a second breeding area for the peninsula, containing up to 100 pairs. Of 42 nests actually checked, three were in rice and the remainder in scrub and reeds lining ditches and bunds (raised banks) between fields (nests in rice were located by walking through the crops flushing sitting adults).

The first nests were found in late April, and contained eggs and small chicks. A visit to the area in June produced four new colonies within a half-mile radius of the first, with between them more than 10 breeding pairs (colonies were regarded as distinct when a distance of over 200 m lay between the nearest nests of respective groupings). In early July an isolated colony of twelve nests was found in a previously unstudied area of the same ricefield system. One nest held an incomplete clutch, one held a complete clutch and five held unfledged young at different stages of development; the remaining five were not approached too closely, owing to the risk of disturbance causing desertion.

In late June 1986, as a result of an increase in the number of records of summering Yellow Bitterns in Singapore, I paid a visit to a potential breeding site there, the Kranji Reservoir, where I saw more than 20 birds, many of which were immatures, and found a nest of the species.

For many years in Borneo there have been suggestions that a breeding population of Yellow Bitterns exists (Smythies 1981); for Sabah such speculation was founded on a sighting of an immature bird near Kota Kinabalu and two records of adults at Kota Belud in July (Smythies 1981). Holmes and Burton (1987) suggest the presence of a resident population in Kalimantan, although there has as yet been no proof of breeding. In September 1986, during fieldwork in the Kota Belud Bird Sanctuary, Sabah, I observed a flightless juvenile Yellow Bittern begging from an adult. The juvenile was subsequently caught and examined, and had not yet grown fully formed flight feathers.

Given this proof of breeding in Borneo, where long suspected, the suggestion by Uttley (1987) that a resident population exists in Sulawesi may yet prove to be correct. However, it remains debatable whether the new records presented here indicate a range expansion by the Yellow Bittern itself or merely confirmation of its long-term presence as a breeding bird in the areas covered.

During the fieldwork relevant to this paper, the author was working for Interwader, which I would like to thank for its support.

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R. V. Lansdown, 10 Havergal Close, Caswell, Swansea, West Glamorgan SA3 4RL, U.K.

Notes on the feeding behaviour of the Milky Stork *Mycteria cinerea*

C. SWENNEN and E. C. L. MARTEIJN

As part of the Interwader East Asia/Pacific Shorebird Study Programme in 1984, we studied the foraging behaviour and prey selection of birds living on intertidal flats around the Malay Peninsula. The opportunity arose to observe a Milky Stork *Mycteria cinerea* for one hour at close range with the help of a 40 × 60 telescope from a hide. Little has been published on the behaviour of this large bird, which at present is scarce and may be in danger of extinction in Malaysia, and indeed is currently regarded as globally threatened (King 1978–1979). The following observations may, therefore, be of interest.

Our bird was discovered on an intertidal mudflat near Sungai Burung, Perak State, peninsular Malaysia, about one hour after low tide on 9 October 1984. According to local fishermen, Milky Storks were regularly to be seen foraging on the flats in that area, which is only 20 km north of the Pulau Kelumpang Forest Reserve, the main roost site for Milky Storks where we had counted 101 birds a few days earlier (see Plate 1; also Plate 2). The white head feathers, yellow-orange bill and pink legs indicated that our bird was an adult. It was foraging at a distance of about 25–100 m in front of the mangrove. It avoided coming nearer to the vegetation and spent its time walking through the large pools on the flat or visiting the water's edge.

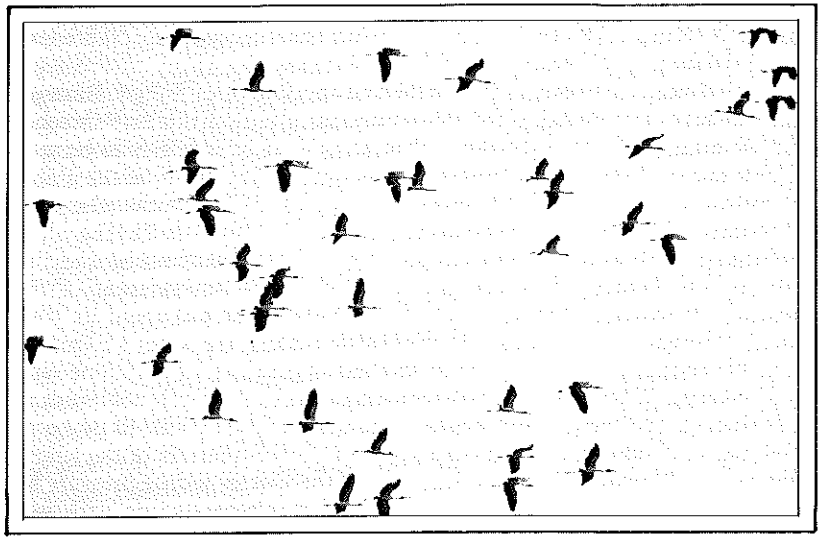
The flat consisted of very soft mud and was impassable for man (one sank in waist-deep). When walking, the very long tarsi of the stork only sank in about 6 cm (a quarter of their length), but when standing still to probe or preen, the tarsi sank in about 15–20 cm (about three-quarters of the length of the tarsus). Probably the thick, long toes of the species reduce pressure by increasing the surface area of the feet and hence help it cope with soft substrates.

