot *Fulica atra*, and Common Moorhen *Gallinula chloropus* were not recorded in 1933; these species, especially Purple Moorhen (2815 birds), were found in good numbers in 2009.

Birds of prey

Black Baza *Aviceda leuphotes*, Lesser Grey-headed Fish-Eagle, White-belied Sea Eagle, Short-toed Snake-Eagle *Circaetus gallicus*, Crested Goshawk *Accipiter trivirgatus*, Eurasian Sparrow Hawk *A. nisus*, White-eyed Buzzard *Butastur teesa,* Common Buzzard *Buteo buteo*, Bonelli's Eagle *Hieraaetus fasciatus*, Booted Eagle *H. pennatus*, Lesser Kestrel *Falco naumanni* and *Aquila* eagles, which were recorded in 2009, were not seen in 1933.

Disappearance of vultures

Vultures were not seen at all in 2009. Ali had recorded Long-billed Vulture *Gyps indicus*, Indian White-backed Vulture *G. bengalensis*, Red-headed Vulture *Sarcogyps calvus* and Egyptian Vulture *Neophron percnopterus* during the 1933 survey. He observed Egyptian Vulture at three locations, Long-billed-, and Red-headed vultures at five locations each, and Indian White-backed Vulture at four locations. On our interactions with the local people during the survey, we could understand that vultures disappeared about thirty years ago from most of these sites. According to the villagers of Marayur (10°17′N, 77°10′E), the main reason for the extinction of vultures in that locality was the poisoning by villagers of the left-over carcasses of cattle killed by tigers and leopards, to kill those carnivores. Vultures that fed on the poisoned carcasses might have died en masse, causing local extinction over the years. Scarcity of carcasses to feed, both in the wilderness, due to deforestation, poaching, *etc.*, as well as of domestic animals, due to a general decline in cattle numbers, disposal of carcasses by burial instead of open disposal, and above all, increase in demand for consumable beef in Kerala, also could have caused the decline of vultures. More recently, the problems caused by the veterinary drug Diclofenac, as proven elsewhere in India, could have decimated whatever remained of the vulture population in the Tamil Nadu plains on the eastern side of these localities.

Black Kite *Milvus migrans*

The distribution pattern of Black Kite seems to have undergone considerable change. Ali & Whistler (1937a) found this raptor, "generally distributed in the low country of Travancore and Cochin about towns and villages, and is also found on the hills (up to 5000 ft. !) [=1524 m] by human habitations." Black Kites were also seen in association with vultures at carcasses in 1933 (Ali & Whistler, 1937a). In 2009 it was recorded only at nine sites, whereas it was present at 15 sites in 1933. Now they seem to congregate in the larger towns attracted by the abundant garbage; ***c***. 1500 birds were counted at a single roost in Trivandrum city in 2009.

Indian Peafowl *Pavo cristatus*

Indian Peafowl was not met with in the 1933 survey; but in 2009, it was recorded in ten out of 19 locations. This is an interesting development as the species usually occurs in dense scrub and deciduous forests (Ali 1969). Dispersal of Indian Peafowl to more areas points to the emergence of suitable drier conditions and open areas formerly not present in the southern Western Ghats. No other obvious reasons, e.g., change into agricultural crops, like groundnut, which attracts peafowl, could be detected.

House Swift *Apus affinis*

House Swift, described as, "… uncommon, patchily and capriciously distributed …" by Ali & Whistler (1936c), was found to be common and widespread in 2009. Concrete buildings, dams, and bridges constructed all over Kerala since 1933 provide the species with enough suitable substrate to construct nests and this may be the reason for its present status.

Red-vented Bulbul *Pycnonotus cafer* a case of generalist species moving to higher altitudes

Regarding the status of Red-vented Bulbul, Ali & Whistler (1935a) commented, "… met it from about sea level to altitude 4000 ft (1219 m), but on the whole it would perhaps be correct to say that it avoids elevations over 1500–2000 ft (457–610 m) and also country that is densely wooded." There is a tremendous change in the distributional pattern of this bulbul now. The highest elevation at which we observed it was 2132 m during the present survey. At Padagari (600 m), where Ali had recorded it as "absent," its encounter rate was 135 birds/100 h in 2009. It was absent in Munnar in 1933, but we recorded an encounter rate of 60 birds/100 h. These instances point to the fact that this habitat generalist has moved up to higher elevations, which, sadly, indicates a great increase in the area of depleted habitats.

Status of the birds of Shola-grassland

Shola-grassland is a unique ecosystem in the Western Ghats that normally exists above 1800 m (Nair 1991). Over the years, these high altitude habitats of the High Ranges have been altered for monoculture plantations such as pine (*Pinus* sp.), eucalyptus (*Eucalyptus* sp.), *etc.* Anthropogenic factors like fire, agriculture, construction of tourism infrastructure, and dams and reservoirs

Photo: C. K. Vishnudas

47. Quarrying deep inside the forest.

have so degraded and fragmented this habitat that today only a fraction of this ecosystem exists undisturbed, in its natural state. The bird community in this high altitude area also is unique with high endemism and presence of habitat specialists. The endemic Black-and-Orange Flycatcher, White-bellied Shortwing, and Grey-breasted Laughingthrush are common here. In Munnar, though large areas of prime shola forests had been cleared for tea and eucalyptus plantations, we found that good population of these birds survived in the relict shola patches. We found that the encounter rate of Grey-breasted Laughingthrush was higher (414 birds/100 h) in the undisturbed shola forest than in the disturbed shola patches (375 birds/100 h). The extent of Kannan Devan Tea Planations in Munnar (Tata Tea) is 240 km^2 (www.kdhptea.com), which is more than three times the area of Eravikulam National Park. This clearly indicates the extent of loss of endemic bird habitat in south Kerala.

Conclusion

The Western Ghats region has been recognised as one of the important ecological hotspots of the world. During the survey, we came across evidence of extensive ecological damage that has taken place in the last seven decades. We found that large tracts of contiguous forests have become fragmented with smaller, isolated forest patches, without any connectivity in between. Generalist birds have started moving up to the high altitude habitats causing severe competition for endemic and specialist taxa. Uncontrolled tourism in high altitude area has become a major threat to endemic species. The ever increasing crow population is a major threat to the survival of small birds. In most of the higher altitude grasslands where the survey was undertaken, annual fire was a regular feature, which is detrimental to grassland specialists. Many of the wetlands have been encroached for construction activities like land filling, and quarrying [**48**] takes place even deep inside the forest.

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Appendix: A checklist of birds recorded at 19 locations in 2009.

Sl. No.	Species	Wadakkancheri	Nemmara	Padagiri	Kuriyarkutti	Karuppadanna	Maraiyur	Munnar	Thattakkad	Santhanpara	Kumili	Peermade	Kottayam	Camp Deramalai	Rajampara	Tennalai	Trivandrum	Balamore Estate	Aramboli	Cape Comorin
1	Little Grebe *Tachybaptus ruficollis*					X		X			X		X						X	X
2	Spot-billed Pelican *Pelecanus philippensis*																		X	X
3	Little Cormorant *Phalacrocorax niger*	X	X	X	X	X	X		X		X	X	X		X	X	X	X	X	X
4	Indian Shag *P. fuscicollis*				X	X			X				X						X	X
5	Great Cormorant *P. carbo*								X		X		X							
6	Darter *Anhinga melanogaster*	X			X	X			X		X		X			X	X		X	X
7	Little Egret *Egretta garzetta*	X	X			X	X	X	X		X		X	X	X	X	X		X	X
8	Western Reef-Egret *E. gularis*					X							X				X			X
9	Grey Heron *Ardea cinerea*					X					X		X				X		X	X
10	Purple Heron *A. purpurea*					X			X				X				X		X	X
11	Large Egret *Casmerodius albus*		X			X			X		X		X			X	X		X	X
12	Median Egret *Mesophoyx intermedia*	X	X			X		X	X		X		X				X		X	X
13	Cattle Egret *Bubulcus ibis*	X	X		X	X		X	X		X	X	X		X	X	X		X	X
14	Indian Pond-Heron *Ardeola grayii*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	Little Green Heron *Butorides striatus*			X	X		X				X			X	X	X				X
16	Black-crowned Night-Heron *Nycticorax nycticorax*					X							X						X	X
17	Malayan Night-Heron *Gorsachius melanolophus*										X									
18	Yellow Bittern *Ixobrychus sinensis*												X						X	X
19	Chestnut Bittern *I. cinnamomeus*		X								X					X			X	X
20	Black Bittern *Dupetor flavicollis*																		X	X
21	Painted Stork *Mycteria leucocephala*					X							X						X	X
22	Asian Openbill-Stork *Anastomus oscitans*					X							X			X			X	X
23	White-necked Stork *Ciconia episcopus*					X					X		X							
24	Glossy Ibis *Plegadis falcinellus*					X											X			
25	Oriental White Ibis *Threskiornis melanocephalus*		X			X					X		X				X		X	X
26	Black Ibis *Pseudibis papillosa*																		X	X
27	Eurasian Spoonbill *Platalea leucorodia*																			X
28	Greater Flamingo *Phoenicopterus ruber*																			X
29	Lesser Whistling-Duck *Dendrocygna javanica*					X			X				X				X			X
30	Cotton Teal *Nettapus coromandelianus*					X							X				X		X	X
31	Spot-billed Duck *Anas poecilorhyncha*					X		X					X				X		X	X
32	Northern Shoveller *A. clypeata*					X														
33	Northern Pintail *A. acuta*					X							X							
34	Garganey *A. querquedula*					X							X							X
35	Black Baza *Aviceda leuphotes*								X		X	X			X	X				
36	Oriental Honey-Buzzard *Pernis ptilorhynchus*	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	X
37	Black-shouldered Kite *Elanus caeruleus*		X				X	X		X	X	X	X	X				X		
38	Black Kite *Milvus migrans*		X			X							X		X	X	X	X	X	X
39	Brahminy Kite *Haliastur indus*	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X
40	White-bellied Sea-Eagle *Haliaeetus leucogaster*															X				
41	Lesser Grey-headed Fish-Eagle *Ichthyophaga humilis*				X				X		X					X				
42	Short-toed Snake-Eagle *Circaetus gallicus*									X						X			X	
43	Crested Serpent-Eagle *Spilornis cheela*	X	X	X	X		X	X	X	X	X	X		X	X	X		X	X	X
44	Western Marsh-Harrier *Circus aeruginosus*					X		X					X							X
45	Pallid Harrier *C. macrourus*			X			X				X	X								
46	Crested Goshawk *Accipiter trivirgatus*				X		X	X	X			X		X	X	X		X		
47	Shikra *A. badius*	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X
48	Besra Sparrowhawk *A. virgatus*				X			X	X		X					X		X		
49	Eurasian Sparrowhawk *A. nisus*										X									
50	White-eyed Buzzard *Butastur teesa*		X	X			X													
51	Common Buzzard *Buteo buteo*	X		X	X		X	X	X			X		X						
52	Black Eagle *Ictinaetus malayensis*	X	X	X	X		X	X	X	X	X	X		X	X	X		X	X	
53	Indian Spotted Eagle *Aquila hastata*												X							
54	Greater Spotted Eagle *A. clanga*										X		X							
55	Steppe Eagle *A. nipalensis*												X							
56	Bonelli's Eagle *Hieraaetus fasciatus*			X						X	X									
57	Booted Eagle *H. pennatus*		X	X	X	X			X	X	X	X	X	X		X			X	
58	Rufous-bellied Eagle *H. kienerii*				X		X	X		X	X			X		X				
59	Changeable Hawk-Eagle *Spizaetus cirrhatus*	X	X	X	X		X		X	X						X		X	X	
60	Mountain Hawk-Eagle *S. nipalensis*			X												X		X		
61	Osprey *Pandion haliaetus*										X		X			X				
62	Lesser Kestrel *Falco naumanni*										X									
63	Common Kestrel *F. tinnunculus*		X	X	X	X	X	X		X	X	X	X	X				X		
64	Amur Falcon *F. amurensis*						X													

