

# Nests, eggs, hatchlings and behaviour of the Masked Finfoot *Heliopais personatus* from the Sundarbans in Bangladesh, with first nesting observations

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During a week-long survey in August 2004, we found 19 nests of the Masked Finfoot *Heliopais personatus* in a 60 km<sup>2</sup> area of the Bangladesh Sundarbans mangrove forest in the Ganges–Meghna–Brahmaputra delta. Three nests contained eggs (3–5 per clutch). The preferred nesting tree was ‘sundri’ *Heritiera fomes* (79% of nests). The nests were positioned in the first line of vegetation overhanging riverbanks (mean stream width 23 m) with a mean height of the nest above high tide water level of 1.8 m. The nesting behaviour, not previously described, was studied at one nest. During the entire observation period (commencing three days before hatching), only the female incubated the eggs; the male was not seen near the nest. While on the nest, the hatchlings were fed small fish and shrimp. A presumed contact call of the female, heard before she returned to the chicks, was sound-recorded. The chicks had left the nest by the morning after hatching. Future nesting surveys in the Sundarbans should cover at least the months of July and August to gather information on nest densities, egg-laying and hatching dates, incubation periods, and the role of the sexes in nest construction and incubation.

## INTRODUCTION

According to the most comprehensive review of available data on the Masked Finfoot *Heliopais personatus*, its geographic range covers Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, Singapore, Indonesia, India and Bangladesh (BirdLife International 2001). In Bangladesh this bird is only recorded from the Sundarbans, the mangrove forest in the Ganges–Meghna–Brahmaputra delta (Hussain and Acharya 1994, Khan 2003, 2005, Gani 2005). There appear to be no confirmed published sightings of the species from the Indian Sundarbans, adjacent to the west. Breeding evidence through the finding of nests and eggs is reported from India, Myanmar and Malaysia, and through sightings of juveniles from Malaysia, Indonesia and Thailand (BirdLife International 2001), Cambodia (Robson 2002) and Bangladesh (Khan 2005).

Delany and Scott (2002) estimated the global population at 2,500–10,000 with a ‘1% threshold’ of 60 birds. The global status of Masked Finfoot in the IUCN Red List of Threatened Species is ‘Vulnerable’ (VU A2cd+3cd; C1) with declining trend (IUCN 2007). According to the IUCN (2000) *Red Book of Threatened Birds of Bangladesh* its national status is ‘Endangered’ (ie, facing a very high risk of extinction in the wild in Bangladesh in the near future). The Masked Finfoot is included in the Bangladesh Wildlife (Preservation) (Amendment) Act 1974, in the 3rd Schedule: ‘protected animals, i.e., animals which shall not be hunted, killed or captured’ (Banik 1994).

Only a few authors, namely Baker (1919, 1935), Hopwood (1921) and Cairns (1963), have dealt directly with the nesting of the Masked Finfoot. Baker’s writings must be treated with caution, as some of his nesting information is known to be incorrect (Rasmussen and Anderton 2005), so his findings require independent corroboration. The first recorded Masked Finfoot nest was discovered in Assam on 24 July 1904 by M. Gregerson and B. Nuttall and the one egg collected (Baker 1919) was later found to be underdeveloped and addled. Hopwood (1921) published the earliest details of the nidification, gathered during 1920 by the forest officers T. Marlow and

