
An assessment of common and rare forest bird species of the Andaman islands

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A rapid assessment of forest birds was carried out in the Andaman islands in the Bay of Bengal. Forty-five islands were surveyed for 47 species of forest birds. The status of each species was determined by their distribution across the islands and their relative abundance. Four species were very rare, with infrequent sightings and found only on a few islands. Only one endemic species, the Andaman Treepie *Dendrocitta bayleyi* was rare. In general the status of the forest birds was robust, but the rare species that were identified need to be monitored as an indicator of the status of the forest bird community and of the forests of the Andaman islands.

INTRODUCTION

Rare species are under greater threat than others, and the science of conservation biology has to a large extent focused on the conservation of rare species (Soule 1986, Gaston 1994). Rare species can be identified by small range sizes or low abundance or both (Gaston 1994), and can form the core for the protection of habitats and ecosystems. The Andaman and Nicobar islands, with a rich variety of tropical forest types and diverse flora and fauna, are under intense developmental pressures (Saldanha 1989, Whitaker 1985).

Although a large number of sanctuaries and national parks has been notified (Pande *et al.* 1991), the protected area network might not be adequate to conserve all of the species and ecosystems (Davidar *et al.* 1995). This study was undertaken to assess the status of forest birds of the Andaman islands, in order to identify rare species and species vulnerable to extinction. These rare species can be used as monitors to assess the status of the forests and forest biodiversity in the Andaman islands over time, and to measure the impact of conservation programmes.

The birds of the Andaman islands have received attention for over a century (see Ripley and Beehler 1989). The most recent and comprehensive record was by Abdulali (1965, 1981) and Tikader (1984). The status of each species was approximated from collections and field observations, but little quantitative work has been undertaken.

We surveyed 45 islands of the Andaman group for 47 species of forest birds in 1992, 1993 (February to May), and 1994 (February). The status of each species was determined by the number of islands on which it was distributed and its abundance.

Study site

The Andaman islands are part of the Andaman and Nicobar chain of islands that extend from south-western Myanmar to north-western Sumatra, lying between 6°45'N and 13°41'N (Srinivasan 1986). Commonly called the 'Bay islands', the Andamans and Nicobars are a submerged mountain chain which is part of the Arakan Yomas of Myanmar. These islands lie off the south-east coast of Asia about 571 km from the Malayan peninsula and 1,330 km from southern India.

The northernmost islands are less than 300 km from Myanmar and the southernmost Great Nicobar island is about 189 km from Sumatra. These islands are considered truly oceanic as they were never connected to the continent during the Pleistocene glaciation (Ripley and Beehler 1989).

The Andamans are composed of about 300 islands, of a total land area of over 5,000 km². The major land mass is made up of North, Middle, Baratang and South Andaman islands, forming a super-island. Rutland, another large island lies within 1 km of the southern tip of South Andaman Island. Little Andaman (675 km² in area) is located about 67 km from the South Andamans and is the southernmost island in the Andaman group. It is separated from the Nicobars, which lie further south, by the 140 km wide 10 degree channel.

The climate is tropical and oceanic with rainfall from both the SW and NE monsoons. The average annual rainfall is 3,000 mm (State Statistical Bureau 1989). The dry season extends from January to May, with another short break in September-October.

According to Ripley and Beehler's (1989) analysis, 104 species of birds are known to breed in the Bay islands. Their affinities are predominantly with Myanmar and the Malay peninsula, with 81 of the species also breeding in south-western Myanmar and 75 in the Malay peninsula. There are also 13 endemic species and eighty-six endemic races.

Of the 104 breeding bird species, 47 were identified as predominantly forest dwelling. Taxa that were excluded are nocturnal species such as owls and nightjars, swifts, swallows and kingfishers. A few other species were also excluded because of their particular ecology. The teals were excluded as they were dependent on freshwater bodies, which appeared seasonal in many places, the Narcondam Hornbill *Aceros narcondami*, as it occurred on only one island which was not surveyed, and a few others like the Red Collared Dove *Streptopelia tranquebarica* and the White-breasted Woodswallow *Artamus leucorhynchus*, appeared to favour open areas. The Large-billed Crow *Corvus macrorhynchos* was ubiquitous, even in towns and villages. The Pied Triller *Lalage nigra* was not recorded in the survey.