Sl. No.	Species	Wadakkancheri	Nemmara	Padagiri	Kuriyarkutti	Karuppadanna	Maraiyur	Munnar	Thattakkad	Santhanpara	Kumili	Peermade	Kottayam	Camp Deramalai	Rajampara	Tenmalai	Trivandrum	Balamore Estate	Aramboli	Cape Comorin
65	Peregrine Falcon *F. peregrinus calidus*												X							
65a	Shaheen *F. peregrinus perigrinator*				X							X		X				X		
66	Grey Francolin *Francolinus pondicerianus*		X																X	X
67	Jungle Bush-Quail *Perdicula asiatica*					X														
68	Painted Bush-Quail *P. erythrorhyncha*					X	X			X	X									
69	Red Spurfowl *Galloperdix spadicea*	X	X	X	X				X		X	X		X	X					
70	Grey Junglefowl *Gallus sonneratii*	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	
71	Indian Peafowl *Pavo cristatus*		X	X	X	X		X						X		X	X		X	X
72	Slaty-legged Crake *Rallina eurizonoides*								X											
73	Baillon's Crake *Porzana pusilla*																X			
74	White-breasted Waterhen *Amaurornis phoenicurus*	X				X		X	X	X	X	X	X			X	X		X	X
75	Watercock *Gallicrex cinerea*												X							X
76	Purple Moorhen *Porphyrio porphyrio*					X							X				X		X	X
77	Common Moorhen *Gallinula chloropus*							X					X							X
78	Common Coot *Fulica atra*					X							X				X			X
79	Pheasant-tailed Jacana *Hydrophasianus chirurgus*					X							X						X	X
80	Bronze-winged Jacana *Metopidius indicus*		X			X			X				X						X	X
81	Pacific Golden-Plover *Pluvialis fulva*					X							X							
82	Grey Plover *Pluvialis squatarola*																			X
83	Little Ringed Plover *Charadrius dubius*	X				X					X		X							X
84	Kentish Plover *C. alexandrinus*					X							X							X
85	Lesser Sand Plover *C. mongolus*					X							X							X
86	Greater Sand Plover *C. leschenaultii*					X							X							X
87	Yellow-wattled Lapwing *Vanellus malabaricus*					X														
88	Grey-headed Lapwing *V. cinereus*												X							
89	Red-wattled Lapwing *V. indicus*	X	X		X	X	X	X	X		X	X	X			X				X
90	Pintail Snipe *Gallinago stenura*										X									
91	Common Snipe *G. gallinago*							X												
92	Black-tailed Godwit *Limosa limosa*												X							X
93	Eurasian Curlew *Numenius arquata*					X							X							
94	Common Redshank *Tringa totanus*					X							X							X
95	Marsh Sandpiper *T. stagnatilis*					X							X							
96	Common Greenshank *T. nebularia*					X							X							X
97	Green Sandpiper *T. ochropus*		X			X					X	X	X							
98	Wood Sandpiper *T. glareola*					X							X							X
99	Terek Sandpiper *Xenus cinereus*																			X
100	Common Sandpiper *Actitis hypoleucos*					X		X	X		X		X				X		X	X
101	Ruddy Turnstone *Arenaria interpres*																			X
102	Sanderling *Calidris alba*					X							X							
103	Little Stint *C. minuta*												X							X
104	Black-winged Stilt *Himantopus himantopus*					X							X							X
105	Stone-Curlew *Burhinus oedicnemus*																			X
106	Small Pratincole *Glareola lactea*					X										X				
107	Heuglin's Gull *Larus heuglini*					X														
108	Pallas's Gull *L. ichthyaetus*					X														
109	Brown-headed Gull *L. brunnicephalus*					X							X							
110	Black-headed Gull *L. ridibundus*					X							X							X
111	Gull-billed Tern *Gelochelidon nilotica*					X							X							X
112	Caspian Tern *Hydroprogne caspia*																			X
113	River Tern *Sterna aurantia*	X	X						X		X					X				
114	Large Crested Tern *S. bergii*																			X
115	Common Tern *S. hirundo*					X														
116	Little Tern / Saunder's Tern *S. albifrons / saundersi*					X							X							
117	Whiskered Tern *Chlidonias hybridus*					X			X				X				X		X	X
118	Blue Rock Pigeon *Columba livia*		X			X	X	X	X			X	X		X	X	X			X
119	Nilgiri Wood-Pigeon *C. elphinstonii*			X			X	X		X	X							X		
120	Little Brown Dove *Streptopelia senegalensis*						X												X	X
121	Eurasian Collared-Dove *S. decaocto*																		X	
122	Spotted Dove *S. chinensis*	X	X	X	X	X	X	X	X		X	X				X	X		X	X
123	Emerald Dove *Chalcophaps indica*	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X		
124	Pompadour Green-Pigeon *Treron pompadora*	X	X	X	X		X	X	X	X	X	X		X	X	X	X			
125	Yellow-legged Green-Pigeon *T. phoenicoptera*	X	X																	
126	Green Imperial-Pigeon *Ducula aenea*	X					X		X		X									
127	Mountain Imperial-Pigeon *D. badia*			X	X				X	X	X	X	X	X	X	X		X		
128	Indian Hanging-Parrot *Loriculus vernalis*	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	
129	Rose-ringed Parakeet *Psittacula krameri*	X	X			X							X		X		X		X	X
130	Plum-headed Parakeet *P. cyanocephala*	X	X	X	X		X	X	X		X	X			X	X	X			

Sl. No.	Species	Wadakkancheri	Nemmara	Padagiri	Kuriyarkutti	Karuppadanna	Marayur	Munnar	Thattakkad	Santhanpara	Kumili	Peermade	Kottayam	Camp Deramalai	Rajampara	Tenmalai	Trivandrum	Balamore Estate	Aramboli	Cape Comorin
131	Blue-winged Parakeet *P. columboides*	X	X	X	X		X	X	X	X	X	X		X	X	X		X		
132	Pied Crested Cuckoo *Clamator jacobinus*					X													X	X
133	Red-winged Crested Cuckoo *C. coromandus*										X									
134	Large Hawk-Cuckoo *Hierococcyx sparverioides*										X					X				
135	Brainfever Bird *H. varius*	X	X	X	X		X	X	X	X	X	X		X	X	X	X		X	
136	Indian Cuckoo *Cuculus micropterus*								X							X				
137	Banded Bay Cuckoo *Cacomantis sonneratii*	X			X				X		X	X			X	X			X	
138	Indian Plaintive Cuckoo *C. passerinus*						X	X	X											
139	Drongo Cuckoo *Surniculus lugubris*	X							X		X				X			X		
140	Asian Koel *Eudynamys scolopacea*	X	X			X	X		X		X	X	X		X	X	X		X	X
141	Small Green-billed Malkoha *Phaenicophaeus viridirostris*	X	X		X		X												X	X
142	Sirkeer Malkoha *P. leschenaultii*						X													
143	Greater Coucal *Centropus sinensis*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
144	Lesser Coucal *C. bengalensis*										X							X		
145	Barn Owl *Tyto alba*											X	X							
146	Oriental Scops-Owl *Otus sunia*			X	X					X	X			X						
147	Collared Scops-Owl *O. bakkamoena*		X		X				X	X	X	X						X		
148	Forest Eagle-Owl *Bubo nipalensis*						X													
149	Brown Fish-Owl *Ketupa zeylonensis*				X		X		X		X	X		X				X		
150	Mottled Wood-Owl *Strix ocellata*	X	X																	
151	Brown Wood-Owl *S. leptogrammica*																	X		
152	Jungle Owlet *Glaucidium radiatum*	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		
153	Spotted Owlet *Athene brama*		X														X			X
154	Brown Hawk-Owl *Ninox scutulata*				X				X	X	X	X		X		X		X		
155	Ceylon Frogmouth *Batrachostomus moniliger*								X											
156	Great Eared-Nightjar *Eurostopodus macrotis*			X	X				X		X				X	X				
157	Indian Jungle Nightjar *Caprimulgus indicus*											X		X				X		
158	Jerdon's Nightjar *C. atripennis*		X		X				X							X				
159	Franklin's Nightjar *C. affinis*													X						
160	Indian Edible-nest Swiftlet *Collocalia unicolor*		X	X	X		X		X			X			X	X		X		
161	White-rumped Needletail-Swift *Zoonavena sylvatica*			X	X		X	X	X		X	X		X	X	X				
162	Brown-backed Needletail-Swift *Hirundapus giganteus*			X	X		X	X		X	X	X		X	X	X		X		
163	Asian Palm-Swift *Cypsiurus balasiensis*	X	X		X				X		X	X			X	X	X		X	X
164	Alpine Swift *Tachymarptis melba*		X	X	X		X	X		X	X	X	X			X		X		X
165	Pacific Swift *Apus pacificus*				X															
166	House Swift *A. affinis*	X	X	X	X		X	X	X		X	X	X						X	X
167	Crested Tree-Swift *Hemiprocne coronata*	X	X	X			X	X	X	X	X	X			X	X				
168	Malabar Trogon *Harpactes fasciatus*	X	X	X	X		X		X	X	X	X			X	X		X		
169	Small Blue Kingfisher *Alcedo atthis*	X	X	X	X	X	X	X	X	X	X	X	X				X		X	X
170	Stork-billed Kingfisher *Halcyon capensis*	X	X	X	X	X	X		X		X		X		X	X				
171	White-breasted Kingfisher *H. smyrnensis*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
172	Black-capped Kingfisher *H. pileata*				X															
173	Lesser Pied Kingfisher *Ceryle rudis*	X				X			X		X		X				X		X	X
174	Blue-bearded Bee-eater *Nyctyornis athertoni*				X		X													
175	Small Bee-eater *Merops orientalis*	X	X			X	X		X								X		X	X
176	Blue-tailed Bee-eater *M. philippinus*				X	X			X				X							
177	Chestnut-headed Bee-eater *M. leschenaulti*	X	X	X	X		X	X	X		X	X		X	X	X			X	
178	Indian Roller *Coracias benghalensis*		X		X		X				X		X				X		X	X
179	Oriental Broad-billed Roller *Eurystomus orientalis*				X				X						X					
180	Common Hoopoe *Upupa epops*	X					X													X
181	Malabar Grey Hornbill *Ocyceros griseus*	X		X	X			X	X	X	X	X		X	X	X		X		
182	Indian Grey Hornbill *O. birostris*		X																	
183	Malabar Pied Hornbill *Anthracoceros coronatus*				X															
184	Great Pied Hornbill *Buceros bicornis*			X	X						X			X	X	X		X		
185	Brown-headed Barbet *Megalaima zeylanica*				X		X												X	X
186	White-cheeked Barbet *M. viridis*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
187	Crimson-throated Barbet *M. rubricapillus*	X	X	X	X		X	X	X	X	X	X		X	X	X		X		
188	Coppersmith Barbet *M. haemacephala*		X		X		X					X					X		X	X
189	Speckled Piculet *Picumnus innominatus*			X	X															
190	Brown-capped Pygmy Woodpecker *Dendrocopos nanus*	X	X	X	X		X	X	X		X	X			X	X				
191	Yellow-fronted Pied Woodpecker *D. mahrattensis*	X					X													
192	Rufous Woodpecker *Celeus brachyurus*	X	X	X	X				X		X			X	X	X				

