

Nest, eggs and nest sites of the Andaman Crake *Rallina canningi*

NATARAJAN EZHILARASI & LALITHA VIJAYAN

Introduction

The rallid genus *Rallina* comprises eight species of distinctively plumaged rails which inhabit forest understorey or marshland inside forest and are confined to Asia and Australasia (Taylor 1998). Many rallids are little known, and the nest, eggs and young of more than 20 species remain undescribed (Taylor 1998). The previously little-studied Andaman Crake *Rallina canningi* is endemic to the Andaman islands; it is a large (34 cm) chestnut-coloured crake with dense but indistinct black-and-white bars on the belly, greenish legs and a bright green bill, whitish at the tip; the sexes are alike.

The Andamans, lying in the Bay of Bengal, India, are a group of 325 oceanic islands (21 inhabited) covering 6,408 km² (Saldanha 1989). They experience both south-west and north-east monsoons, having an annual average rainfall of 3,200 mm, with a monthly mean of 86–450 mm (Kumar & Gangwar 1985). The Andaman Crake had been thought to be common on South Andaman in the nineteenth century, when it was reportedly hard to see but easy to catch in snares (BirdLife International 2001). It continued to be hard to find during survey visits in the twentieth century because of its shy skulking habits, and as a result was classified Data Deficient (BirdLife International 2001). Recent studies by the Sálím Ali Centre for Ornithology and Natural History (SACON) resulted in reclassification to Near Threatened (BirdLife International 2013). We carried out a study of the ecology of the Andaman Crake between February 2004 and March 2007 (Vijayan & Ezhilarasi 2007, Ezhilarasi 2009) and from this we present the first detailed descriptions of nests, eggs and nest sites of this little-known species, aspects of its ecology not before described (Ali & Ripley 1969, Taylor 1998, BirdLife International 2001).

Part of the study involved population status surveys in selected localities on the four main islands and 37 of the outlying islands, using direct observation and calls, but an accurate population estimate was not possible. Crakes were not found on islands less than 10 km² in area and encounter rates were lower on small islands than on Little, South, Middle and North Andaman. The species was found most frequently inside and at the edges of moist deciduous and semi-evergreen forest, less frequently in evergreen forest, seldom in mangrove forest and not at all in littoral forest, plantation and cultivated areas (Vijayan & Ezhilarasi 2007).

Most rails breed seasonally in or near the wet season in the tropics (Taylor 1998) and, in common with other Indian and Australasian rails, the Andaman Crake was reported to breed between June and August (Taylor 1998). Two areas were selected for intensive study, Chidiyatapu (about 40 ha) on South Andaman and Pathilevel (about 30 ha) on North Andaman; this report is focused on studies at Pathilevel.

Study area and methods

The village of Pathilevel (Chalis Ek caves) on North Andaman is about 20 km south of Diglipur. The study was carried out between June and September in 2005 and 2006. The predominant habitat was moist deciduous forest with a somewhat irregular upper storey of mainly deciduous trees about 40 m or more in height, with many woody climbers. The understorey contained numerous species, some evergreen, below which a luxurious evergreen undergrowth of shrubby *Licuala peltata* was present.

A general search for nests was made in the area and a 10 ha area of forest was delineated which was searched systematically and intensively for nests (Martin & Geupel 1993). Local villagers were recruited to help during the breeding season. When breeding was finished, the nests were described with reference to size,

materials used, position and degree of concealment, this last based on scores given for nest-site visibility from 16 vantage points at 1, 3, 5 and 7 m away in each of the four cardinal directions, with low concealment scoring 13–16 points (0–25%), medium 9–12 points (25–50%), high 5–8 points (50–75%), and very high 0–4 points (75–100%) (Martin & Roper 1988, Martin *et al.* 1996).

Results

The Andaman Crake breeds during the south-west monsoon between June and September and in 2006 a total of 120 crake nests were located; of these 59 were found in June, 40 during July, 16 in August and 5 in September. Most nests were located within 200 m of the forest edge and close to water; both sexes took part in nest-building and incubation. Of the 120 nests recorded, 17 held eggs (clutch size 5–6) and eggs hatched in only seven of these nests with an overall hatching success of 22%. The young were found in August, September and October, towards the end of the monsoon.