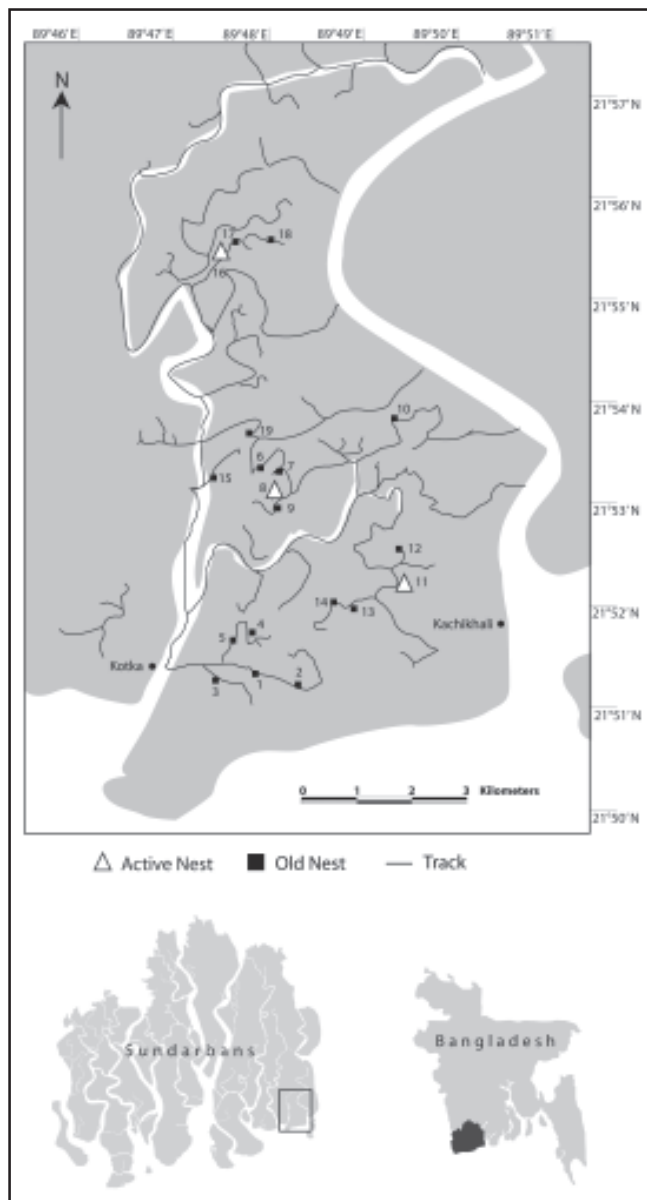
H. C. Smith from nesting sites in the flooded jungles of the Irrawaddy river system, Myanmar. Cairns (1963) examined 16 nests between 1941 and 1961 in Kedah State, Malaysia.

Nests and eggs of Masked Finfoot have been collected and described earlier, but this elusive bird has never been studied or photographed on the nest. In this paper, we describe nest observations of the Masked Finfoot in the Bangladesh Sundarbans, and compare our results with available historical data.

## STUDY AREA AND METHODS

The entire Bangladesh Sundarbans (6,017 km<sup>2</sup> mangrove forest) is a Reserved Forest in south-west Bangladesh, with its northern boundary c.35 km south of the city of Khulna. It was designated a Wetland of International Importance in 1992. Three protected areas (Sundarbans-East, -West and -South Sanctuaries) were established in 1996 covering a total area of 1,397 km<sup>2</sup>, and were together designated a World Heritage Site in 1997 (Wetlands International 2008). We have seen Masked Finfoot species near Mirgamari (22°23’N 89°40’E), in Shapla Khal (22°04’N 89°50’E), in Kotka Khal (21°51’N 89°48’E), in Kachikhali Khal (22°52’N 89°50’E), at the eastern bank of Sela Gang (21°55’N 89°41’E), east of Supati Khal (21°57’N 89°49’E), and near Hiron Point (21°48’N 89°28’E).

During 16–22 August 2004, we surveyed 110 km of waterways in the Sundarbans-East Sanctuary, covering approximately 60 km<sup>2</sup> or 1% of the total area of the Bangladesh Sundarbans. The survey was mainly conducted from a man-powered wooden boat, occasionally from an outboard engine boat, enabling passage through creeks with a minimum width of 3 m. All accessible waterways in the survey area were investigated for Masked Finfoot nests. At first, we searched for any nest made of piled sticks. Later, as we gained experience, we looked for nesting trees standing near or in water, with nests approachable by the bird on foot along a slanting trunk or branch, and nests located directly above water. Track and nest locations (Figure 1) were recorded with a Garmin GPS 12.



**Figure 1.** Map of study area, in the south-eastern corner of Sundarbans Reserve Forest, Bangladesh, with locations of active and old nests. Track lines indicate the survey routes. Nest numbers correspond to those in Table 1.

Trunk diameter at the high water mark, trunk diameter at nest level, and nest size were measured with tape to the nearest cm. For nest size, we measured diameter and depth (distance from top of the rim to bottom of the base). The height of the nest above high water mark was visually estimated with an accuracy of c.10 cm at low positions and c.20–30 cm at high positions. The angle between trunk or branch with nest and water surface was visually estimated with an accuracy of c.10–15°.

We estimated the stream width at nest locations using the survey boat as a measuring reference. The condition of the nests and materials used in their construction were noted. Where eggs were present in an accessible nest their maximum length and width were measured (to the nearest 0.5 mm) with a pair of callipers once the incubating bird left the nest.