Sl. No.	Species	Wadakkancheri	Nemmara	Padagiri	Kuriyarkutti	Karuppadanna	Maraiyur	Munnar	Thattakkad	Santhanpara	Kumili	Peermade	Kottayam	Camp Deramalai	Rajampara	Tenmalai	Trivandrum	Balamore Estate	Aramboli	Cape Comorin
193	Great Black Woodpecker *Dryocopus javensis*								X	X	X				X					
194	Small Yellow-naped Woodpecker *Picus chlorolophus*		X	X	X		X		X		X	X		X	X	X				
195	Little Scaly-bellied Green Woodpecker *P. xanthopygaeus*	X					X	X	X											
196	Common Golden-backed Woodpecker *Dinopium javanense*	X		X	X		X		X	X	X			X	X	X		X		
197	Lesser Golden-backed Woodpecker *D. benghalense*	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X
198	Black-shouldered Woodpecker *Chrysocolaptes festivus*						X													
199	Greater Golden-backed Woodpecker *C. lucidus*	X	X	X	X		X	X	X		X	X		X		X		X		
200	Heart-spotted Woodpecker *Hemicircus canente*	X	X	X	X		X	X	X	X	X	X			X	X		X		
201	Indian Pitta *Pitta brachyura*		X				X		X	X	X	X			X	X				
202	Jerdon's Bush-Lark *Mirafra affinis*				X		X												X	X
203	Ashy-crowned Sparrow-Lark *Eremopterix grisea*																			X
204	Eastern Skylark *Alauda gulgula*										X	X	X	X				X		X
205	Eurasian Crag-Martin *Hirundo rupestris*						X													
206	Dusky Crag-Martin *H. concolor*		X	X	X		X	X	X		X	X		X		X		X		
207	Common Swallow *H. rustica*				X	X	X				X	X	X		X	X			X	X
208	House Swallow *H. tahitica*			X			X	X										X		
209	Wire-tailed Swallow *H. smithii*									X			X							
210	Red-rumped Swallow *H. daurica*		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X
211	Northern House-Martin *Delichon urbica*								X		X									
212	Forest Wagtail *Motacilla indicus*		X	X	X				X		X			X	X	X				X
213	White Wagtail *M. alba*												X							
214	Large Pied Wagtail *M. maderaspatensis*	X	X		X	X	X	X	X		X	X	X	X	X	X	X		X	X
215	Citrine Wagtail *M. citreola*																X			
216	Yellow Wagtail *M. flava*					X							X				X			X
217	Grey Wagtail *M. cinerea*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
218	Richard's Pipit *Anthus richardi*										X									
219	Paddyfield Pipit *A. rufulus*				X	X	X	X		X	X	X		X		X		X		X
220	Brown Rock Pipit *A. similis*																X	X		
221	Nilgiri Pipit *A. nilghiriensis*						X	X										X		
222	Large Cuckoo-Shrike *Coracina macei*	X	X	X	X		X		X		X	X			X	X				
223	Black-headed Cuckoo-Shrike *C. melanoptera*	X	X		X		X		X		X				X					
224	Small Minivet *Pericrocotus cinnamomeus*	X	X		X		X	X	X		X			X	X	X				
225	Scarlet Minivet *P. flammeus*	X	X	X	X		X	X	X	X	X	X		X	X	X		X		
226	Pied Flycatcher-Shrike *Hemipus picatus*	X	X	X	X		X	X	X	X	X	X			X	X		X		
227	Large Woodshrike *Tephrodornis gularis*	X	X	X	X		X		X	X	X	X		X	X	X				
228	Common Woodshrike *T. pondicerianus*	X	X				X		X						X	X			X	X
229	Grey-headed Bulbul *Pycnonotus priocephalus*			X	X		X		X		X	X		X	X	X		X		
230	Ruby-throated Bulbul *P. melanicterus gularis*	X	X	X	X		X		X		X	X			X	X		X		
231	Red-whiskered Bulbul *P. jocosus*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
232	Red-vented Bulbul *P. cafer*	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X
233	White-browed Bulbul *P. luteolus*	X	X		X		X												X	X
234	Yellow-browed Bulbul *Hypsipetes indicus*	X	X	X	X		X	X	X	X	X	X		X	X	X		X		
235	Black Bulbul *H. leucocephalus*			X	X		X	X		X	X	X		X	X	X		X		
236	Common Iora *Aegithina tiphia*	X	X	X	X		X		X	X	X	X	X		X	X	X	X	X	X
237	Jerdon's Chloropsis *Chloropsis cochinchinensis*	X	X				X		X											
238	Gold-fronted Chloropsis *C. aurifrons*	X	X	X	X		X		X		X	X		X	X	X		X		
239	Asian Fairy-Bluebird *Irena puella*	X	X	X	X		X		X		X	X		X	X	X		X		
240	Brown Shrike *Lanius cristatus cristatus*		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
240a	Philippine Shrike *L. cristatus lucionensis*		X		X				X			X			X				X	
241	Bay-backed Shrike *L. vittatus*					X	X												X	
242	Rufous-backed Shrike *L. schach*						X	X	X	X	X		X							
243	Blue-headed Rock-Thrush *Monticola cinclorhynchus*	X		X	X		X	X	X	X		X								
244	Blue Rock-Thrush *M. solitarius*			X								X								
245	Malabar Whistling-Thrush *Myiophonus horsfieldii*	X	X	X	X		X	X	X	X	X	X		X	X	X		X		
246	White-throated Ground Thrush *Zoothera citrina cyanotus*	X	X	X	X		X	X	X		X	X		X	X	X				
247	Scaly Thrush *Zoothera dauma*							X												
248	Eurasian Blackbird *Turdus merula nigropileus*	X		X	X		X	X	X	X	X	X		X						
248a	Bourdillon's Blackbird *T. merula bourdilloni*			X			X	X		X	X							X		
249	White-bellied Shortwing *Brachypteryx major albiventris*						X	X		X	X	X				X		X		

Sl. No.	Species	Wadakkancheri	Nemmara	Padagiri	Kuriyarkutti	Karuppadanna	Marayur	Munnar	Thattakkad	Santhanpara	Kumili	Peermade	Kottayam	Camp Deramalai	Rajampara	Tenmalai	Trivandrum	Balamore Estate	Aramboli	Cape Comorin
250	Indian Blue Robin *Luscinia brunnea*		X		X		X	X		X	X	X		X	X					
251	Oriental Magpie-Robin *Copsychus saularis*	X	X	X	X	X	X		X	X	X	X	X		X	X	X		X	X
252	White-rumped Shama *C. malabaricus*				X		X													
253	Indian Robin *Saxicoloides fulicata*		X			X	X												X	X
254	Pied Bushchat *Saxicola caprata*			X			X	X		X	X	X								
255	Wynaad Laughingthrush *Garrulax delesserti*				X									X						
256	Grey-breasted Laughingthursh *G. jerdoni fairbanki*						X	X		X	X									
256a	Blanford's Laughingthrush *G. jerdoni merdionale*															X		X		
257	Spotted Babbler *Pellorneum ruficeps*	X	X	X	X		X		X	X	X	X		X	X	X		X	X	
258	Indian Scimitar-Babbler *Pomatorhinus horsfieldii*		X	X	X		X	X	X	X	X	X		X	X	X		X		
259	Rufous-bellied Babbler *Dumetia hyperythra*		X		X		X					X								
260	Black-headed Babbler *Rhopocichla atriceps*	X		X	X				X	X	X	X			X	X		X		
261	Yellow-eyed Babbler *Chrysomma sinense*						X													
262	Indian Rufous Babbler *Turdoides subrufus*	X		X	X		X	X	X	X	X	X			X	X		X		
263	Jungle Babbler *T. striatus*	X	X	X	X		X	X	X	X	X	X			X	X				
264	White-headed Babbler *T. affinis*	X	X		X		X		X							X	X		X	X
265	Quaker Tit-Babbler *Alcippe poioicephala*	X		X	X		X	X	X	X	X	X		X	X	X		X		
266	Streaked Fantail-Warbler *Cisticola juncidis*					X	X				X	X	X			X	X			
267	Franklin's Prinia *Prinia hodgsonii*	X		X	X		X		X		X	X						X		
268	Jungle Prinia *P. sylvatica*						X												X	
269	Ashy Prinia *P. socialis*					X	X				X		X	X				X		
270	Plain Prinia *P. inornata*					X	X	X	X	X	X	X	X						X	
271	Pale Grasshopper-Warbler *Locustella naevia*										X	X								
272	Paddyfield Warbler *Acrocephalus agricola*							X												
273	Blyth's Reed-Warbler *A. dumetorum*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
274	Indian Great Reed-Warbler *A. stentoreus*					X			X		X		X							
275	Thick-billed Warbler *A. aedon*	X		X			X	X			X					X				X
276	Common Tailorbird *Orthotomus sutorius*	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
277	Tickell's Warbler *Phylloscopus affinis*			X	X		X	X		X	X	X				X				
278	Greenish Leaf-Warbler *P. trochiloides*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
279	Large-billed Leaf-Warbler *P. magnirostris*	X	X	X	X		X	X	X	X	X	X			X	X		X		
280	Tytler's Leaf-Warbler *P. tytleri*						X	X				X								
281	Western Crowned Leaf-Warbler *P. occipitalis*			X	X		X	X		X	X	X								
282	Broad-tailed Grass-Warbler *Schoenicola platyura*							X			X	X						X		
283	Asian Brown Flycatcher *Muscicapa latirostris*	X	X	X	X		X		X		X	X	X	X	X	X				
284	Rusty-tailed Flycatcher *M. ruficauda*	X		X	X		X		X		X				X	X				
285	Brown-breasted Flycatcher *M. muttui*	X	X	X	X		X	X	X		X	X			X					
286	Red-throated Flycatcher *Ficedula parva*				X				X											
287	Black-and-Orange Flycatcher *F. nigrorufa*						X	X		X	X									
288	Verditer Flycatcher *Eumyias thalassina*	X		X	X		X		X			X								
289	Nilgiri Flycatcher *E. albicaudata*						X	X		X	X	X						X		
290	White-bellied Blue-Flycatcher *Cyornis pallipes*			X	X		X		X		X	X			X	X		X		
291	Blue-throated Flycatcher *C. rubeculoides*	X	X	X	X		X		X		X				X	X				
292	Tickell's Blue-Flycatcher *C. tickelliae*	X	X	X	X		X		X		X	X			X	X				
293	Grey-headed Flycatcher *Culicicapa ceylonensis*			X			X	X			X			X		X		X		
294	Asian Paradise-Flycatcher *Terpsiphone paradisi*	X	X	X	X		X		X		X	X	X	X	X	X		X		X
295	Black-naped Monarch-Flycatcher *Hypothymis azurea*	X	X	X	X		X		X	X	X	X			X	X		X		
296	White-browed Fantail-Flycatcher *Rhipidura aureola*		X				X													
297	Great Tit *Parus major*	X	X	X	X		X		X		X				X	X				
298	Black-lored Yellow Tit *P. xanthogenys*			X	X		X	X		X	X			X						
299	Velvet-fronted Nuthatch *Sitta frontalis*		X	X	X		X	X	X	X	X			X	X	X		X		
300	Thick-billed Flowerpecker *Dicaeum agile*						X		X						X					
301	Tickell's Flowerpecker *D. erythrorhynchos*	X	X		X	X	X						X				X		X	X
302	Plain Flowerpecker *D. concolor*	X		X	X		X	X	X	X	X	X		X	X	X		X		
303	Purple-rumped Sunbird *Nectarinia zeylonica*	X	X	X	X	X	X		X		X		X				X		X	
304	Small Sunbird *N. minima*	X	X	X	X		X	X	X	X	X	X		X	X	X		X	X	
305	Purple Sunbird *N. asiatica*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
306	Loten's Sunbird *N. lotenia*	X					X		X	X	X		X	X	X	X	X	X		
307	Little Spiderhunter *Arachnothera longirostris*		X	X	X			X	X	X	X	X			X	X	X	X		
308	Oriental White-eye *Zosterops palpebrosus*			X	X		X	X		X	X	X		X		X		X		
309	Common Rosefinch *Carpodacus erythrinus*		X	X			X	X	X	X	X									
310	Red Munia *Amandava amandava*					X														
311	White-rumped Munia *Lonchura striata*	X	X		X			X												
312	Black-throated Munia *L. kelaarti*		X	X			X	X	X	X		X						X		
313	Spotted Munia *L. punctulata*		X				X													
314	Black-headed Munia *L. malacca*					X			X				X				X			

Sl. No.	Species	Wadakkancheri	Nemmara	Padagiri	Kuriyarkutti	Karuppadanna	Maraiyur	Munnar	Thattakkad	Santhanpara	Kumili	Peermade	Kottayam	Camp Deramalai	Rajampara	Tenmalai	Trivandrum	Balamore Estate	Aramboli	Cape Comorin
315	House Sparrow *Passer domesticus*						X	X			X	X								X
316	Yellow-throated Sparrow *Petronia xanthocollis*					X	X						X						X	X
317	Streaked Weaver *Ploceus manyar*					X							X							
318	Baya Weaver *P. philippinus*					X							X				X		X	X
319	Grey-headed Starling *Sturnus malabaricus malabaricus*			X			X		X		X		X	X		X				
319a	Blyth's Starling *Sturnus malabaricus blythi*	X	X	X	X				X		X	X		X	X	X		X		
320	Brahminy Starling *S. pagodarum*																			X
321	Rosy Starling *S. roseus*					X	X						X							
322	Common Myna *Acridotheres tristis*	X	X	X	X	X	X		X				X		X	X	X		X	X
323	Jungle Myna *A. fuscus*					X	X	X	X		X	X	X		X	X	X		X	X
324	Southern Hill-Myna *Gracula indica*	X	X	X	X			X	X	X	X	X		X	X	X		X		
325	Indian Golden Oriole *Oriolus kundoo*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X
326	Black-naped Oriole *O. chinensis*	X	X	X	X		X		X				X		X	X				
327	Black-headed Oriole *O. xanthornus*	X	X		X	X	X		X		X	X	X		X	X	X			
328	Black Drongo *Dicrurus macrocercus*	X	X	X		X			X				X				X		X	X
329	Ashy Drongo *D. leucophaeus*	X	X	X	X		X	X	X	X	X	X		X	X	X	X			
330	White-bellied Drongo *D. caerulescens*	X			X		X													
331	Bronzed Drongo *D. aeneus*	X	X	X	X		X		X		X	X		X	X	X		X		
332	Spangled Drongo *D. hottentottus*	X																		
333	Greater Racket-tailed Drongo *D. paradiseus*	X	X	X	X		X		X	X	X	X	X	X	X	X		X		
334	Ashy Woodswallow *Artamus fuscus*	X	X			X	X		X	X	X	X	X		X	X	X	X	X	X
335	Indian Treepie *Dendrocitta vagabunda*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
336	White-bellied Treepie *D. leucogastra*			X	X		X		X		X	X		X	X	X		X		
337	House Crow *Corvus splendens*		X		X	X	X	X	X		X	X	X		X	X	X		X	X
338	Jungle Crow *C. macrorhynchos*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Total number of species	**124**	**137**	**130**	**158**	**112**	**180**	**114**	**166**	**96**	**185**	**138**	**127**	**93**	**118**	**146**	**73**	**94**	**93**	**120**

In memoriam

James Channabasappa Uttangi

1916 – 2014

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Steppe Buzzard *Buteo buteo vulpinus* in the Little Rann of Kachchh, and its distribution in the Saurashtra region of Gujarat, India

Prasad Ganpule & Nirav Bhatt

Ganpule, P., & Bhatt, N., 2014. Steppe Buzzard *Buteo buteo vulpinus* in the Little Rann of Kachchh, and its distribution in the Saurashtra region of Gujarat, India. *Indian BIRDS* 9 (2): 41–45.
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Introduction

Steppe Buzzard *Buteo buteo vulpinus* is a migratory buzzard breeding from northern Europe to Siberia (*c.* 96°E) and wintering mainly in eastern and central Africa, including the southern-most part of that continent (Shirihai & Forsman 1991). It is also a winter migrant to the southern Western Ghats in India. Rasmussen & Anderton (2012) give its status as 'scarce', but do not show it occurring in Gujarat.