During the 2005/2006 study period, eight pairs and 39 nests were found in the 10 ha Pathilevel study plot. Each pair thus presumably makes several nests and one is selected for laying, although we could not determine which pair made which nests. Nests may be abandoned before completion, but rarely after laying has commenced. Failure of nests was due to poor weather, human disturbance and predation by monitor lizards, snakes and Andaman Coucal *Centropus andamanensis*. Crake families use other nests for roosting after leaving the incubation nest.

Nest structure and position

The nest used for laying was typically platform-shaped with a shallow cup, made of dried leaves and twigs on top of the leaf-litter. These nests have two distinct layers, an outer stratum of loosely arranged leaves and an inner one consisting of a tight cup made up of flexible soft twigs, whereas roosting nests were made only of soft leaves. The position of the shallow cup varied: asymmetrical in ground nests and in the centre in others.

Nearly 96% of the nests were composed of leaves and twigs only, with 4% also adding bark. The nest materials comprised leaves of 17 species of plants and trees. In all, 60 nests were measured: mean outer diameter was 26.5 cm, inner diameter 15 cm and depth 4.7 cm. Nests were recorded in four types of site:

1. *Between tree-buttresses.* Most nests, 105 of 120, were located between the buttresses of huge trees (Figures 1 & 2). All these nests were very well concealed by undergrowth (shrubs and climbers) (Figure 1) and the folds of the buttresses (Figure 2); concealment levels ranged from 75–100%. All nests placed on the ground were raised on a cushion of decaying leaves and they were devoid of attachment materials. The back of the nest was supported as well as concealed by the main trunk, and both sides of the nest were supported by the buttresses. In a few cases some stones or shrubs between the buttresses supported the nest from below. The nests were also protected from rain as they were concealed in the hollow of the buttresses. In all 23 different species of trees were used with *Tetrameles nudiflora* (23%), *Pterocarpus dalbergioides* (23%), *Terminalia bialata* (13%) and *Pterygota alata* (11%) predominating.
2. *On top of dead tree-stumps.* Four nests were placed on 1–1.5 m high dead tree-stumps, partly hidden by undergrowth or a nearby tree (Figure 3), but concealment levels were only medium (25–50%). Nests were placed in shallow depressions in the top of the stumps.



Figure 1. Nest placed between buttresses of a tree on ground.

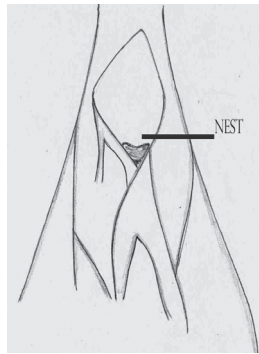


Figure 2. Nest placed between buttresses of a tree above the ground.



Figure 3. Nest placed on the top of a dead tree stump.



Figure 4. Nest placed on the top of a termite mound.



Figure 5. Nest placed on the branches of a tree.

3. *On top of termite mounds.* Seven nests were found on the top of termite mounds, four of the latter being located between buttresses and three free-standing (Figure 4), and were partly hidden by surrounding vegetation (concealment levels 25–75%). The height of the mound varied from 1 m to 5 m.
4. *Among vegetation branches.* Four of the 120 nests were found on the branches of a tree or bush, being supported from below by contact with two or more branches (Figure 5). In such a site, a nest may be secured simply by its weight, which lodges it in a tangle of branches, or by attachment materials to prevent it from being dislodged. One nest was in the centre of a huge *Licuala peltata* supported by nearby *Licuala* shrubs and branches of the nearby tree. The height of the nests ranged from 1–3 m, and the concealment levels were 0–75%.

After hatching, the family moved to one or a series of 'roost nests', where the birds stayed until the chicks became independent. These nests were similar to incubation nests but were usually more lightly constructed using only leaves.