On the afternoon of 21 August 2004 we set up a hide on the opposite bank of one of three active nests (#16, Table 1), ideal for direct observations. Observation sessions lasted

from dawn to dusk (c.06h30–18h00) on 22–26 August, unless interrupted by constant rain, and ended on 26 August at 13h30 (total observation time: 47 hours, 20 minutes). Summary statistics are presented as mean±SD.

## RESULTS

### Nests

In total, we found 19 Masked Finfoot nests, details of which are presented in Table 1. Linear distance between Masked Finfoot nests was 220–2,200 m. We surveyed a total of 110 km of waterways, so, on average, we found one nest per 5.8 km. It was usually impossible to tell if an empty nest was built in the present season or in an earlier one, hence we cannot calculate a nest density. The preferred nesting tree was ‘sundri’ *Heritiera fomes* (15 nests, 78.9%), followed by ‘dundul’ *Xylocarpus granatum* (3 nests, 15.8%) and ‘gewa’ *Excoecaria agallocha* (1 nest, 5.3%) (Table 1).

All nest trees were leaning over water at all tide levels (mean angle between water surface and trunk = 49.2°) and positioned in the first row of vegetation along a creek or in an isolated group of dead trees in the water near the bank. No other local bird species (like crows *Corvus* spp.) with comparable nest size would place these at heights as low above the water (mean 1.8 m), or as approachable by climbing as the Masked Finfoot. The mean trunk diameter at the high water level mark was 16.7 cm, while the mean trunk diameter at nest level was 8.0 cm. We did not take the water depths below the nests, but on all cases it was deep enough, even at low tide, to ensure a fast escape for the bird by jumping down or diving away. The mean stream width recorded at the nesting sites was 23.3 m. The tree canopy on both creek sides near the nest usually did not meet overhead.

Masked Finfoot nests were built on a fork, naturally formed by branches or the branching trunk. In two cases (#16, 17) the nest was found embedded in nest fern *Asplenium* sp. (Plate 1). The nests consisted of dead twigs loosely piled up, in two cases (#1, 2) interwoven with slender leaves of ‘hental’ *Phoenix paludosa* or nest fern. The basin was lined with dead leaves in three nests (#11, 16, 18). In three cases (#10, 12, 19), the nesting trees were dead, in two of these the dead tree was covered with the epiphytic twiner ‘pargacha’ *Hoya parasitica*.

### Eggs

During the survey, three nests containing eggs were found (# 8, 11, 16). The clutch sizes were three, four and five. The first nest was unapproachable, while the nine eggs from the other two clutches had a mean size of 51.2 × 42.2 mm. All eggs were quite round, barely oval (mean length to width 1:0.82; N=9). Some spots and blotches in lighter bluish grey and darker mouse-grey, medium brown and dark violet were scattered on a light cream-coloured ground.

### Role of sexes

Both males and females were seen incubating on different nests. At nest #8 a female was seen incubating on 17 and 19 August, at nest #16 a female was sitting on the eggs on 21, 22, 23 and 24 August, feeding her hatchlings on 25 August, and at nest #11 an incubating male was present on 18, 24 and 26 August.

**Table 1.** Tree, nest and egg data of Masked Finfoot from Bangladesh Sundarbans, 2004. For nest locations see Figure 1.

