

Among the large storks that nest singly, the maximum number of fledglings recorded is three, with one exceptional record of a Jabiru *Jabiru mycteria* nest with five chicks fledging (Thomas 1981) and one record of four Black-necked Stork chicks fledging in Australia, where the species has been well studied (D. Richards *in litt.* 2006). There are no records of four Black-necked Stork chicks fledging from a single nest in South-East Asia, where the species is sparsely but widely distributed (J. Barzen, T. Clements, W. Duckworth, T. Evans and R. Timmins *in litt.* 2005).

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K. S. Gopi Sundar, *Indian Cranes and Wetlands Working Group, c/o International Crane Foundation, E-11376, Shady Lane Road, Baraboo, WI-53913, U.S.A. and c/o Wildlife Protection Society of India, S-25, Panchsheel Park, New Delhi 110 017, India. Email: gopi@savingcranes.org*

Arpit Deomurari, 'AVANI', Anand Colony, Rd. no. 1, Nr. 'Gurukrupa', Vikasgruh Road, Jamnagar 361 008, Gujarat, India.

Yashodan Bhatia, c/o. Bhatia Stores, Nr Teen Batti, Jamnagar 361 008, Gujarat, India.

S. Prasanth Narayanan, Salim Ali Centre for Ornithology and Natural History, Anaikatty Post, Coimbatore 641 108, Tamil Nadu, India.

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A recent record of Storm's Stork *Ciconia stormi* in Thailand

PETER CUTTER, PASSANAN BOONTUA and KRIANGSAK SRI-BUAROD

Storm's Stork *Ciconia stormi* is one of the rarest species of storks in the world and very little is known of its natural history (Luthin 1987, BirdLife International 2001, Wetlands International 2006). The species is classified as Endangered due to its small (250–500 individuals) and rapidly declining population, caused primarily by the destruction or conversion of its preferred lowland evergreen forest habitat (BirdLife International 2001, Wetlands International 2006).

In this note we report the first sighting of this species in Thailand for 18 years. The observation was made on 3 April 2004 by an infrared camera trap device (placed at c. 100 m above sea level at c. 9°10'N 98°40'E) within Klong Saeng Wildlife Sanctuary in Surat Thani province.

Most observations of the species come from Borneo where individuals and small groups have been sighted alongside rivers in forested areas, but it also occurs in peninsular Malaysia and Sumatra (Luthin 1987, BirdLife

International 2001). There is only one previous record from Thailand, where a nesting pair with chicks was observed in detail in a lowland evergreen forest area (at c. 9°05'N 98°30'E, 69 m) during September/October 1986 (Nakhasathien 1987). Recent range-wide assessments have suggested that the species is probably extinct in Thailand (BirdLife International 2001, Bird Conservation Society of Thailand 2004).

METHODS

The record was made during a camera-trap survey for fishing cat *Prionailurus viverrinus* in a remote area of Surat Thani province in southern Thailand. The survey used six passive infrared-triggered camera traps which were rotated among several evergreen forest sites along the banks of smaller streams and lakes surrounding the



Plate 1. Storm's Stork *Ciconia stormi* recorded on 3 April 2004 at Klong Saeng Wildlife Sanctuary in Surat Thani province, Thailand.

Ratchaprapa (formerly Chiew Larn) Reservoir in Khlong Saeng Wildlife Sanctuary. The survey resulted in a total of 528 camera trap-days during January–April 2004 (see Boontua 2004 for further details).

Created in 1987–1988, the Ratchaprapa Reservoir flooded an area of approximately 165 km² of what, at the time, was one of South-East Asia's most pristine lowland evergreen forest areas and the only extensive lowland valley-bottom protected forest habitat in peninsular Thailand (Nakhasathien 1987). The extensive reservoir now falls within the boundaries of Klong Saeng Wildlife Sanctuary and Khao Sok National Park—both part of the c.4,285 km² Khao Sok protected area cluster, spanning Surat Thani, Chumphon, Phangnga, and Ranong provinces, Southern Thailand.

OBSERVATIONS

One camera, active at a single site for a period of 24 days, recorded four pictures of at least two Storm's Storks on 3 April 2004 (Plate 1). The camera was set in a relatively open area along a seasonal stream draining into the large Khlong Ya branch of the Chiew Larn Reservoir. One individual was photographed in a wing-droop spread-wing position (see Kahl 1971 for nomenclature). Photographed birds were standing on the pebbly part of the river out of the water.

DISCUSSION

The single detection despite the high intensity of sampling in potential habitat underscores the rarity of Storm's Storks in the region. Although the species has also recently been detected in the Thanintharyi division of Myanmar (J. Eames *in litt.* 2006), the prospect of finding this species elsewhere in Thailand is highly unlikely given that there is almost certainly no other remaining site in the country that holds sufficient lowland forest habitat to support this species. This record thus highlights the great conservation

significance of the Khao Sok–Klong Saeng Forest Complex.