METHODS

This survey covered the different large island masses and archipelagos in the Andaman group of islands. The islands surveyed ranged from Landfall off the northern part of the North Andaman island, to Twins and North Cinque off the southern tip of South Andaman island. Islands in the Labyrinth group, where the Marine National Park is located, the Ritchie's archipelago, islands off Mayabundar, Ariel Bay, and on the west coast of North Andamans such as North Reef were surveyed. Different sites were surveyed on large islands, such as the North Andaman, Baratang, South Andaman, Rutland and Little Andaman. On larger islands with a diversity of habitats, separate transects were walked on each habitat type, and the number of transects in each habitat type was related to the size of that particular habitat. Transects of 1 km length were walked in the mornings starting at 07h00. All birds seen or heard were recorded and identified using Ali and Ripley (1987) and King *et al.* (1975). Their distance along the transect line and approximate perpendicular distance to the transect line were noted. Transects were laid in different habitat types on each island or, in large islands and the number of transects was related to the proportion of each habitat type.

The status of each species was assessed by its distribution and its relative abundance. The number of sites in which the bird was recorded, was used to assess its geographic range and the total number of sightings, its abundance.

These parameters are commonly used to identify rarity (Gaston 1994). In this study the habitat-niche was not taken into account as many bird species were found to occupy more habitats on smaller islands (Yoganand unpublished).

The bird species recorded on all the above-mentioned sites and islands were ranked in ascending order according to the number of islands on which each was recorded. These ranks were transformed into an index of 1-5. Birds recorded from 1-11 islands were assigned a rank 1 (<11 islands form 25% of the total sampled), 12-20 a rank of 2, 21-30 a rank of 3, 31-40 a rank of 4, and finally 41-45 a rank of 5.

The total number of sightings per species in the 1993 and 1994 surveys was ranked in ascending order. These were assessed in a total length of 70 km of transect in the North Andaman island, Baratang, Little Andaman and associated islands.

The total number of birds recorded in these surveys was 5,028. The data from the survey of South Andamans and associated islands (12 islands) in 1992 were not included. Each species was given a rank from 0 to 5, from the least abundant to the most abundant species. Species with less than 10 sightings were given a value of 0, 10-50 sightings a rank 1, 50-100 a rank 2, 100-150 a rank 3, 150-200 a rank of 4 and 200+ a rank 5. These ranks were