#	Date	Tree species <sup>1</sup>	Nest location					Nest size		Egg size		Remarks
			Trunk diam. at high water level (cm)	Trunk diam. at nest level (cm)	Angle between trunk and water	Stream width at nest site (m)	Nest height above high water (m)	Nest diameter (cm)	Nest depth (cm)	Egg length (mm)	Egg width (mm)	
1	16 Aug	<i>Hf</i>	7	5	60°	30	2.0	30	17			Empty nest, some leaves of <i>Phoenix paludosa</i> interwoven
2	16 Aug	<i>Hf</i>	15	8	45°	25	2.5	35	15			Empty nest, some leaves of an <i>Asplenium</i> interwoven
3	16 Aug	<i>Xg</i>	12	6	30°	40	0.75	23	10			Empty nest, very small, incomplete?
4	17 Aug	<i>Hf</i>	8	5	45°	15	0.50	38	18			Empty nest (was used in 2003; RM pers. obs.)
5	17 Aug	<i>Hf</i>	7	4	30°	22	0.60	35	18			Empty nest
6	17 Aug	<i>Ea</i>	18	12	45°	25	1.3	35	22			Empty nest
7	17 Aug	<i>Hf</i>	25	8	45°	12	2.0					Empty nest in bad condition (no nest data obtained)
8	17 Aug	<i>Xg</i>	15	4	90°	20	3.0	38	10			Nest with 3 eggs, eggs gone 22 Aug, no egg data taken
9	17 Aug	<i>Hf</i>	15	5	45°	15	2.5	35	20			Empty nest
10	17 Aug	<i>Hf</i>	25	15	70°	35	5.0					Dead tree covered with <i>Hoya parasitica</i> ; empty nest, too high for taking nest data
11	18 Aug	<i>Hf</i>	25	12	45°	35	3.0	35	14	53 55 54.5 50	41.5 43 44 41	Nest with 4 eggs on layer of dead <i>Heritiera fomes</i> leaves, not hatched until 26 Aug.
12	18 Aug	<i>Hf</i>	20	5	45°	20	2.0	40	20			Dead tree; empty nest
13	18 Aug	<i>Hf</i>	14	2	45°	13	1.3	38	15			Empty nest lined with dead leaves
14	19 Aug	<i>Xg</i>	15	6	70°	10	2.0	38	13			Empty nest
15	20 Aug	<i>Hf</i>	15	9	30°	10	2.0	30	15			Empty nest
16	21 Aug	<i>Hf</i>	18	8	60°	30	1.2	37	17	50 48 50 50 51	42 41 42 42 43	Nest with 5 eggs, built in an <i>Asplenium</i> ; eggs on layer of dead <i>Heritiera fomes</i> leaves, 3 eggs hatched 25 Aug.
17	21 Aug	<i>Hf</i>	18	15	45°	30	1.5	42	17			Empty nest, built in an <i>Asplenium</i>
18	21 Aug	<i>Hf</i>	20	13	45°	25	1.0	37	16			Empty nest, dead leaves inside, but no eggs
19	22 Aug	<i>Hf</i>	25	10	45°	30	0.5	35	20			Dead tree covered with <i>Hoya parasitica</i> ; empty nest
		Mean	16.7	8.0	49.2	23.3	1.8	35.4	16.3	51.2	42.2	
		SD	5.8	3.9	15.0	9.1	1.1	4.4	3.4	2.4	1.0	
		Range	7–25	4–15	30–90	10–40	0.5–5.0	23–42	10–22	48–55	41–44	
		N	19	19	19	19	19	17	17	9	9	

<sup>1</sup> *Hf*: *Heritiera fomes*; *Xg*: *Xylocarpus granatum*; *Ea*: *Excoecaria agallocha***Incubation and nesting behaviour at nest #16**

The female on the nest was never seen asleep; she was wide awake and active with the exception of a few seconds of dozing, when her grey-blue nictitating membrane remained closed. She preened herself most of the time. She also pecked at crawling insects in reach, caught flying insects, and rearranged sticks in the nest structure. Turning the eggs and changing her position increased in frequency as the hatching time approached. No other Masked Finfoot, male or female, was observed in the proximity of the nest at any time.

Over 22–24 August, the mean incubation bout observed was 156±97 minutes (N=7) and the mean interbout interval was 52±44 minutes (N=7). When leaving the nest without being disturbed, the bird jumped from a suitable branch while flapping its wings to ensure a soft landing on the water surface. It quickly swam out of sight and returned slowly searching for food along the water's edge. The female bird fed in close proximity to the nest several times. She also left the nest exclusively for bathing, involving diving, splashing and fluttering. After this she tended to stand on a low overhanging branch at

a distance of about 30 m from the nest, flap her wings, and preen.

When returning to the nest (N=21), the female always approached on foot, either by walking up the slanting trunk of the nesting tree or by climbing up a higher neighbouring tree and jumping down, landing just beside the nest. There are no previous records of this behaviour. While climbing up to the nest, she stopped frequently to sort her feathers meticulously. The bird always returned to the nest before rain started. It removed raindrops from its feathers with a slight shaking of neck and body.



**Plate 1.** Nest #16 with eggs of Masked Finfoot built in the centre of an *Asplenium* fern, 21 August 2004. (G. and H. Denzau)



**Plate 2.** Three freshly hatched Masked Finfoot chicks beside two unfertile eggs, 25 August 2004. (E. and R. Fahrni Mansur)



**Plate 3.** Female Masked Finfoot climbing the nesting tree with small fish in bill for feeding the chicks, 25 August 2004. (G. and H. Denzau).