In various published literature, Steppe Buzzard was considered to be a passage migrant over Gujarat (Dharmakumarsinhji 1955; Grimmett *et al.* 1998; Kazmierczak 2000). Naoroji (2006) puts a question mark on whether it winters in Gujarat and considers it to be mainly a passage migrant. Roberts (1991) opined that it was a winter visitor to Pakistan, occurring in Sind and the eastern border regions of Pakistan.

Tiwari *et al.* (2008) suggested that some Steppe Buzzards might over winter in the Kachchh region of Gujarat, with sightings from November 2006 to February 2007 in the Greater Rann of Kachchh and surrounding areas.

Taxonomy & identification

Taxonomic treatment differs in current reference books (Grimmett *et al.* 2011; Rasmussen & Anderton 2012). Grimmett *et al.* (2011) give two subspecies of *Buteo buteo*, Common Buzzard Buteo buteo, and Himalayan Buzzard *Buteo* (*buteo*) *burmanicus*.

Table 1: Steppe Buzzard sightings in the Little Rann of Kachchh

Date	No of Individuals	Colour morph of adults
20 December 2009	2	One fox-red
26 January 2010	1	–
05 December 2010	6	One black
29 December 2010	4	One fox-red
02 January 2011	1	Grey-brown
09 January 2011	6	One fox-red
06 February 2011	3	One dark rufous
17 February 2011	3	
27 November 2011	4	One fox-red
11 December 2011	6	One fox-red
8 January 2012	4	One fox-red
14 January 2012	1	–
5 February 2012	3	–
4 March 2012	3	–
18 March 2012	3	–
21 October 2012	1	–
1 December 2012	1	–
16 December 2012	1	–
24 February 2013	1	–

For Himalayan Buzzard, it is stated that Himalayan breeding birds are larger than migrant *burmanicus* and very rufous, and are probably an undescribed race (or species) more closely related to *B. b. vulpinus*. A question mark is shown regarding occurrence of Common Buzzard in Gujarat while Himalayan Buzzard is shown as a winter visitor for Himalayas and the southern Western Ghats with an isolated record given for Gujarat.
This is an error, as the isolated record for Gujarat should have been plotted for Common Buzzard and not Himalayan Buzzard (Tim Inskipp, email dated 20 June 2013). Rasmussen & Anderton (2012) also recognise two subspecies; Himalayan Buzzard *Buteo burmanicus*, and 'Steppe' Buzzard *Buteo b. vulpinus*, and give distribution of Steppe Buzzard mainly for southern Western Ghats and show no record for Gujarat. Naoroji (2006) also gives two subspecies, *B. b. vulpinus* and *B. b. japonicus*, and states that both are migratory to India and winter throughout the subcontinent.

We follow the taxonomy of Rasmussen & Anderton (2012) who treat the wintering birds in Peninsular India as mostly *vulpinus* and the breeding birds of Himalayas as *burmanicus* (=*refectus*). Himalayan breeders (*burmanicus*=*refectus*) are considered to be indistinguishable on plumage and size from the widespread Chinese *burmanicus,* which is said to breed in China. This is also congruent with other recent treatment of the *Buteo* buzzards (Dickinsen & Remsen 2013; Gill & Donsker 2013; Lindhom & Forsten 2013). Identification of our birds as *vulpinus* types follows the same reference in addition to Forsman (2006). We have included only those birds in our study which showed typical *vulpinus* characteristics and wherein there was no doubt regarding their identification. We refrain from discussing certain individuals recorded during our study which are not fitting the *vulpinus* types as the full variation of birds recorded from the Himalayas remains unstudied (Grimmett *et al.* 2011; Lindhom & Forsten 2013). Some of these Himalayan breeding (*burmanicus*=*refectus*) birds could potentially winter in Gujarat and would explain these odd individuals. There is also the possibility that these are birds breeding in Northern China and Siberia (=*burmanicus*) and wintering in Peninsular India.

Study area and observations

We have been observing Steppe Buzzard wintering regularly in the western part of the Little Rann of Kachchh (23°20'N, 71°15'E) over the last four years (Table 1). The area is locally known as *'handi-bet'* (*bet*=elevated area in the *rann*) and is situated at edge of the *rann* towards its western end. It is an

Table 2: Steppe Buzzard year-wise data of juveniles and adults

Year	Total Individuals	Juveniles	Adults
2009–2010	3	1	2
2010–2011	23	17	6
2011–2012	24	21	3
2012–2013	4	3	1
Total	54	42	12
Percentage		78	22

Table 3: Steppe Buzzard sightings outside Little Rann of Kachchh

Date	Place	No. of Individuals
15 January 2008	Gir National Park	01
02 November 2008	Velavadar National Park	02
03 November 2008	Velavadar National Park	02
30 November 2008	Bhavnagar City Outskirts	01
06 January 2011	Velavadar National Park	01
14 January 2011	Eastern Part of Jamnagar Dist.	02
07 November 2011	Charakhla Salt Pans,Jamnagar	01
08 November 2011	Nageshwar, Dwarka, Jamnagar	01

elevated area surrounded by extensive salt/mud flats.

Steppe Buzzards are usually seen from the last week of October till the last week of March.

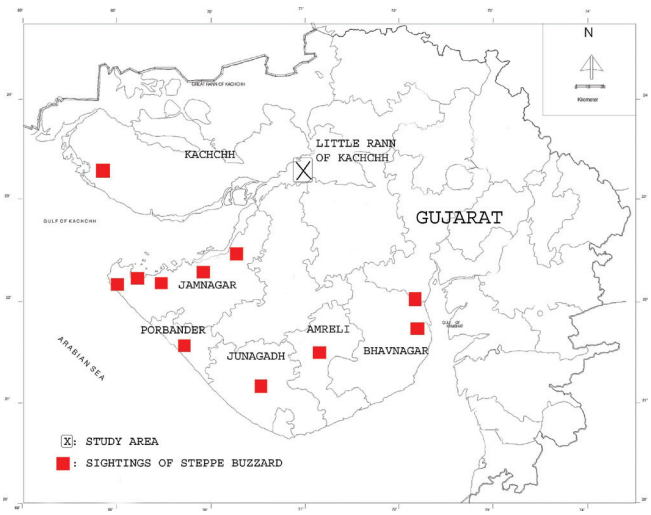
Considering that some of the birds may have been repeated during observation, it would be prudent to say that in four years *c.* 30 different birds were observed.

Ageing & morphs

Steppe Buzzard is known to occur in four main colour morphs: grey-brown, fox-red, dark-rufous, and black (Forsman 2006). All four morphs have been recorded in the Little Rann of Kachchh.

Since assigning juveniles to a certain colour morph is difficult (Forsman 2006), colour morphs have been assigned only to adult birds. There is a lot of variation within each morph and some birds are intermediate and cannot be assigned to a certain morph.

Perched adult Steppe Buzzards have a very dark brown iris and the pupil is not discernible in the field. Also, adult birds have a finely barred (or uniformly dark) underbody, trailing edge of underwing is distinct and black, and tail shows a broad sub-terminal band (Forsman 2006); hence perched birds, seen in good lighting conditions, could be aged properly. Adult plumage is attained in Steppe Buzzard after third calendar year spring/autumn. (A bird is in its first calendar year from its birth until 31 December of that same year, when it overnight enters its second calendar year, and so on. The 'birthday' is thus on 1 of January every year). These birds are first-year adults and resemble full adults but frequently show retained juvenile outer primaries and a paler iris. Immature birds (from second calendar year autumn to third calendar year spring) have underparts that are intermediate between those of a juvenile and an adult, or sometimes, even juvenile-like (van Duivendijk 2011a). Juveniles have pale eyes, streaks on underparts in a majority of birds, and uniform plumage without moult.



Map 1: Square with 'X': study area; red squares: sightings.

The majority of birds observed were juveniles (Table 2). Fox-red morph birds were most common while grey-brown morph birds were uncommon. Six different individuals of dark morph (black, and dark-rufous morph) were recorded. This is in variance with data of migrating Steppe Buzzards from Eilat, Israel, where only 2–5% birds were dark morph birds (Forsman 2006), while here, around 11–12% of birds were dark morph even considering the total number of birds observed as 54. Juveniles and adults of dark morph were easy to identify, with uniform deep rufous, tar-brown, or blackish body plumage. Adults can be separated from juveniles by their dark eye, sub-terminal tail band, and distinct broad black trailing edge to wing.

Distribution

We have also observed Steppe Buzzard outside the Little Rann of Kachchh area. Our sightings are given in Table 3.

Other recent reports from the Saurashtra region, in areas other than those mentioned above, are from Jamnagar (Varu 2011), Porbander district (Parmar; http://www.indianaturewatch.net/), Dwarka in Jamnagar district (Ashvin Trivedi, *pers. comm.*), and Amreli Dist. (V. Joshi, *in litt. 19 December 2011*). Hence Steppe Buzzard is widely distributed in Saurashtra. All sightings (including Kachchh) are given in Map 1.

Hunting & prey

Based on our observations of the Steppe Buzzard, its primary prey seems to be locusts/large insects (*Orthoptera* genus) occurring in the area, which is surprising, since its main prey during breeding is small mammals. But it is known to switch partly to reptiles, amphibians, and birds when prey is scarce, and it is also known to eat large insects (Forsman 2006). A total of ten observations were made where the birds were observed feeding on large insects. NB also observed them feeding twice on a large insect in Velavadar National Park [**57**]. No other prey was recorded by us.

Discussion

B. b. vulpinus is a winter migrant to Gujarat as it has been regularly recorded in the Little Rann of Kachchh. Himalayan Buzzard may be a vagrant/passage migrant/winter migrant in Gujarat and further study is needed to ascertain its status. Nominate *B. b. buteo* is not known to occur in India. Many times it is not safely possible to separate *B. b. buteo* from *B. b. vulpinus* and intergrades between the two are also known to occur. Grey-brown morph birds are most similar to nominate *buteo* and separation of the two is especially difficult (van Duivendijk 2011b).

The sighting of six individuals thrice, in a small area, is unusual, as these birds are not known to form groups. They are said to occur singly or in pairs (Grimmett *et al.* 1998). They are also known to gather together during migration (Naoroji 2006). Since six individuals were seen thrice in winter, it may be possible that

48. 06 February 2011. Sub-adult (third to fourth calendar years). Dark rufous morph. Note iris is not very dark and wing coverts show obvious different generations of feathers.

51. December 2010. Probably a black morph adult. Note uniform dark plumage and dark eye.

49. 05 December 2010. Juveniles. Note individual variation. Upper bird with pale iris and streaked breast, while lower bird has pale iris, uniform plumage and pale tipped greater coverts and primaries. Both birds best regarded as 'rufous' or 'fox-red' morphs.

52. 27 November 2011. Probably a fox-red morph juvenile. Note very pale iris and streaked breast.

50. 02 December 2012. Immature (second calendar year). Fox-red morph. Note adult like barring on underbody but outer two primaries and many secondaries still juvenile, best seen in secondaries which are shorter with smaller and less black tip.

53. 06 February 2011. Juvenile (second calendar year). Grey-brown morph. Note streaked breast and pale iris.

Photos: P. Ganpule

54. 06 February 2011. Same Individual as Fig 6. Grey-brown morph. Note worn greater coverts, grey-brown tail without rufous.