Detailed observations on the foraging behaviour could only be made for 39 minutes. For the remaining 21 minutes the bird rested, preened or was alert because of people within sight. While feeding, the bird walked or waded through the mud with great deliberation, making 6 to 60 steps per minute (mean of 22.5 ± 16.3 steps per minute). This number appeared to be strongly negatively correlated with the number and duration of probes.

Three feeding methods were observed in this individual, two of them tactile (probing in mud, groping in shallow water), the third being direct visual searching. On the mudflat the stork searched for large, water-filled holes in the mud. It probed in and around these holes with the mandibles open about 6 cm wide at the tip. The slightly curved mandibles were inserted and partly withdrawn a number of times over 5 to 32 seconds (mean 16.5 ± 8.7 seconds) per hole. Most probings were to a depth of 15 to 18 cm (three-quarters the bill length), but occasionally went up to the full length of the bill (about 23 cm) and even up to the eyes. Before a prey was captured, the bill was always inserted to its full length. Occasionally, starting from a hole, the bill was inserted from half to three-quarters of its length and ploughed through the mud in a straight line for about one metre ahead creating a runnel in the soft mud.

Only one fish was clearly located by sight, as after a short rest the bird suddenly flew about 5 m, alighted, and immediately caught a fish without probing deeply. All other fish were caught by probing in and around deep

Plate 1. A group of Milky Storks *Mycteria cinerea* flying to rest in the Pulau Kelumpang Forest Reserve, October 1984. (Photo: C. Swennen and E. C. L. Marteijn)

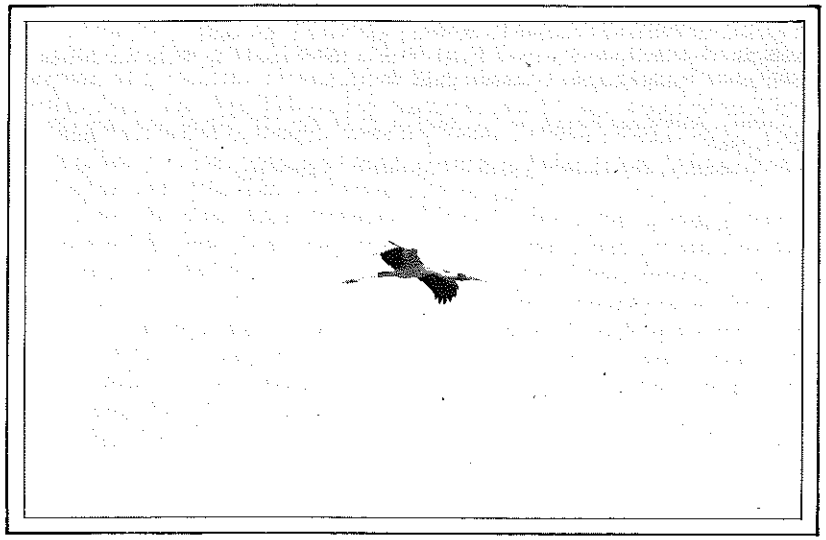


holes in the mud. The bird probed in 2.3 ± 0.7 different spots per minute and on average caught one prey every four minutes. The prey was pulled out of the mud and swallowed with a few catch-and-throw movements. All prey were rather large mudskippers Gobiidae. The length of the fish could be estimated in relation to the length of the bill (± 23 cm): 2 × 10–14 cm, 3 × 14–18 cm, 2 × 18–22 cm, 1 × 23 cm. After catching a fish, greyish mud usually stuck to the whole bill, which was then cleaned by moving up and down in a water-filled hole, while rapidly opening and closing the mandibles. After a few seconds the bill came out bright orange-yellow again. When a large fish was swallowed, the bird rested for 20 to 58 seconds before starting to forage again.