### Hatching and hatchlings at nest #16

On 24 August 2004 at 10h43 the incubating female started to poke at the eggs, and ate the smallest fragments of the eggshells (six times during the following 7 hours 17 minutes of observation). By evening, the eggs showed visible cracks and small holes. The female bird was observed trying to open them, but none broke open before nightfall. In the morning of 25 August three chicks had hatched. The two remaining eggs, possibly infertile, remained intact and were left unnoticed in the nest.



**Plate 4.** Female Masked Finfoot on the nest offering a fish (tail first) to a chick, 25 August 2004. (E. and R. Fahrni Mansur)



**Plate 5.** Chicks (note bill marked with tiny white spot at the top) besides adult female Masked Finfoot on the nest, 25 August 2004. (G. and H. Denzau)



**Plate 6.** Female Masked Finfoot on the nest in gesture of defence during approach of a Rhesus Macaque (on the left), 24 August 2004. (E. and R. Fahrni Mansur)

The chicks were dark grey, much paler on the underside, and paler also above and below a black eye-stripe that joined with the black bill. The bill itself was marked at the tip with a tiny white spot (Plate 2).

The food provided to the hatchlings by the female bird consisted of whole small fish and shrimp. Holding one fish or shrimp at a time laterally in her beak she walked up to the nest (Plate 3) and fed the chicks (Plate 4) eleven times in 7 hours and 15 minutes, with mean bouts on the nest of  $26 \pm 28$  minutes ( $N=10$ ), and mean intervals away of  $12 \pm 7$  minutes ( $N=10$ ). After feeding, the mother tucked the hatchlings under her body, but one or the other managed occasionally to move around within the nest (Plate 5).

The chicks were nidifugous, which was expected, but had not been observed before. Heavy monsoon showers poured down the first afternoon and night after hatching. The female bird and all three chicks had left the nest by the next morning (26 August) and were not seen again. Depredation does not seem to have occurred, as no indications were found.

### Predators

Once a water monitor *Varanus salvator* swam below the nesting tree on 23 August, but did not notice the bird on the nest (#16). When people passed the same nesting site by boat, the bird flattened its body into the nest depression and relied on its effective camouflage. Disturbances at nest #16 were only caused by our own activities during drop and pick up of an observer, not by other humans passing by, as the creek ended blind. Other nests, like #11 were located in connecting creeks with about 5–10 boats passing per day, but were not noticed by the local

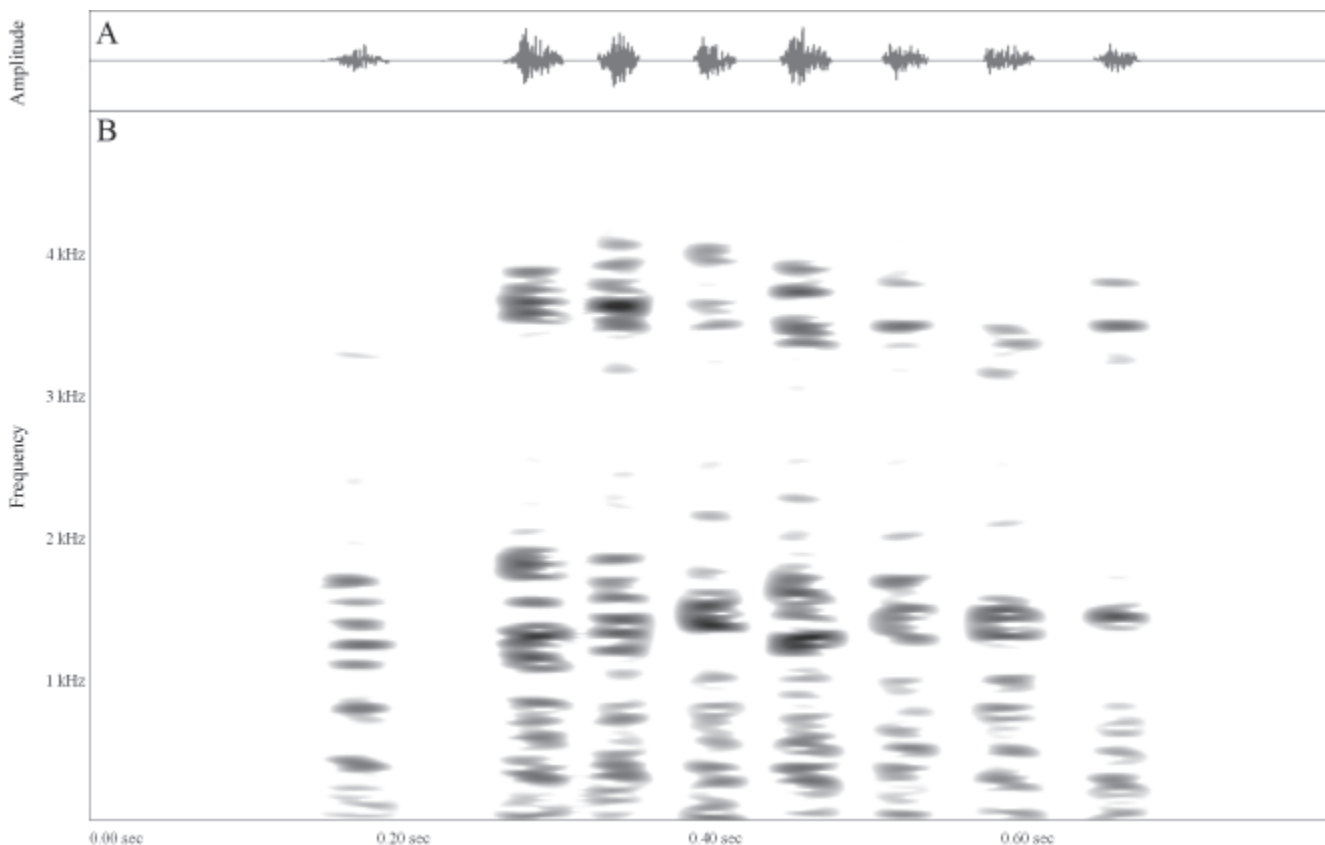
people, as it was extremely well camouflaged. Once detected a nest would be most likely plundered, as neither the boundaries of the protected area nor the protected status of the bird is well advertised among the public.