Photos: P. Ganpule

55. 27 November 2011. Adult. Fox-red morph. Note dark eye, clean barring on thighs, uniform plumage.

Photo: N. Bhatt

57. 06 January 2011. Juvenile (second calendar year) with prey. Note pale iris, barred tail.

Photo: N. Bhatt

56. 16 December 2010. Probably fox-red morph sub-adult. Note iris not very dark, irregularly worn upper wing coverts, dark sub-terminal tail band.

these birds may be forming loose groups in winter. This aspect of its behaviour is unrecorded and needs further study.

Steppe Buzzard is less of a desert bird than Long-legged Buzzard *Buteo rufinus* (Rasmussen & Anderton 2012) but here it shows a marked preference to fringe areas of the Little Rann of Kachchh, which is primarily a desert area, and the Kachchh region (Tiwari *et al.* 2008) which is also primarily a semi-arid and desert area. It is possible that it may prefer desert areas in winter, due to availability of prey.

The occurrence of all four morphs here is significant. Grey-brown morph birds are found in the western-most part of the subspecies' range; further east, the birds gradually become rustier toned (differing degrees of the fox-red morph) and in the eastern-most part of the subspecies' distribution, the uniform rusty fox-red and the blackish morphs occur (Shirihai & Forsman 1991). The fact that birds from the entire breeding range occur in Gujarat shows that Steppe Buzzards from northern Europe to eastern Siberia occur here, though birds from eastern range (fox-red and dark morph) are more common. This is contrary to Naoroji (2006) who states that birds from western range winter in Africa and Arabia, though it is stated that this can only be authenticated by large scale ringing. Grey-brown morph birds have been recorded in the Little Rann of Kachchh and Velavadar.

There is considerable variation in birds observed here and this is shown and explained in Pics **[48–56]**. This is to be expected, since adults and juveniles of all four morphs, and from the entire breeding range occur here.

Conclusion

These sightings over a long period of time suggest that Steppe Buzzard is a regular winter migrant to the Little Rann of Kachchh with at least some individuals over wintering in this area. It may be wintering in other areas of Saurashtra also. Its status could be 'uncommon', but it is not rare, and it is widely distributed in Saurashtra with sightings from almost the entire region.

A detailed survey of the entire state will be helpful in understanding its present status and distribution in other areas of Gujarat. Further research is also needed to understand its wintering ecology in the Little Rann of Kachchh.

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Diet of the Spotted Owlet *Athene brama* in an urban landscape

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Abstract: We aimed to study the food habits of the Spotted Owlet *Athene brama* by combining the pellet analysis as well as direct/visual observation methods. Both methods were used simultaneously for seven months. Direct observations were carried out by visually monitoring the owlets for 214 days, over 642 hrs. All events of feeding were recorded, and prey identified using relevant field guides. 70 pellets were collected from the roosting site of the same owlet pair, treated, and further analysed for remains of prey items. A total of 11 prey orders were recorded by both the methods. Out of these, 3 orders were detected only by pellet analysis, 5 orders were detected only by direct observations, and 3 orders were detected by both the methods. Common Indian toads, cicadas, and wasps were some new prey taxa/items detected by us during this study. As each of the followed method has its own advantages as well as limitations, we combined both the methods to obtain a more reliable dietary of this species.

Introduction

The Spotted Owlet *Athene brama* is a common nocturnal raptor, widely distributed throughout the Indian Subcontinent and abundant, especially, around human habitation (Ali & Ripley 1983; Ali 2002). Owls are known to play an important role in the bio-control of pests (Santhanakrishnan *et al.* 2011). Considerable work has been done regarding the dietary analysis of the Spotted Owlet from various geographical areas including India (Jain & Advani 1983; Kumar 1985; Jadhav & Parasharya 2003; Pande *et al.* 2004; Santhanakrishnan *et al.* 2011; Zade *et al.* 2011), and neighbouring countries like Pakistan (Beg *et al.* 1990; Shah *et al.* 2004). All the aforementioned studies have used only one method in the analysis of the owlet's dietary: study of regurgitated pellets. Our aim was to determine its dietary using both methods, pellet analysis and direct observation, simultaneously.

Study area & methods

The present study was carried out in the campus of Fergusson College, Pune (18°31'N, 73°50'E; 570 m asl). A combination of

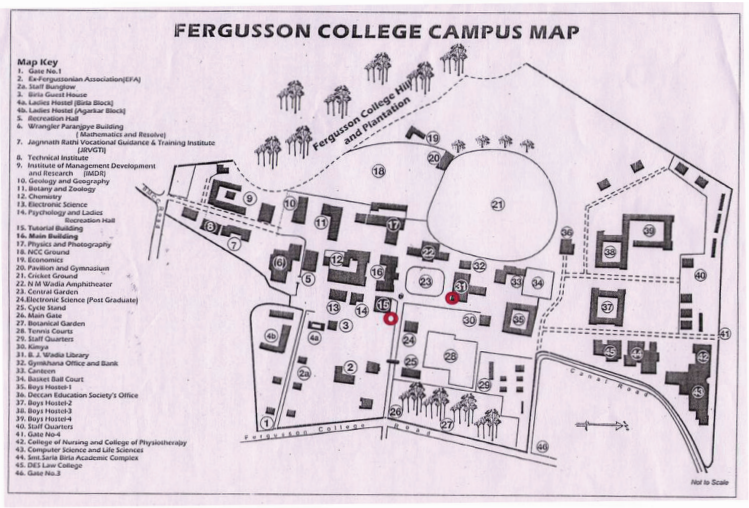


Fig. 1. Map of study area. Monitored roosting sites are marked with red circles.

methods was used to understand the dietary composition of the study species—we combined the popularly used pellet analyses technique with direct observations to obtain a reliable qualitative dietary composition of the Spotted Owlet. The study was carried out for a total of 214 days from 01 April 2012 to 31 October 2012. The roosting/nesting sites of the owlets monitored are given in Fig. 1.

Direct observation

We monitored two pairs of Spotted Owlet adults and their juveniles (from approximately 20 days of hatching out) for seven months to document opportunistic dietary records. A pilot study for obtaining direct observations revealed that the maximum frequency of feeding occurs between 1830 hrs and 2130 hrs. Hence, the observations were made from 1830 hrs to 2130 hrs (total effort=642 hrs) using a pair of binoculars and torches. Juveniles were tracked following their distinct call. All events of foraging by adults or by the adult/s to the juvenile/s were visually observed and photographed (Pic XX1). Prey was identified based on morphological characters which were evident in the field and from the photographs we clicked, after consulting Daniel (2002), and Daniels (2011) for reptiles and amphibians, and Distant (1906), and Mani (2004) for insects; these were also validated by consulting experts in the field.

Pellet analysis

Additionally, 70 freshly regurgitated pellets were also collected from below two roosting/nesting sites of the same owlet families, packed in polythene bags, and labelled for further identification. The pellets were treated in a hot air oven at 70ºC for 24 hrs for eliminating any associated invertebrates and were further treated with 8% NaOH (Sodium Hydroxide). The prey items were identified following Talmale & Pradhan (2009) for rodents, Asokan *et al.* (2009) for insect orders, and for other vertebrate

Table 1: List of prey items identified in Spotted Owlet pellets during the study period

No.	Date 2012	Time [hrs]	Prey item					Total no. of prey items detected		Eaten by Juveniles / Adults
			Order	Family	Genus	Species	Common name	Direct obs.	Pellet analysis	
1	19 April 14 May	2115 2025	Anura	Bufonidae	*Bufo* (=*Duttaphrynus*)	*melanostictus**	Common Indian Toad	02	–	Juvenile
2	17 April–12 May	1900–2030	Homoptera	Cicadidae*	Unidentified	Unidentified	Cicada	147	–	Juvenile
3	01 September	1920	Hymenoptera	Vespidae*	*Vespa*	Unidentified	Wasp	03	–	Adult
4	09 May– 19 July	–	Hymenoptera	Formicidae	*Campanotus*	Unidentified	Carpenter ant	–	15	Unknown
5	17 April– 30 October	–	Coleoptera	Scarabaeidae	Unidentified	Unidentified	Beetle	16	55	Adult
6	17 May	1940	Blattodea	Blattidae	*Periplaneta*	Unidentified	Cockroach	02	–	Juvenile
7	13 May– 12 June	1900–2100	Squamata	Geckkonidae	*Hemidactylus*	Unidentified	House gecko	07	06	Adult & Juveniles
8	15 May 05 April	1942	Squamata	Agamidae	*Calotes*	*versicolor*	Garden Lizard	02		Adult
9	22 April	1935	Scolopendro-morpha	Unidentified	Unidentified	Unidentified	Centipede	01		Adult & Juveniles
10	05 May 18 May 24 May 17 July 02 October	–	Orthoptera	Unidentified	Unidentified	Unidentified	Grasshopper	–	05	Unknown
11	01 May	1915	Isoptera	Unidentified	Unidentified	Unidentified	Termites	07		Juveniles
12	20 June 23 July	–			Threads			–	✓	Unknown
13	24 April 27 April 25 May	–			Plant mater (seeds/fibres)			–	✓	Unknown
14	20–25 May	–	Rodentia	Muridae	*Mus*	sp.	House mouse	–	11	Unknown
15	08 June– 11 August	–	Soricomorpha	Soricidae	*Suncus*	*murinus*	Asian house shrew	–	07	Unknown

* Prey taxa/items reported for the first time by this study.
Note: For number of prey items calculated in pellet analysis, one item corresponds to remains of that prey item found in one pellet. Whereas, for direct observation, one item corresponds to one entire intact prey species that is photographed. Thus, one pellet may contain remains of more than one individual of that prey species though it is counted as one.

prey, museum specimens (Zoology Department, Fergusson College) from the same area were referred. Experts of respective taxa were also consulted for identification.

Results

We recorded a total of 286 prey items belonging to 11 Orders using both the methods (Table 1). Out of these, 3 Orders were detected only through pellet analysis, 5 Orders only by direct observations, and 3 were detected by both the methods.

Common Indian Toad *Duttaphrynus melanostictus* in the diet of spotted owlet

Kumar (1985) reported the occurrence of anurans (=frogs) for the first time in the diet of Spotted Owlet. To date, only Jadhav & Parasharya (2003) have recorded presence of the toad *Bufo stomaticus (=D. stomaticus)* in the diet of this owlet.

We observed the following series of events on the aforementioned date:

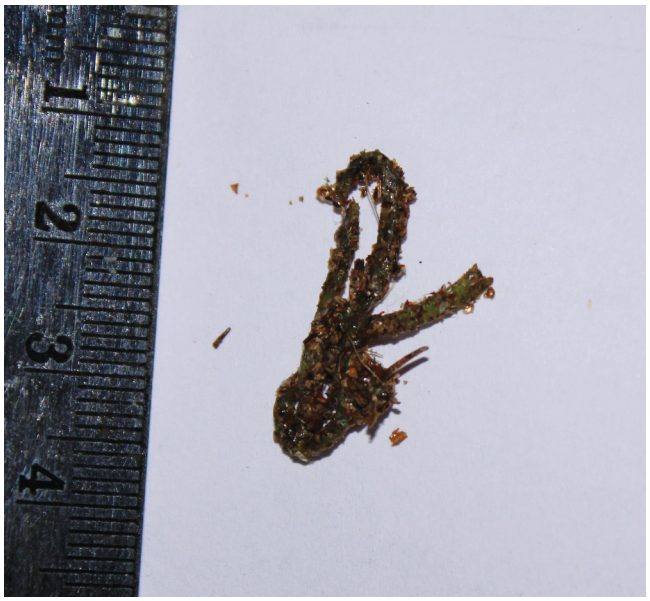
At 2115 hrs an adult owlet successfully attacked a toad that was foraging for insects near a lamp-post. At 2117 hrs, it fed the injured toad to one of the juveniles that was perched on a branch. The juvenile immediately grasped the toad in its claws and started to feed on its head. By 2125 hrs the toad was completely ingested [**58**].

On 14 May 2012 we observed a similar series of events in the same area and by the same owlet pair. Based on our observations, it appears that Spotted Owlet can feed on *Bufo (=Duttaphrynus) sp*., and as suggested by Jadhav & Parasharya (2003), the poison glands on the toad's skin do not affect the owlet.

Rubber band in the diet of Spotted Owlet

On analyzing the pellet collected on 17 July 2012, we found a greenish elastic material entangled in the crushed matter of other prey. On further dissection and clearing, it was identified as a 2 mm thick rubber band. The band was intact to a greater extent and had minor scraping marks [**59**]. Such artificial materials in an owlet's pellet indicate two possibilities: Direct ingestion of the material mistaking it for its natural prey, or indirect ingestion by feeding on rodents or other prey that had ingested the artificial material.