Egg and clutch size

The eggs are glossy white in colour, ovoid and without spots (similar to those of domestic hens, but smaller). As incubation progressed, the eggs turned creamy-yellow and hatched synchronously within about two hours in the morning. Eighteen eggs from abandoned nests were measured: the mean weight, length and width were 24 ± 3 g, 4.2 ± 0.2 cm and 2.2 ± 0.2 cm respectively. These measurements differ somewhat from earlier studies (Taylor 1998).

We observed 15 nests with completed clutches; clutch size ranged from 4–8, mean 5.7 ± 1.7 . Three nests held four eggs, eight nests held five eggs, three nests six eggs and one nest eight eggs. One clutch of one egg and one of three eggs were predated or abandoned and hence not considered as completed. Unhatched eggs were removed from nests by parents.

Chicks

Andaman Crake chicks are precocial and leave the nest within a day of hatching. We found that chicks then spent 30–32 days roaming the forest floor with their parents and returned to a nursery nest with them to roost, when the female joined the chicks in the chosen nest and the male roosted in a nearby tree. The female parent (colour-ringed) attended and looked after the chicks while the male frequently brought them food; chicks were generally fed bill-to-bill by both parents for several days or weeks. After about a month, parents chased the juveniles away and although a few individuals were marked, no information on their subsequent dispersal was obtained because they were very difficult to observe inside the forest and were rarely seen.

Measurements of a few chicks, young and adults were obtained (Table 1). Chicks from two nests were ringed: three chicks from one nest on the fifth day after hatching and three from a second nest on the eighth day; one of these was recaptured on the tenth day and remeasured.

Table 1. Mean measurements of the chicks of the Andaman Crake at different stages.

Measurement	Chicks			Juvenile (n=3)	Adult (n=11)
	5th day (n=3)	8th day (n=3)	10th day (n=1)		
Wing (mm)	12.3	12.6	12.8	143±30	158±4
Tail (mm)	–	–	–	75±27	79±16
Culmen (mm)	17	17±1	20	30±6	33±3
Tarsus (mm)	31±4	32±2	39	59±5	76±2
Weight (g)	49±4	52±2	53	195±42	253±43

Discussion

The breeding season of the Andaman Crake directly correlated with rainfall and relative humidity, and had a negative correlation with temperature. Nests were made from leaves, twigs and bark, the same materials as used by Red-necked Crake *Rallina tricolor* and Slaty-legged Crake *R. eurizonoides* (Taylor 1998). According to Ali & Ripley (1969) and Taylor (1998), the nest of the Andaman Crake is a collection of grass and leaves, placed at the foot of a forest tree or under tangled forest undergrowth. In our study, nests were found to be made of leaves, twigs and bark; no grass was used. The size (corner width) of the buttresses might have influenced the amount of nest material used as well as the size of the nest. Although the dead leaves of 17 plant species were recorded in the nests, no species consistently dominated, which suggests that birds used any available leaf materials at the site.

Most of the nests were found on the ground between buttresses, possibly for maximum concealment— since the nest is hidden on three sides by the buttresses and protection from rain, wind and direct sunlight.

Of the other *Rallina* species, Red-necked Crake has been found to nest between buttresses, while Slaty-legged Crake nests have been reported on tree-stumps (Taylor 1998), but the Chestnut Forest-rail *R. rubra* and White-striped Forest-rail *R. leucospila* of New Guinea build dome-shaped nests (Taylor 1998).

The egg colour and the clutch size of the Andaman Crake are similar to several other *Rallina* species—Forbes's Forest-rail *R. forbesi* lays 4–5 glossy white eggs, Red-necked Crake 3–7 white eggs, Red-legged Crake *R. fasciata* 3–6 chalky-white eggs and Slaty-legged Crake 4–8 creamy-white eggs (Taylor 1998).

Acknowledgements

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Natarajan EZHILARASI, Sálim Ali Centre for Ornithology and Natural History, Anaikatty, Coimbatore, Tamil Nadu, India. Email: ezhilarasinatarajan@gmail.com

Lalitha VIJAYAN, Sálim Ali Centre for Ornithology and Natural History, Anaikatty, Coimbatore, Tamil Nadu, India.