Throughout the entire Sunda subregion, lowland valley bottom forests are being converted at an escalating rate, threatening this stork and other species dependent on this habitat. Other globally threatened species that occur within the Klong Saeng–Khao Sok forest complex include birds such as Masked Finfoot *Heliopais personata*, Wallace's Hawk Eagle *Spizaetus nanus* and Blue-banded Kingfisher *Alcedo euryzona*, and mammals such as tiger *Panthera tigris*, Malayan tapir *Tapirus indicus*, and Asian elephant *Elephas maximus*.

The photographs document an open-winged posture which has not been described previously for this species (Kahl 1971). This reflects one of the benefits of remote camera-traps that can capture behaviour that might otherwise be difficult to observe.

Specific threats to the site of this observation (and indeed to much of the entire Klong Saeng–Khao Sok forest complex) include illegal hunting, trapping and fishing, collection of non-timber forest products, and dramatic changes in vegetation structure brought about by the construction of the reservoir as well as the sometimes large water level fluctuations that occur at the margin of the reservoir and the surrounding forest (Nakhasathien 1987, 1989). These patterns have likely increased since the dam was built as the reservoir provides easy access to remote areas. Overall human traffic continues to increase due in part to the construction of numerous floating tourism bases. Additionally, there are now plans for a road through the northern region of the complex (Bangkok Post 2006).

Given that this record opens the possibility that a small breeding population is still present at this locality, targeted survey efforts for the species and nest sites should be a priority, and special protection measures should be implemented at any confirmed nest sites. More generally, increased protection and monitoring efforts are needed to conserve the natural communities of the Klong Saeng–Khao Sok Forest Complex as a whole, especially the extremely limited lower evergreen areas around the Chiew Larn Reservoir. Designation of the area as one of Thailand's Important Bird Areas should also be considered in light of this highly significant record and the other globally threatened birds that occur at the site.

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Peter Cutter, University of Minnesota Conservation Biology Graduate Program, 200 Hodson Hall, 1980 Folwell Avenue, St. Paul, MN 55108. Email: peter@conservationasia.org
 Passanan Boontua, 77/24 Moo 1, Preuksagan 1, Lad Yah Road, Kanjanaburi 71000, Thailand. Email: namfon@conservationasia.org
 Kriangsak Sri-buarod, Klong Saeng Research Center, Klongsaeng Wildlife Sanctuary, Surat-thani 82150, Thailand.

Observations of unusual clutch size, re-nesting and egg concealment by Sarus Cranes *Grus antigone* in Gujarat, India

KANDARP KATHJU

Detailed studies on the nesting behaviour of Sarus Cranes *Grus antigone* are few. Two notable exceptions are a study in Gujarat (Mukherjee 1999) and another in Uttar Pradesh (Sundar and Choudhury 2003, 2005), both in India. Here I detail observations of a nest with an unusually large clutch size, and of re-nesting and apparent egg concealment by Sarus Cranes in Gujarat.

STUDY AREA AND METHODS

Observations on breeding pairs of Sarus Cranes were carried out in Sanand, Kalol and Kadi sub-districts of Ahmedabad, Gandhinagar and Mahesana districts (23°N 73°E), Gujarat state, India during 1998–2005. The study area was c.40 km north-west of Ahmedabad city; most of it was accessible by road or dirt tracks, and the area contained >25 villages.

Sarus Cranes used flooded rice paddies and monsoon-fed ponds and marshes in the area, and bred only during the rainy season (July–October). Birds were not individually marked, but breeding crane pairs could be distinguished by their territorial behaviour, and appeared to be faithful to nesting sites each year, as is consistent with Sarus Crane behaviour elsewhere (K.S.G. Sundar *in litt.* 2006). Sexes were differentiated by size (males being larger) following Sundar and Choudhury (2003). Observations of breeding pairs were made during periodic visits to nesting sites (mostly on foot). Selected nests were observed twice a week and in some cases daily during egg-laying and incubation. Local farmers at several nest sites were asked not to disturb nesting birds.

RESULTS

Clutch size

One nest in 2005 near Thol village had a clutch size of three eggs. The third egg was laid on 8 August, six days after the second: it was distinguished by its strikingly fresh, chalky white appearance that contrasted markedly with the dirtier hues of the first two eggs. It remained light-coloured until the end of incubation. One of the first two eggs hatched on 4 September followed by the third-laid egg on 6 September. On 8 September, the adults and the two chicks were seen foraging together away from the nest, leaving the remaining egg unattended. Close inspection of the unhatched egg on 11 September showed that it was addled; it cracked when handled, spilling the stinking fluid contents.

Distraction and egg-concealment behaviour

I approached the nest with three eggs 11 times during incubation. On each occasion, the incubating adult gave a display apparently to lure me away from the nest. This consisted of the bird pacing agitatedly in a semi-crouching gait, followed by opening and drooping a wing and then plucking vegetation and tossing it around. On three occasions, the incubating bird then returned to the nest and appeared to attempt to conceal the eggs by pulling out vegetation from the edge of the nest and placing it over the eggs in the centre (Plate 1). They did this when I was 15–20 m from the nest. The bird resumed incubation once I was out of sight.

Renesting

At least 15 of 73 nests (21%) monitored during 2002–