58. Spotted Owlet feeding on Common Indian Toad



59. Rubber band in owlet pellet

60. Spotted owlet feeding on Cicadidae nymph

Cicadidae and *Vespa* species in the diet of the Spotted Owlet

We also recorded the occurrence of family Cicadidae (order Homoptera) in the diet of the Spotted Owlet juveniles [**60**]. Specimens from the same area were identified based on morphological characters following the keys provided by Distant (1906). It was observed that for their juveniles, the adult owlets preferred to hunt freshly moulted nymphs of Cicadidae that were present on the vertical surfaces of rocks, old walls, and tree trunks, probably due to the soft nature of the nymphs. Similarly, *Vespa* species (order Hymenoptera) in the diet of the adult owlets was also observed by us.

Discussion

Both the methods followed in this study have their own advantages and disadvantages. Pellet analysis is considered to be a reliable and non-invasive method for dietary analysis of insectivorous birds (Ralph *et al.* 1985). Prey items that have soft body parts (like insect nymphs) are easily digested and consequently no remains are left in pellets. Hence pellet analysis cannot detect such prey (Lewis *et al.* 2004). Also, as the matter in pellets is crushed to a great degree (Zade *et al.* 2011), pellet analysis can detect insect prey items mostly upto the level of Order. Whereas, direct observation method is highly labour intensive (Lewis *et al.* 2004) but can sometimes facilitate identification of prey at Genus level. Hence recent studies (Simmons *et al.* 1991; Redpath *et al.* 2001; Jathar & Rahmani 2004; Lewis *et al.* 2004; Margalida *et al.* 2005) have preferred a multi-method approach for dietary analysis of raptors. Due to the nocturnal habit of the bird and logistical constraints, the sampling for direct observation was restricted to three hours daily, which might have caused an observational bias in the present study.

The Spotted Owlet has adapted well in the urban landscape and this is indicated by it's habit of using electric wires (Ali & Santhanakrishnan 2013), or lamp-posts, as perches for foraging, and also roosting on man-made structures like wooden ledges. Majority of the Spotted Owlet's prey can be termed as household pests, as plant bugs, beetle larvae, rodents, termites, and ants cause considerable damage to trees, garden plants, or furniture (Pawar & Desai 2011). Use of artificial insecticides and pesticides against such pests has known to cause significant side-effects on human health and has also contributed to the deterioration of the environment (Casida & Quistad 1998). Entomophagous birds like the study species are known to play the role of effective bio-control agents against pests (Santhanakrishnan *et al.* 2011; Kler & Kumar 2013).

Also, among all the Indian owl species, the Spotted Owlet is reported to have the highest frequency of occurrence in illegal trade across the country (Ahmed 2010). Hence, in spite of it being listed under 'Least Concern' (IUCN 2012), *in situ* conservation of this species is essential due to its aforementioned role in the urban ecosystem.

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Godlewski's Bunting *Emberiza godlewskii* in Arunachal Pradesh: A first breeding record for the Indian Subcontinent and review of its status in the region

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On 07 May 2013, at 0505 hrs we came across a bunting perched on an electric cable along the road from Walong to Kibithu, close to Dong village (28°10'N, 97°01'E, *c.* 1225m asl), Anjaw district, Arunachal Pradesh, India [**61**].The first photographs, taken in light drizzle and poor light conditions, showed it to be similar to Rock Bunting *Emberiza cia.* As that species does not occur in north-eastern Arunachal Pradesh, further photographs were taken when the light conditions improved. The bird disappeared briefly down the steep slope, only to come back with feed in its beak. On close inspection we realised that a pair was feeding young in a nest concealed in a vertical grassy crevice, 2.5–3.0 m above the road on a vertical rockface [**62**]. The birds were observed till 0545 hrs and later from 1335 hrs to 1350 hrs. On both occasions, though the nest and chicks were not seen, the adults were observed carrying feed into a vertical grassy crevice, and returning with empty beaks. There appeared to be more than one chick in the nest, as they were frequently heard begging for feed.

The birds were identified as Godlewski's Bunting *E. godlewskii* based on the features noted in the field, from images, and after consulting literature. It is described as a fairly large bunting, superficially similar to Rock Bunting (del Hoyo *et al.* 2011) but its head and breast are darker grey, and stripes on crown and behind eye dark chestnut rather than black (Rasmussen & Anderton 2012). It has black lores and moustachial stripe, chestnut border to rear ear-coverts, white wing-bars, (del Hoyo *et al.* 2011). It shows a clear-cut contrast between rufous belly and grey breast (Pic.XX1), sandy-brown mantle boldly streaked with black, bright chestnut scapulars, black tertials, rufous rump, and pinkish-brown feet (Byers *et al.* 1996). The tail is described by del Hoyo *et al.* (2011) as, 'blackish, central feather pair with thin rufous edges, outer pair with white on one or both webs.' As per Bayer *et al.* (1996) the breeding female has darker central crown stripes and slightly paler underparts.

The birds observed and photographed at Walong showed the following features: dark grey head, throat, and breast with black streaking in central crown, chestnut lateral crown stripes, and posterior eye-stripe, black lores and moustachial stripe, clear contrast of grey breast with rufous belly, brown mantle with very bold black streaks, bright chestnut scapulars, white wingbars, blackish tertials with pale edges, rufous rump, dark tail with brownish central tail feathers and some white in the outermost tail feathers, and pinkish-brown tarsus. One of the birds, possibly a female, had bold instead of fine streaking in the central crown and comparatively paler coloration to the underparts. During our field surveys conducted in eastern Arunachal Pradesh from 05 to 12 May 2013, we did not come across the species anywhere else, and it appeared to be scarce and restricted to the extreme north-eastern parts of Arunachal Pradesh.

del Hoyo *et al.* (2011) describe its range from the Russian Altai mountains to southern Baikal Lake and west Transbaikalia; Mongolia; widespread in China in north, north-west, south-central,

Photos: M. Sharma

61. Godlewski's Bunting *E. godlewskii* at Walong.

62. Godlewski's Bunting *E. godlewskii* carrying food in its bill.

east and south China; south and south-east Tibet to Lhasa and Gyantse regions; wintering in Myanmar.

There is great confusion amongst various authors about its status in the Indian Subcontinent. It is claimed to occur, presumably in eastern Nepal (Ali & Ripley 1974), Sikkim (Baker 1926), Bhutan (Ripley 1961), and Arunachal Pradesh (Singh 1995), but in the absence of hard proof, later authors (Grimmett *et al.* 2011; Rasmussen & Anderton 2012) treat it as doubtful and hypothetical. del Hoyo *et al.* (2011) do not show its distribution within the Indian Subcontinent. BirdLife International (2013) shows its status in India as 'native' without giving any further details, probably following Ali & Ripley (1974).

Its first reference is given by Kinnear & Wollaston (1922). During the first Mt. Everest expedition, Wollaston observed many birds migrating through Arun valley in southern Tibet during August and September, and Kinnear believed that these, 'must have come from farther north, and possibly they pass the winter in some of the lower valleys adjoining the Nepal border.' This assumption led Ali & Ripley (1974), and Ripley (1982), to presume it to occur in eastern Nepal. Such a presumption was not correct and this is highlighted by the species' absence from any subsequent work on Nepal (Fleming *et al.* 1976; Inskipp & Inskipp 1985, 1991; Grimmett *et al.* 2000; Bird Conservation Nepal & Department of National Parks and Wildlife Conservation 2012).

Baker (1926) mentions that it winters in Sikkim, but without giving any details or source. Unnithan (2005), describing three specimens in the BNHS collection, obtained by Wollaston from southern Tibet in August 1921, cites Baker (1926) for their distribution as, 'wintering in Sikkim and hills of north Assam,' (present day Arunachal Pradesh). Ticehurst (1941), while categorically denouncing Baker's statement says, it is said to occur in Sikkim and the hills of N. Assam. No one has recorded it, nor are there any specimens thence.' Matthews (1944), following Baker (1926), states that it doubtfully occurred in Sikkim, and Dutta *et al.* (2006) list the species for Sikkim, without any details or sources, probably based on Baker (1926). Ali (1962) does not record the species from that area, but interestingly Ali & Ripley (1974) presume it to occur in Sikkim, once again following Baker (1926). There are no confirmed records of the species from Sikkim, and later authors (Grimmett *et al.* 2011; Rasmussen & Anderton 2012) do not include it for that area.

Its status in Bhutan is much misinterpreted. The species was obtained by Ludlow (Ludlow & Kinnear 1937) on his east Bhutan expedition, from Lhakhang Dzong (3048 m), a place located in southern Tibet, and not in Bhutan, as pointed out by Ticehurst (1941). Kinnear states that he could find no record of its occurrence in British India. As Bhutan was never a part of British India, subsequent authors have misinterpreted this statement believing that the species was recorded from Bhutan. Ripley (1961) clearly misinterprets Ludlow & Kninear (1937) while giving the distribution of the species as, 'wintering south to Bhutan, 10,000 ft,' believing Lhakhang Dzong (3048 m) to be in Bhutan rather than southern Tibet. The species is however not listed for Bhutan by any later authors (Ali *et al.* 1996; Inskipp *et al.* 1999; Spierenburg 2005).

Ali & Ripley (1974) give its status and distribution as a 'Common resident, subject to vertical movements. Southeastern Tibet and northern Arunachal Pradesh, breeding between 2700 and 4200 m, wintering between 2200 and 3300 m.' Ali (1977) repeats this, and Ripley (1982) changed his statement from that given in Ripley (1961) and follows Ali & Ripley (1974). No sources are given for these statements and they are presumably extrapolations from the Tibet information. It is also clear that the northern Arunachal Pradesh distribution given by the authors is based on Baker (1926). Byers *et al.* (1996), no doubt, following Ali & Ripley (1974) stated that it 'occurs locally in Arunachal Pradesh.' Singh (1995) found it quite often in northern Arunachal Pradesh, in upper Subhansiri valley in the Redding–Taksing area, and in upper Lohit valley on the Kibithu track north of Walong during 1988–1994. Rasmussen and Anderton (2005, 2012) seek corroboration for these sight records and Grimmett *et al.* (2011) treat the species as doubtful in the Indian Subcontinent. The species has recently been photographed from areas close to Walong (Gode 2013).

The species is 'often considered conspecific with *E. cia*' (Rasmussen & Anderton 2005, 2012), and earlier authors have often described races as *E. c. godlewskii* (Kinnear & Wollaston 1922; Baker 1926), *E. c. khamensis*, and *E. c. yunnanensis* (Ripley 1961, 1982; Ali & Ripley 1974). Both, Byers *et al.* (1996), and del Hoyo *et al.* (2011) recognise five races of the species out of which two, *khamensis* and *yunnanensis* are said to occur in India (Ali & Ripley 1974). del Hoyo *et al.* (2011) describe the range of *khamensis* as 'SC China from S Qinghai S to S & SE Tibetan Plateau (to Lhasa and Gyantse regions) and W Sichuan (to 29° N)', and that of *yunnanensis* as 'S. China in extreme SE Tibetan plateau and N Yunnan E to C Sichuan; also NE Myanmar in winter.' del Hoyo *et al.* (2011) describe *E. g. khamensis* to be heavily streaked on mantle and *E. g. yunnanensis* as darkest amongst all races with most saturated plumage.