A newly described call and mechanical noise produced by the Black-and-crimson Pitta *Pitta ussheri*

TERESA M. PEGAN, JACK P. HRUSKA & JUSTIN M. HITE

Introduction

The Black-and-crimson Pitta *Pitta ussheri* is endemic to Sabah, Malaysia. It inhabits lowland rainforests from sea level to 300 m and is often found in dense undergrowth (Erritzoe 2003). It is tolerant of disturbance and can sometimes be found in selectively logged areas and overgrown plantations (Lambert & Woodcock 1996). Nonetheless, the species is classified as Near Threatened because of high rates of lowland deforestation and habitat loss (BirdLife International 2012).

The primary call of the Black-and-crimson Pitta has been well documented. Lambert & Woodcock (1996) describe it as 'a prolonged, relatively quiet whistle that gradually rises in power and pitch and then suddenly stops'.

Two previously undocumented sounds produced by the Black-and-crimson Pitta are documented here: a presumed mechanical noise (sonation) and a call similar to one produced by the Blue-headed Pitta *Pitta baudii* and hereafter referred to as the 'baudii-like call'.

The observations were made between 27 June and 27 July 2012 at Tawau Hills Park, Sabah. The pittas occupied two different low (about 250 m) swampy areas of primary dipterocarp rainforest, each within 1 km of the park headquarters (4.399°N 117.889°E). How many pittas were in these areas was not determined.

Novel sounds

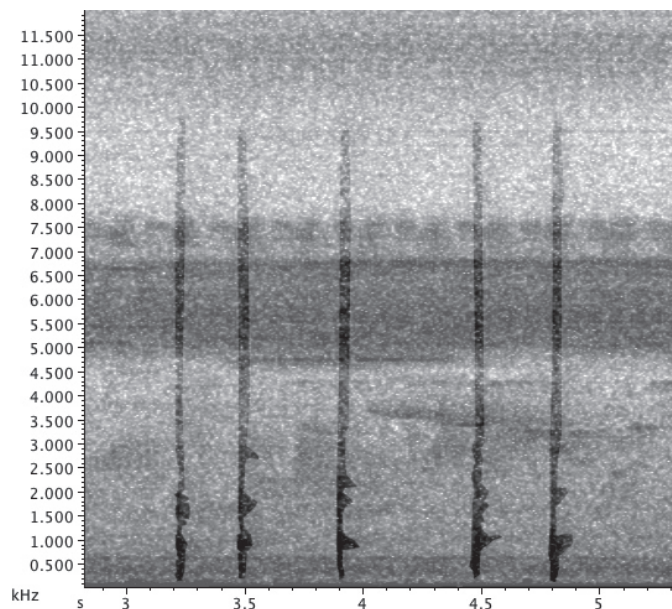
Sonation

A recording of this sound can be found at <http://macaulaylibrary.org/audio/169900>, whilst video recordings of the bird perched and calling, then flying away and producing the sound off-camera, can be seen at <http://macaulaylibrary.org/video/471600> and <http://macaulaylibrary.org/video/471609>. This sonation sounds like a series of soft claps or pops.

In the recording, the mean frequency range of each of the five claps was 85 Hz to 9.7 kHz, and the duration of each clap was 0.1 second or less. Hereafter the noise is referred to as a non-vocal sonation, although this has not been confirmed conclusively.

The species was first seen making this sonation on 27 June 2012, when JMH encountered a Black-and-crimson Pitta after playing back this species's song. When the bird was found it was perched

Figure 1. The sonation. Each dark vertical bar represents one sonation. The horizontal band between 4.5 and 8 kHz is the result of background insect noise. This spectrogram was produced by Raven software using the same recording linked below. Recording by Justin Hite. Because of the quality of the recording, the sonations have been artificially highlighted with Photoshop for clarity.



Spectrogram parameters:
Type: Hann
Window size: 2762 samples
Overlap: 70%
Hop size: 829 samples
DFT: 8192 samples

about 4 m up in a tree, where it sang at regular intervals. After about 10 minutes, JMH moved closer and the bird became slightly agitated but continued to call. It then flew to the ground and produced the sonation as it flew from tree to ground. It was unclear whether the presence of the observer had any effect on the behaviour of the bird.