When a troop of rhesus macaques *Macaca mulatta* passed by the nest (#16) on 24 August the incubating female puffed up her feathers and stayed absolutely motionless on the nest, relying completely on this defensive gesture and her camouflage. One monkey spotted the bird on the nest (Plate 6), but kept its distance and moved on. On 26 August, after the mother and the hatchlings had left the nest, a troop (presumably the same) of monkeys passed by again. One approached the nest, grabbed one of the two abandoned eggs and dropped it into the water.

When we discovered the first active nest (#8), the adult bird jumped down and landed on the water surface with abrupt and frantic movements, causing water to splash up by flapping the wings. This looked like distraction behaviour with the aim to lure predators from nest and eggs. On another occasion the bird jumped from the nest and disappeared out of sight immediately by diving. The incubating female on nest #16 soon got very used to us and remained on the nest when we entered or left the hide.

### Vocalisations

The female Masked Finfoot uttered a low *ga ga ga gackga gack* call once on 23 August while on the nest. After the chicks had hatched (25 August) the female gave a distinctive *gurr* call while searching for food when close to the nest, recorded seven times within c.90 seconds. A sonogram of the recorded call was computed with the audio spectrum analysis program Spectrogram (Fig. 2).



**Figure 2.** Waveform (amplitude *vs* time, A) and sonogram (frequency *vs* time, B) of the female Masked Finfoot's call near the nest with newly hatched chicks.

Each call lasted about 0.6 sec and consisted of eight notes with durations of 0.03–0.05 sec (pitch 4 kHz, with gap at 2–3.5 kHz). This call is possibly a contact signal between the adult and the chicks.

A loud and shrill alarm call *kui-kui-kui*... was observed on another occasion (not near a nest), possibly comparable to the harsh *keek-keek-keek* described by Khan (2003). The characteristic ‘bubbling’ of the Masked Finfoot, roughly comparable with the sound produced when blowing through a straw into a glass of water, was also heard on several occasions. This comparatively loud call seems to be used for communicating over long distances, because it was not heard in proximity of a nest.

### Distribution

The Sundarbans in the Ganges–Meghna–Brahmaputra delta contain the westernmost known population of Masked Finfoot. Combining all available information, this bird’s distribution appears to be confined to the eastern half of the Bangladesh Sundarbans, encompassing the freshwater and moderately saline zones in the Khulna, Chandpai and Sarankhola ranges. Furthermore, it seems that this shy bird gets accustomed to human presence and it may therefore be more often seen in the eastern areas with high frequencies of visitors, than in the western areas. We noticed, that sightings and approachability of Masked Finfoot rose with increasing tourism along certain favourite boating routes, when silence prevailed (no engine sound, no talking) and boats moved slowly.