Kinnear & Wollaston (1922) describe the birds collected from southern Tibet during the first Mt. Everest expedition in August 1921 as *E. c. godlewskii*, treated by Unnithan (2005) as *E. g. khamensis*, based on distribution. Though Baker (1926) describes *E. c. godlewskii* as wintering in Sikkim and the hills of northern Assam (present day Arunachal Pradesh), without proof, he does not, however, give the distribution of *yunnanensis* within the boundaries of erstwhile British India nor within those of present day India. The birds collected by Ludlow are described as *khamensis* (Ludlow & Kinnear 1937). Ripley (1962) states that race *yunnanensis* was a 'winter visitant in southeast Tibet which may occasionally reach the higher hills of Bhutan or Assam.' There appears to be no basis of this statement. Ali & Ripley (1974), and Ripley (1982) describe *khamensis* as a common

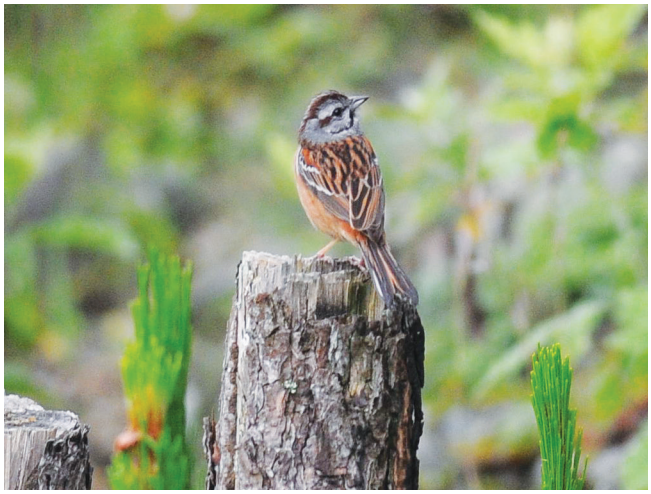

Photo: M. Sharma

63. Godlewski's Bunting at Walong, with bold black streaks on the mantle; probably *E. g. khamensis*.

Photo: A. Vaidya

64. Godlewski's Bunting photographed north of Walong.

resident subject to vertical movements in south-eastern Tibet and northern Arunachal Pradesh. The same authors state *yunnanensis* to be a winter visitor to south-eastern Tibet and that it may occur in the higher hills of Arunachal Pradesh. No sources are given for these statements and they are presumably extrapolations from the Tibet information. del Hoyo *et al.* (2011) do not include the range of either of the races within the Indian Subcontinent. There appears to be no conclusive proof of occurrence of *yunnanensis* from the Indian Subcontinent. The birds photographed at Walong showed very bold black streaks on the mantle and were most probably *khamensis* [**63**].

The species is known to summer at 2700–4200 m and winter at elevations as low as 2200 m (Rasmussen & Anderton 2012). Interestingly the birds at Walong were found in summer at *c*. 1225 m, considerably lower than its previously described summer range. This is probably the lowest elevation record for the species. Its nest is described as 'cup-shaped, with loose structure made from withered grasses and plant stems, lined with fine rootlets and hair, placed on ground under overhanging rocks, or sheltered by stones' (del Hoyo *et al.* 2011).

At Walong we observed the birds nesting in a vertical grassy crevice, 2.5–3.0 m from ground on a vertical rockface. This is probably a first record of the species nesting so high from ground and in a vertical crevice. This is the first breeding record of Godlewski's Bunting from the Indian Subcontinent. Alka Vaidya (*pers. comm*., email dated 06 February 2014) came across good numbers of the species in areas north of Walong during 22–24 January 2014 [**64**]. On 22 January 2014 at least 20–25 individuals, mostly singles, were observed between Mesai village and Kibithu. The birds were on the ground, on the bushes, on rocky slopes, and on overhead electric wires. It is possible that most of the birds wintering in areas close to Walong may go to higher elevations in nearby Tibet, to breed. Further studies are required to establish its correct status in Walong and surrounds.

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The evolution of *The Unfeathered Bird*

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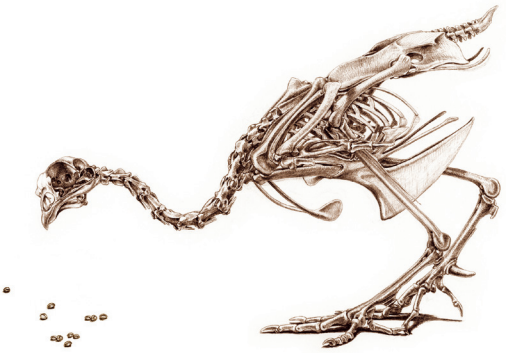


Fig. 1. Red Junglefowl: skeleton.

"Just who is Amy, anyway?"

It was a passive inquiry. My inquisitor simply imagined the mystery muse as a family member, old friend, or childhood mentor; someone who had inspired the idea for the book, perhaps, or nurtured it through the twenty five year struggle from start to finish. My answer took him by surprise.

The Amy in question—the object of the dedication in the front of *The Unfeathered Bird*—was, in fact, a dead duck. She was never even a live duck. By that I mean that she was nameless until the day I picked up her fresh but lifeless corpse on the beach and decided she was a suitable subject for my next project.

I was an undergraduate Fine Art student of 22 with a passionate interest in natural history in general, and birds in particular. My college artwork was large, Audubonesque, copper plate engravings of dramatic birds doing dramatic things. I'd thrown myself with gusto into ornithology: trained to be a bird ringer; taught myself taxidermy and prepared bird skins as a volunteer at my local museum; all to kindle the flame of inspiration for my pictures of living birds.

What I was looking for that day, down on the beach, was a bird I could dismantle in stages, make drawings of, layer-by-layer, bone by bone; strip down and then re-assemble again as a skeleton.

Now, if you're going to spend several months intimately involved with a dead duck, it's got to have a name. So I christened her Amy. The drawings of her and other early specimens were bound into a book with a professional-looking title embossed in gold on the cover: *The Anatomy of Birds*. Little did I realize what this humble collection would evolve into.

I would love to say that I spent the intervening years researching, writing and drawing the illustrations for the book that was to become *The Unfeathered Bird*, but reality is seldom so neat. It didn't take shape all at once and remained a long while an ugly duckling before it finally developed into a swan. What I ultimately wanted to do was combine the beauty, the attention to detail and sheer artistry typified by the best historical illustrations with up-to-date, jargon-free text that relates birds' structure with their lifestyle and evolution, making it more a book about living birds than dead ones. Not half art and half science, but 100% of both, and definitely not a textbook.

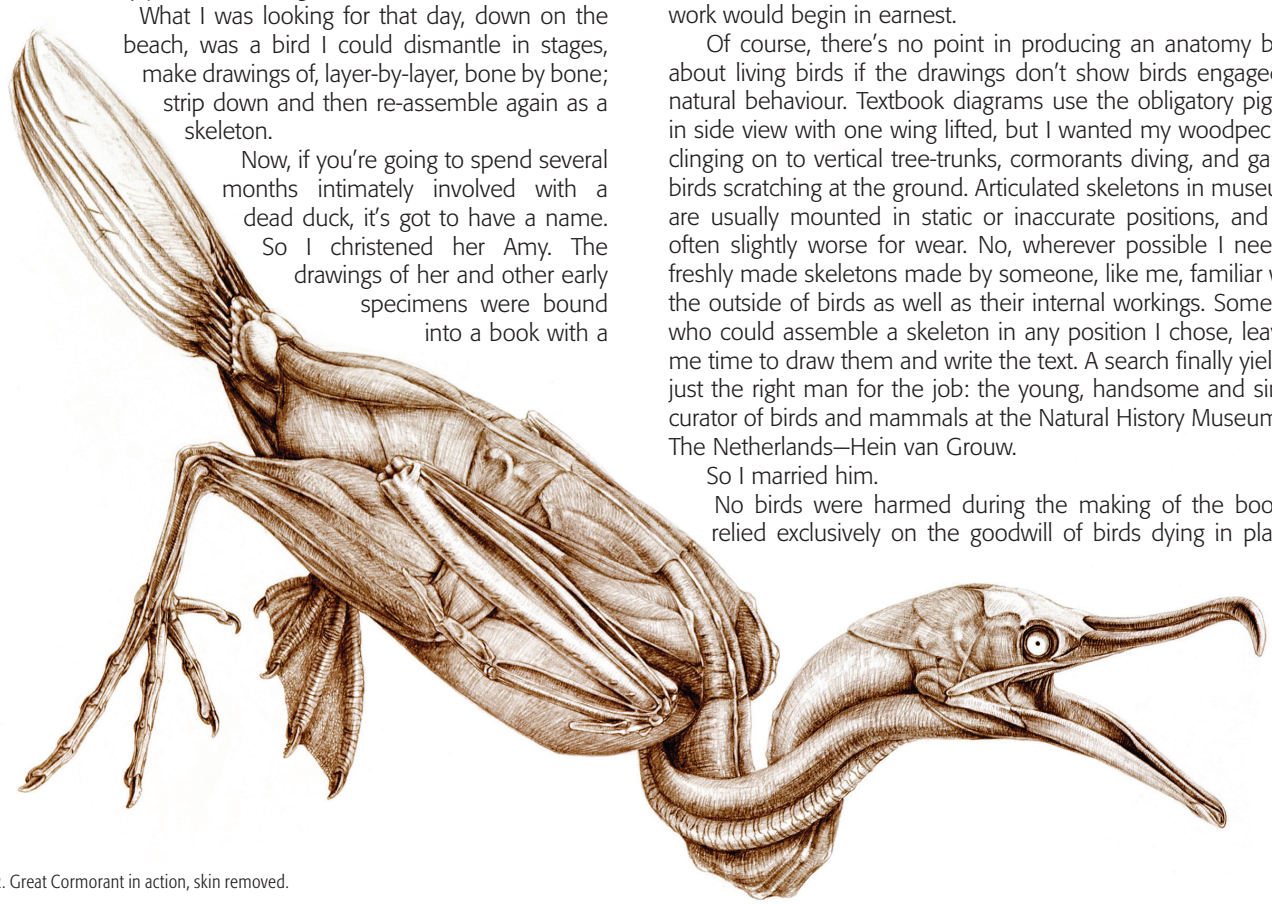
The first hurdle was to convince a publisher that there would be a niche for such a book. Science publishers pointed me in the direction of arts publishers, gave me a shove and slammed the door. And arts publishers directed me back to the science lot.

It was 2008 before the dream finally became a reality and work would begin in earnest.

Of course, there's no point in producing an anatomy book about living birds if the drawings don't show birds engaged in natural behaviour. Textbook diagrams use the obligatory pigeon in side view with one wing lifted, but I wanted my woodpeckers clinging on to vertical tree-trunks, cormorants diving, and game-birds scratching at the ground. Articulated skeletons in museums are usually mounted in static or inaccurate positions, and are often slightly worse for wear. No, wherever possible I needed freshly made skeletons made by someone, like me, familiar with the outside of birds as well as their internal workings. Someone who could assemble a skeleton in any position I chose, leaving me time to draw them and write the text. A search finally yielded just the right man for the job: the young, handsome and single curator of birds and mammals at the Natural History Museum of The Netherlands—Hein van Grouw.

So I married him.

No birds were harmed during the making of the book. I relied exclusively on the goodwill of birds dying in places



Artwork: K. van Grouw.

Fig. 2. Great Cormorant in action, skin removed.

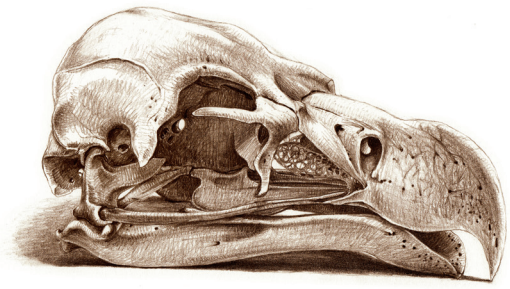
where they could be found, and the goodwill of people who were willing to pick them up for me. I had a freezer full of road kill and oiled seabirds; corpses were donated or loaned by biologists, taxidermists, aviculturists, and conservations charities. The boiling began and the house was transformed. Evil smelling buckets whose contents were best left to the imagination appeared outside the back door and drying bones filled every household surface.

While the bone factory chugged away downstairs, I'd be up in my study drawing the next subject on a seemingly never ending list; craning my neck over an enormous sheet of paper to see close-up details on an equally enormous skeleton on the other side. (I have a stubborn habit of working life-sized; a ridiculously impractical habit that causes only neck ache and storage problems). Drawing the musculature of birds in lifelike positions brought a different set of difficulties and I was faced with the choice between having the moist and seeping carcass draped over my lap whilst endeavouring to re-animate it with reference to photos of living birds. Or I could rig up some complicated device of wires, pins, thread and blocks of wood—the same technique that Audubon used, with a few modifications—to make a faintly grotesque artist's mannequin.

The real challenge was drawing lifelike skeletons from bones that were not articulated at all. I'm talking about the scientifically important reference collections kept behind the scenes in major natural history museums. The people using these collections, mostly zoo-archaeologists, need to study the articulating surfaces of individual bones. So they're not much use if they're glued or wired together. Faced with nothing but a box of jumbled bones, necessity spawned a quite brilliantly inventive solution. I would make an outline drawing of the skeleton of *another* bird already prepared in the position I wanted, then rub out and re-draw each bone in turn, with reference to the respective bone of the desired species.

Some people might wonder why I went to all the trouble of producing 385 pencil drawings when I could simply photograph the specimens. A book of photographs might have been equally beautiful and artistically stimulating, in a different sort of way. Apart from the quick answer, that I don't know one end of a camera from the other, there's another, more personal reason.

65. Great Bustard. Katrina with the skeleton and finished drawing.



Artwork: K. van Grouw.

Fig. 3. Lappet-faced Vulture skull.