Species	Feeding type	Number of islands	Rank (1-5)	Total of Individuals	Rank	Abundance (1-10)
<i>Coracina striata</i>	i	3	1	3	0	1
<i>Oriolus xanthornus</i>	o	4	1	5	0	1
<i>Chrysococcyx xanthorhynchus</i>	o	5	1	5	0	1
<i>Terpsiphone paradisi</i>	i	5	1	6	0	1
<i>Ducula bicolor</i>	f	5	1	12	1	2
<i>Dendrocitta bayleyi</i> *	o	9	1	36	1	2
<i>Pycnonotus atriceps</i>	o	10	1	45	1	2
<i>Columba palumboides</i> *	f	11	1	30	1	2
<i>Copsychus malabaricus</i>	o	11	1	11	1	2
<i>Aviceda leuphotes</i>	r	11	1	16	1	2
<i>Cuculus micropterus</i>	o	12	2	19	1	3
<i>Eurystomus orientalis</i>	i	14	2	16	1	3
<i>Accipiter virgatus</i>	r	14	2	16	1	3
<i>Macropygia rufipennis</i> *	g	16	2	22	1	3
<i>Spizaetus cirrhatus</i>	r	17	2	19	1	3
<i>Spilornis cheela</i>	r	19	2	23	1	3
<i>Dryocopus hodgei</i> *	i	18	2	70	2	4
<i>Pericrocotus flammeus</i>	o	18	2	90	2	4
<i>Eudynamis scolopacea</i>	f	23	3	35	1	4
<i>Zoothera citrina</i>	o	25	3	45	1	4
<i>Dicrurus andamanensis</i> *	o	18	2	119	3	5
<i>Spilornis elgini</i> *	r	25	3	62	2	5
<i>Chalcophaps indica</i>	g	27	3	67	2	5
<i>Coracina macei</i>	i	27	3	52	2	5
<i>Dendrocopos macei</i>	i	29	3	62	2	5
<i>Centropus andamanensis</i> *	o	30	3	75	2	5
<i>Psittacula eupatria</i>	f	30	3	100	2	5
<i>Merops leschenaulti</i>	i	32	4	44	1	5
<i>Psittacula alexandri</i>	f	23	3	127	3	6
<i>Gracula religiosa</i>	f	27	3	111	3	6
<i>Psittacula longicauda</i>	f	29	3	147	3	6
<i>Treron pompadora</i>	f	29	3	121	3	6
<i>Aplonis panayensis</i>	o	27	3	313	4	7
<i>Sturnus erythropygius</i> *	o	33	4	150	3	7
<i>Dicaeum concolor</i>	f	34	4	131	3	7
<i>Hypothymis azurea</i>	i	37	4	143	3	7
<i>Pachycephala grisola</i>	i	38	4	111	3	7
<i>Loriculus vernalis</i>	f	39	4	141	3	7
<i>Copsychus saularis</i>	o	41	5	78	2	7
<i>Ducula aenea</i>	f	31	4	377	5	9
<i>Pericrocotus cinnamomeus</i>	o	33	4	271	5	9
<i>Dicrurus paradiseus</i>	o	34	4	203	5	9
<i>Irena puella</i>	f	36	4	201	5	9
<i>Oriolus chinensis</i>	o	39	4	290	5	9
<i>Zosterops palpebrosus</i>	o	39	4	208	5	9
<i>Nectarinia jugularis</i>	n	44	5	279	5	10
<i>Pycnonotus jocosus</i>	o	44	5	530	5	10

* endemic species
 o= omnivore g= granivore i= insectivore
 f= frugivore r= raptor n= nectarivore

Table 1. Ranking the forest bird species of the Andaman islands by distribution and abundance in ascending order from rare to common species

Feeding Categories	Species	Number of islands				Abundances		
		1-11	12-22	23-33	>33	<100	100-120	200+
Omnivore	18	5	3	5	5	10	2	6
Frugivore	12	2	1	6	3	3	7	2
Insectivore	9	2	2	3	2	7	2	0
Granivore	2	0	1	1	0	2	0	0
Raptor	5	1	3	1	0	5	0	0
Nectarivore	1	0	0	0	1	0	0	1
Total Species	47	10	10	16	11	27	11	9

Table 2. Distributional patterns and abundances of Andaman forest birds based on feeding categories

added to give a composite rank from 1 to 10 listing the species from the most infrequent to the most common. Each species was assigned to a feeding category based on field observations and from literature (Ali and Ripley 1987). These categories are omnivore, frugivore, insectivore, granivore, raptor and nectarivore. There is some similarity between the omnivore and frugivore categories and doubtful species were assigned to either of these two categories based on field experience.

RESULTS

The results show that species are distributed evenly across the ranks, with roughly equal numbers being common or rare (Table 1). The ranks based on distribution and relative abundances are correlated (Kendall correlation coefficient $Z=6.05$, $n=47$, $p<0.0001$) implying that species with broad distributional range are also more abundant. However, there are some exceptions. Some species like the Chestnut-headed Bee-eater *Merops leschenaulti* and the Oriental Magpie Robin *Copsychus saularis* were widely distributed, but at low abundances, while others such as the Andaman Drongo *Dicrurus andamanensis* and the Asian Glossy Starling *Aplonis panayensis* were not widely distributed but occur in large numbers.