We have observed this species in the Sundarbans of Bangladesh all year round, with juveniles recorded repeatedly in the months of September and October. Masked Finfoot does not appear to be migratory in the Sundarbans mangroves, although it has been suggested to be so elsewhere. This generally shy bird hides in dense undergrowth and prefers to search for food at low tide. Its activities are partly nocturnal (Khan 2003) and its presence not always easily detectable.

## DISCUSSION

The breeding period of the Masked Finfoot in the Bangladesh Sundarbans is during monsoon, from late June to September, with hatching peaking sometime between July and August. This finding is based on following information. S. Boyati (verbally 2004) discovered a nest in July 2004, with eggs hatching in early August. Haider (2003) mentioned a nest plundered in the end of July 2003, Khan (2003) in June/July 1999. In this survey (16–22 August 2004) we found one clutch that hatched between 19 and 22 August (unless depredated), one on 25 August, and one that had still not hatched on 26 August. RM found a nest with three eggs on 24 August 2003, with incubation ongoing on 14 September. This nest was found empty on 18 September. This observation means that the incubation time for the Masked Finfoot probably exceeds three weeks. Future nesting surveys in the Sundarbans should cover at least the months July and August, and ideally June to September, to add to our understanding of nest densities, egg-laying and hatching dates, incubation periods, and the role of the sexes in nest construction and incubation.

Available dates of active nests (numbers in brackets) found in other regions are: July (1 nest) from Assam, India (Baker 1919); July (1), September (3), October (12) from Malaysia (Cairns 1963); July (2), August (7) from Myanmar (Hopwood 1921); the latter partly overlap with July (5), August (8) of clutches from Myanmar preserved in the Natural History Museum (Tring, UK; BMNH) labelled with dates between 20 July and 22 August. A comparison indicates a similar breeding season for Myanmar, India and Bangladesh, but there are also records from two months later from Malaysia.

Besides three different nesting tree species found in this survey, S. Boyati (verbally 2004) found a Masked Finfoot nest in a ‘passur’ *Xylocarpus mekongensis* tree in the Bangladesh Sundarbans. The nesting sites described earlier by Baker (1919, 1935) and Hopwood (1921) from Myanmar, and by Cairns (1963) from Malaysia, differ from those in the Sundarbans in occurring in non-mangrove habitat. By comparison with our data, Hopwood (1921) mentioned a minimum distance between two nests of 180 m from the nesting area in Myanmar.

In our survey, in a tidal mangrove swamp, the mean nest height above high water level was 1.8 m, comparable to the range of previous reports in a freshwater environment: Hopwood (1921) found nests from a few inches to nine feet (c.3 m) above water, and Cairns (1963) considered 3–6 feet (c.1–2 m) being normal.

The water depth below all nests recorded was sufficient for the nesting bird to make a diving escape, even during low tide. Hopwood (1921) estimated the depth of water below one nest as 5 feet (c.1.5 m), the water depth in the swamp varying generally from 5 to 15 feet (c.1.5 to 4.5 m), or even more, according to the flood situation. Cairns (1963) mentioned a depth of 6–9 inches (c.15–23 cm).

Besides sticks and twigs as main construction material the nests of the Masked Finfoot are sometimes interwoven with a few long and slim leaves, like leaves of *Phoenix paludosa* and *Asplenium* sp. in the Sundarbans. Similar nest components are mentioned by Hopwood (1921): ‘lined with a few dead leaves’; Baker (1935): ‘lined with grass and reed-bits’; and Cairns (1963): ‘lined with dried bamboo leaves’. These elastic materials presumably improve stability and durability of the nest.

The nests we have found, with a mean depth of 16.3 cm, are considerably shallower than those described in other reports. Hopwood (1921) and Cairns (1963) stated nests from Myanmar and Malaysia to be one foot (c.30 cm) deep.