For me, drawing is an exploration, a journey. In my opinion, you can't truly say you understand an object or a surface until you've scrutinized it with a draughtsman's eye, travelled the contours, probed deep into those pits and crevices hidden in shadow. You could almost go so far as to say that the drawing itself is just a by-product of that process of observation. Although I had a long, long list of specimens to include, and an ever-looming deadline, no quick-fix technology, no fairy godmother, could have offered me a more favourable alternative than good, old-fashioned, drawing.

I'm no Luddite, though, and not so much of a traditionalist that I'm against making some digital enhancements. One of these was to adjust the colour of the illustrations. Lead pencils may be my preferred medium to handle, but grey tones can look a bit dry and academic. And with a subject matter so steeped in preconceptions about college textbooks, that was something I wanted to avoid at all costs. I'd already decided that the book would follow the long-outdated taxonomy of Linnaeus, so a choice of warm, sepia lines against a background of pale cream paper seemed to fit the historical theme quite perfectly.

The choice of Linnaean taxonomy caused many a sleepless night. More than one ornithologist had quizzed me about which order I intended to use, and it had soon become apparent that I wouldn't be able to please everyone. Besides wanting to stay firmly on the fence in the minefield of taxonomy, I wanted to be able to *compare* the products of convergent evolution, rather than separate them. The book is about adaptations, after all. So it made sense to arrange my birds solely according to external characteristics and habits, as Linnaeus had done: similar groups brazenly sharing the same chapter without the slightest concern for their evolutionary relationship.

Using Linnaeus's divisions—Accipitres, Picae, Anseres, Grallae, Gallinae, and Passeres—I had the freedom to put cranes next to storks and herons and flag up the similarities between old and new world vultures. Of course, throughout the text I've taken pains to discuss birds' *actual* relationships including the latest theories thrown up by molecular studies, but the order of chapters remains firmly in the eighteenth century. It worked remarkably well for my purpose, only presenting the rather pleasurable challenge of imagining where Linnaeus might have put one or two birds unknown in his day; Kiwis, for example.

In my living room, the skeleton of a Mallard looks down at me benevolently from its glass case. Amy is by no means the most elegant specimen in my possession, but she has a very special place in my affections. Who would have thought a dead duck could do so much?

Sighting of white-throated *vittata* morph of Pied Wheatear *Oenanthe pleschanka* from Tabo, Spiti Valley, Himachal Pradesh

Soma Jha

Jha, S., 2014. Sighting of white-throated *vittata* morph of Pied Wheatear *Oenanthe pleschanka* from Tabo, Spiti Valley, Himachal Pradesh. *Indian BIRDS* 9 (2): 54.

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Pied Wheatear *Oenanthe pleschanka* is a summer visitor to Afghanistan, NWFP (Pakistan) and Kashmir at altitudes between 2700 m and 4000 m, and is a passage migrant in Pakistan, but a vagrant or irregular straggler elsewhere (Rasmussen & Anderton 2012). However, in the species distribution map of the accompanying field guide, a two-way migration across Himachal Pradesh has been shown. Though in regular plumage the species is similar to the *capistrata* morph of Variable Wheatear *O. picata*, a rarer white-throated morph known, *vittata*, also exists. This note describes the sighting of a male and female *vittata* morph of Pied Wheatear from Spiti Valley in Himachal Pradesh.

Three of us, Sivaramakrishnan, Ratna Ghosh, and I, toured Himachal Pradesh between 25 May and 11 June 2013. On 06 June 2013 we were driving towards Tabo and were a kilometer short of Lari village (32°05'N, 78°24'E) at 0830 hrs, when Krishnan and I noticed bird movement on a boulder-filled field on our right. We alighted from the vehicle and walked into the field. Then we noticed this white and black bird and thought it to be our third sighting of the Pied Wheatear during the trip. When we got closer to the bird we noticed that unlike the Pied, the throat of this bird was white. On checking our field guide (Grimmett *et al.* 2011), we didn't find an illustration that fitted the description and there was no mention of any morph for the Pied Wheatear.

Photos: S. Jha

66. Male Pied Wheatear *Oenanthe pleschanka vittata*, Tabo, Himachal Pradesh.

67. Female Pied Wheatear *Oenanthe pleschanka*, Tabo, Himachal Pradesh.

We wondered if it was a partial albino or a morph. Interestingly, on playing the call of a Pied Wheatear, the bird responded immediately, coming very close to us and then flying away. Suddenly we saw a brownish bird and realised it was the female. This bird too responded to the playback of the call. I took several photographs of the male as well as the female [**66–67**]. Apart from this sighting, we saw the regular morph of Pied Wheatear on four occasions between Puh and Kaza during this trip.

On my return to Kolkata, I circulated the photographs and one of the correspondents (Manjula Mathur *pers. comm.* June 2013) drew my attention to the illustration of *vittata* in Rasmussen & Anderton (2012) that seemed to match my photographs.

As per published material, it seems that this sighting may be the first report of the *vittata* morph of Pied Wheatear from India.

Acknowledgments

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Black-necked Storks *Ephippiorhynchus asiaticus* sighted along the India–Bangladesh border: Malda district, West Bengal, India

Arunayan Sharma

Sharma, A., 2014. Black-necked Storks *Ephippiorhynchus asiaticus* sighted along the India-Bangladesh border: Malda district, West Bengal, India. *Indian BIRDS* 9 (2): 55.
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On 21 August 2011, I was watching waterbirds near the Indian Border Security Force (BSF) field station at Alipore Border Out Post, situated *c.* 08 km from Malda town (English Bazar), West Bengal, India, along the India–Bangladesh border, in the eastern part of the district. This area is situated along Gangetic flood plains and has many low lying, shallow marshy areas, waterbodies and wetlands, which are excellent waterbird habitat, particularly during the monsoon. While observing birds from Indian side, on the roadside waterbodies, along the border fencing, at around 1025 hrs at a distance from *c.* 20 m, I saw six large storks foraging within the prohibited area of the no man's land, between the India and Bangladesh borders. They were in paddies, more towards Nawabgung district, North-Western Province of Bangladesh. I observed the birds for more than 20 min. Their plumage was characteristic, with striking black-and-white markings, jet-black head, wingbar, and tail, which contrasted against the white plumage of the rest of the body, glossy dark green and purple neck, massive black bill and long coral-red legs. The colour of the iris of three birds was yellow (=female), and that of the other three was brown or black (=male). I identified those six birds as adult Black-necked Storks *Ephippiorhynchus asiaticus* (Grimmett *et al.* 1998). I also noticed that each pair foraged close to each other, but maintained *c.* 6–8 m distance from the other pair. I suspect that these birds comprised three breeding pairs. I revisited the area on 28 August 2011 and saw four storks foraging in the same locality. Some local people informed me that the birds were present there since two weeks. It is not known if the storks use this area in other seasons too.

In the last few years, sightings of Black-necked Storks have become fairly common in the Gangetic flood plains of central West Bengal (Jha 2006; Sharma 2009), and from Bangladesh (Bangladesh Bird Club 2012). It has also been recorded historically from the northern part of the state, from the Buxa Tiger Reserve (Inglis *et al.* 1920a,b). Records also exist from Mahananda Wildlife Sanctuary, Darjeeling district (Anonymous 1996), Mahananda Barrage, Garati Bheel, Chapramari Wildlife Sanctuary, and Rasik Bheel (Maheswaran *et al.* 2004). There are two very old records of this species from the southern part of the state from the Salt Lake, near Kolkata in 1939 (Home 1995), and from the Sunderbans (Mukherjee 1959). In Bangladesh, this species is thought to be a former resident, now a vagrant (BirdLife International 2012). In recent times, three Black-necked Storks were sighted on 08 March 2010 at Nagua Dhulia, Hakaluki Haor, Sylhet district, and earlier in December 2009, locals captured a single individual that was later sent it to the Dulahazra Safari Park (Bangladesh Bird Club 2012). One bird was also reported to be held in captivity by fishery guards at Pashua haor, in the north-eastern region of Bangladesh on 10 March 1998 (Thompson & Johnson 2003).

My observations, and the sightings documented in literature, point to Black-necked Storks being far more common than previously known and resident in the India–Bangladesh border area. The Gangetic flood plains of India and Bangladesh are highly flood-prone, with annual seasonal flooding providing excellent wetlands for various species of waterbirds. Flooded rice paddy is the dominant crop here during the monsoon suggesting that the Black-necked Storks have a far wider distribution range in this region than merely the locations mentioned above. Observations of these storks using rice fields are increasing, similar to conditions for the species elsewhere in rice growing areas of the Indian Subcontinent (Sundar 2004). Increased conversions of wetlands to farmlands, and of crop fields to developed areas are potential threats to the species in this region.

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Mugimaki Flycatcher *Ficedula mugimaki* from Neil Island, Andaman & Nicobar Islands, India

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Das, S., 2014. Mugimaki Flycatcher *Ficedula mugimaki* from Neil Island, Andaman & Nicobar Islands, India. *Indian BIRDS* 9 (2): 56.
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Mugimaki Flycatcher *Ficedula mugimaki* is primarily an East Asian species that winters widely in South-East Asia. It breeds in south-central and south-eastern Siberia, northern Mongolia, north-eastern China, and North Korea, while wintering in south-eastern China, South-East Asia, and the islands of Indonesia, and Philippines (Robson 2008). This species has not been recorded till date from South Asia (Rasmussen & Anderton 2012). This note describes the sighting of an immature male Mugimaki Flycatcher from Neil Island (11°49'N, 93°03'E) near Port Blair, Andaman & Nicobar Islands, India.

While on a birding trip to the Andaman & Nicobar Islands, I visited Neil Island on 28 November 2013. There I photographed an unfamiliar flycatcher [**68**], and later posted the pictures on the Indian Birds Facebook group for help with its identification. The group's members identified it as an immature male Mugimaki Flycatcher.

Photo: S. Das

68. Mugimaki Flycatcher side view.

Post identification, it became clear that there are very few species which can be confused with this bird. The combination of extensive red on the breast, and white on the head, is only present in the males of Mugimaki Flycatcher, Rufous-chested Flycatcher *F. dumetoria*, and Snowy-browed Flycatcher *F. hyperythra*. The extensive red on the breast and long wings visible in the pictures eliminates Rufous-chested; while the presence of white behind the eyes eliminates Snow-browed. Adult male Mugimaki has a clear white eye-brow and a wing-bar, which is lacking in this bird; the pictures are more similar to the following image available in Oriental Bird Images from Hong Kong (*http://orientalbirdimages.org/search.php?p=13&Bird_ID=2681&Bird_Family_ID=&pagesize=1*).

Though this is a first record for South Asia, it is a 'locally fairly common winter visitor' to the neighbouring South-East Asia (Robson 2000), and hence it comes as no surprise that the first record for South Asia is from the Andaman Islands. Though these birds normally winter at elevations between 800–2000 m in the Malay Peninsula (Robson 2008), it is interesting to note that the species has been seen at sea level—presumably on migration—as has been seen elsewhere, e.g., Hong Kong.

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"AMATEUR NATURALIST TRAINING (ANT)" PROGRAMME FOR FOREST RANGERS

WWF-India's Andhra Pradesh State Office (APSO) conducted a two day "Amateur Naturalist Training (ANT)" Programme for 90 newly-recruited forest rangers from States of Goa and Andhra Pradesh in the Andhra Pradesh Forest Department Academy [AFDA], Dulapally on 6–7 September, 2013. Dr. P. Raghuveer, Director, AFDA, had invited WWF-APSO to conduct the training.

An 18-month course for the Forest Rangers offers them a variety of theoretical lessons, including field visits to the forest areas that encompassed principles of forest management. As a part of their orientation to understanding wildlife, the training programme was planned with a focus on awareness about nature, environment, wildlife, and climate and biodiversity conservation. The course included an introduction to nature & wildlife, understanding wildlife census techniques, interpretation census data, an introduction to plant world, mammals, birds and reptiles, jungle survival, stargazing at night and nature trails.

Sessions held during ANT:

- Treasure Hunt game for Flora
- Nature Trail- Campus Biodiversity Watch
- Mysterious Insect World – PowerPoint Session
- Movie Screening
- Birds and Bird Watching – PowerPoint session
- Nature Watch- A Study of Indirect and Direct Signs
- Night Trail – Herpetofauna Study
- Star-Gazing
- Bird Watching
- Wild Wisdom Quiz
- Champions of the Cause: Community and Group Understanding
- 'U' Present and 'V' Observe

The program ended with the trainees thanking the WWF staff for organising the programme, and with a few Range Officers sharing their experiences over the past two days. They asserted that while this training gave them an overview of wildlife and biodiversity conservation, it also provided them a platform to develop their skills on relaying information to others through logical debate, impassioned speech and insightful presentations. The trainees who performed their best in the two days of training were recognised and gifted WWF prizes by Dr. Raghuveer.

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