Raptors were generally restricted in distribution whereas the Olive-backed Sunbird *Nectarinia jugularis*, a nectarivore was found on almost all of the islands sampled. Omnivores and insectivores were distributed evenly across all island categories, whereas frugivores had generally a broad distributional range (Table 1).

Twenty-seven (57%) species had fewer than 100 records, whereas 9 had more than 200 records. These 9 were made up of omnivores, frugivores and a nectarivore. Granivores and raptors had fewer than 100 sightings. Seven of the 9 (78%) insectivore species had fewer than 100 sightings, and none over 200 sightings (Table 2).

Seven out of 12 (58%) frugivores had abundances between 100-200 and only 2 over 200. Six out of the 18 (33%) species of omnivores were very abundant with over 200 sightings and 10 (55%) had less than 100 sightings (Table 2). Species such as the Bar-bellied Cuckooshrike *Coracina striata*, Violet Cuckoo *Chrysococcyx xanthorhynchus*, Black-hooded Oriole *Oriolus xanthornus* and Asian Paradise-flycatcher *Terpsiphone paradisi* were encountered infrequently and at low numbers, and are considered very rare. The Pied Imperial Pigeon *Ducula bicolor* was very patchily distributed, with flocks being encountered infrequently. However, the Andaman Treepie *Dendrocitta bayleyi* and Black-headed Bulbul *Pycnonotus atriceps* are not as rare as is suggested, as they are found only in large islands and even though fairly common are given just one point for each record on a large island. Very common species are Red-whiskered Bulbul *Pycnonotus jocosus* and Olive-backed Sunbird *Nectarinia jugularis*.

Five of the species, the Andaman Serpent Eagle *Spilornis elgini*, Brown Coucal *Centropus andamanensis*, Andaman Drongo *Dicrurus andamanensis*, Andaman Woodpecker *Dryocopus hodgei* and Andaman Treepie *Dendrocitta bayleyi* are endemic to the Andamans. Three species, Andaman Wood Pigeon *Columba palumboides*, Andaman Cuckoo Dove *Macropygia rufipennis*, and White-headed Starling *Sturnus erythropygius* are endemic to the Andaman and Nicobar islands (Ripley and Beehler 1989). Of these 8 species, *Dendrocitta bayleyi* and *Columba palumboides* had a rank 2 *Macropygia rufipennis* a rank 3 (Table 1). The rest were common.

DISCUSSION

Forest birds are the most important and conspicuous members of the Andaman avifauna. They are not only important in their own right, but can also serve as indicators of the status of the forest.

The status of the birds in general was robust and there is no immediate cause of concern. The very rare species are not so because of any external threat, but probably because of their intrinsic ecological requirements and biology. They are also found predominantly on large islands and therefore are rare due to a limited distributional pattern (Davidar *et al.* 1995). These rare species, if monitored regularly over time can be used as indicators of the state of the forests.

Other species can function as more efficient indicators, as they occur on a large number of islands but in low numbers. These species, such as the Oriental Magpie Robin *Copysychus saularis*, Andaman Serpent Eagle *Spilornis elgini*, Fulvous-breasted Woodpecker *Dendrocopos macei*, Chestnut-headed Bee-eater *Merops leschenaulti*, and others have a distributional rank of 3+, but an abundance of rank 1. Raptors are effective indicator species as they are at the summit of the food chain, large-bodied and few in number. Any threat to the environment will result in a decline in raptor populations.

Frugivores dominate the ecological landscape in the Andamans. Many of the frugivores, usually fruit pigeons and parakeets, are encountered in flocks, which move over a broad area in search of fruiting trees. They easily traverse over water to visit fruiting trees on small islands and probably play a very important ecological function in the dispersal and propagation of the plant species.

The status of the avifauna such as the Narcondam Hornbill *Aceros narcondami*, the Andaman Teal *Anas gibberifrons*, symbolic of these islands, needs special attention due to their unique ecological requirements and limited distributions; in addition to these, community level studies of rarity in broad categories, such as forest birds, are required.

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