At a great distance we saw other Milky Storks feeding on a mudflat whilst standing and slowly walking up to their belly in the extremely turbid rising water. The birds were holding their bills in front of their bodies in the water for long periods. The distance was too great to study their behaviour and its success in any detail. This behaviour was similar to the 'groping' feeding of storks described by Kahl (1964) as the main feeding strategy for the closely related Wood Stork *Mycteria americana*. Kahl does not record the latter species as probing in sediments.

The only other ciconiiform birds seen feeding in the area were Little Heron *Butorides striatus* and Little Egret *Egretta garzetta*. Both species were feeding by standing motionless and waiting until a fish was seen nearby,

Plate 2. Adult Milky Stork soaring over Kuala Gula, October 1984. (Photo: C. Swennen and E. C. L. Marteijn)



contrasting with the tactile feeding of 'our' slowly-walking Milky Stork.

Discussion

For the Milky Stork observed, foraging on an exposed flat, the estimated wet weight of the fish eaten in 39 minutes was 225 g (estimated by comparison with weights of fishes of similar length). In the Wood Stork, Kahl (1964) found the daily intake of fish for birds in captivity was up to 16% of the body weight, and estimated the intake of wild Wood Storks at 21% of their body weight. As the estimated weight of a Milky Stork is about 3 kg, one may expect a daily intake of 630 g of fish. This means that a Milky Stork may be able to capture its daily ration in only about two hours of intensive feeding. Feeding on exposed flats depends on the tides, but on most days ebb tide is low enough to be used by the birds in this way.

Vast mudflats teeming with mudskippers occur along the west coast of the Malay Peninsula. Therefore it seems that the decline of the breeding population of the Milky Stork in Malaysia, of which only 115 individuals are left (Parish 1984), cannot be caused by lack of food or of potential feeding grounds.

Thanks are due to the Director General and Staff of the Malaysian National Parks and Wildlife Department for providing logistical support and advice during our stay at the Kuala Gula Ranger Post of the Matang Forest Reserve in Perak.

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C. Swennen, Netherlands Institute for Sea Research, P. O. Box 59, 1790 AB Den Burg (Texel), Netherlands.

E. C. L. Marteijn, Oranjestraat 11, 4515 CA Ijzendijke, Netherlands.

Collapse of a nest tree used by Finch-billed Mynas *Scissirostrum dubium* in North Sulawesi

GARY J. WILES and YUNUS MASALA

Finch-billed Mynas *Scissirostrum dubium* are endemic to Sulawesi (formerly known as Celebes) and several smaller neighbouring islands in Indonesia (White and Bruce 1986). The species is highly gregarious, and during a visit to Tangkoko-Batuangus Nature Reserve (1°32'N 125°13'E), North Sulawesi, we commonly observed it foraging in the canopy of lowland forest in noisy flocks of up to 50 or more birds. These mynas nest colonially in the trunks of dead trees (Stresemann 1940, Watling 1983, White and Bruce 1986) and colonies may contain hundreds of pairs of birds (Stresemann 1940). It is believed that the heavy, pointed bill of this species is an adaptation for excavating nest holes (White and Bruce 1986).

On 13 May 1987, while walking through the reserve in lowland forest approximately 1 km from the sea coast, we discovered a large, recently fallen tree used by a colony of Finch-billed Mynas for nesting. The carcasses of 15 to 20 nestlings were visible on the ground next to the tree and additional searching revealed more young buried beneath broken wood debris or inside partially intact nest cavities. A total of 82 nestlings and one adult were eventually collected but more birds were undoubtedly present. No eggs were found. All but two of the birds were dead, with both of the surviving young still chirping weakly. Nearly all of the nestlings were similar in size and extent of feather development. Most were 8–10 cm long with pinfeathers present on the wings, tail and head. These birds were estimated to be about seven days old. Reddish rump feathers, which are a characteristic of subadult and adult plumages, were beginning to show on some of the birds. Two smaller young were also found, these being about 5 cm long and naked and estimated to be less than three days of age.

The nest tree was approximately 36 m tall with its top having previously broken off. It possessed large buttresses that were about 5 m tall and had a straight trunk with a diameter of 1 m at the tops of the buttresses. Several hundred nest cavities occurred in the upper 14 m of the snag, with the lowest cavity being approximately 22 m above the ground. Bole diameter in this section of the tree was about 0.6 m. Nest cavities were densely concentrated on all sides of the trunk. The entrance holes of most cavities were approximately 40 mm in diameter and cavity depths varied through 25–30 cm. Cavities were teardrop-shaped and angled downward at 30–60°.

Because two of the young mynas were found alive, it seems likely that the nest tree had fallen sometime during the previous 24 hours. No strong winds were noted on the previous day and the tree had probably toppled under its