In this survey, we found clutches of three, four and five eggs. From the Bangladesh Sundarbans others have reported one nest each with clutch sizes of eight (Khan 2003), five (Haider 2003), three (RM pers. obs. 2003) and four (S. Boyati verbally 2004), resulting in an overall mean of  $4.6 \pm 1.7$  eggs per nest (range 3–8, N=7), presuming that all clutches were complete, as human egg thieves would remove all eggs from a nest. However, this is not a safe assumption for all non-human predators. The mean clutch size recorded from Myanmar (Hopwood 1921) was  $4.0 \pm 2.1$  (range 2–7, N=8). The BMNH egg collection from Myanmar (D. G. D. Russell *in litt.* 2006) has  $5.2 \pm 1.1$  eggs per clutch (range 3–7, N=15), including two clutches also described by Hopwood (1921). Five to eight eggs per nest were found by Cairns (1963) in Malaysia. If true, clutches with eight eggs are found rarely,

reported only once from Sundarbans and an unknown number of times from Malaysia.

The appearance of the eggs from Bangladesh fits previous descriptions by Baker (1919), Hopwood (1921), and Cairns (1963), though these authors found in some cases the ground colouration differing from creamy (greenish, yellowish or greyish).

The eggs from Bangladesh with mean length of  $51.2 \pm 2.4$  mm and mean width of  $42.2 \pm 1.0$  mm (N=9) (Table 1) do not differ significantly from the eggs from Myanmar. The mean egg size from Myanmar as derived from the measurements of Hopwood (1921) is  $50.3 \pm 2.0$  mm  $\times$   $43.2 \pm 0.7$  mm (N=27). Baker (1935) calculated an average egg size of  $52.0$  mm  $\times$   $43.7$  mm (N=44) for eggs from Myanmar without listing individual measurements. According to D. G. D. Russell (*in litt.* 2006), Baker's egg set included 14 eggs examined earlier by Hopwood. Cairns (1963) describes the mean dimensions of eggs from Malaysia as c.  $49 \times 41$  mm without giving further details. This suggests that the eggs from Malaysia are the smallest. The largest egg ever recorded ( $56.1 \times 45.8$  mm) came from Myanmar (Baker 1935).

During our survey we found both male and female birds incubating, with the exchange happening at irregular intervals. There have been sightings of both on the same nest at different times, based on direct observation (RM pers. obs. 2003) and information from local people (verbally 2003). Hopwood (1921) mentioned an incubating female; Cairns (1963) said that both sexes incubate. Overall the role of sexes related to nest building, alternations in incubation and to rearing of the young ones remains unclear.

The appearance of the chicks from the Bangladesh Sundarbans match well with the detailed description of Ticehurst (1929), who obtained six freshly hatched chicks from Myanmar. He further noticed in the chicks a large strong bill, a well-marked digital claw as in other rails, a long soft downy tail (unlike in the Rallidae), and the 'finned' feet, but he did not mention a white tip to the bill. The BMNH preserves six chicks, three as skins and three in spirit (R. Prys-Jones *in litt.* 2005).

Several authors mention a breeding plumage, often without describing how to distinguish breeding and non-breeding appearance. Others make it more clear, e.g. Rasmussen and Anderton (2005): 'breeding male has small yellowish "horn" at base of bill'. Baker (1904) was the first to notice the male bird's tiny frontal shield and a yellow horn, or frontal wattle, c. 8 mm long, brilliant chrome yellow like the beak, after obtaining a male and a female specimen from Assam (India) in June 1904. He presumed this to be seasonal, but this appears to be incorrect: we have never observed adult males without this peculiar bill-knob in Bangladesh Sundarbans, in least 40–50 sightings all year round during almost 20 years.

## THREATS

Unfortunately, the Masked Finfoot is famous for its good flavour. Hume and Davison (1878, p. 465) stated: 'The flesh is delicious, dark coloured but very juicy and highly flavoured. If it could be tamed it would form an invaluable addition to European poultry yards'. Masked Finfoot is threatened by habitat destruction and hunting for human consumption all over its range (BirdLife International

2001). The incubating bird often remains firmly seated when predators approach. This behaviour makes it an easy catch for passing humans on boats. The bird is simply grabbed; no gun or trap is required, just the experience to spot a nest. Therefore the Masked Finfoot is most threatened during the nesting season. Only a few cases of poaching ever become public. Khan (2003) reported that a man had collected eight eggs from Bangladesh Sundarbans. Haider (2003) was told that employees of a forest station in the Bangladesh Sundarbans-East Sanctuary had discovered a nest, caught and eaten the adult bird along with five eggs. Conservation and awareness campaigns and encouragement of law enforcement are required to reduce poaching all over the range.

More research on the biology and ecology of these attractive, but threatened birds is urgently needed. We strongly recommend the Sundarbans in Bangladesh for further studies.

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