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

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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–

2005 were second nests during the same season by the pairs involved. In most cases, the first nests had been destroyed by flooding, with three nests abandoned owing to human disturbance. Exceptionally, a resident pair at Nandoli village was observed nesting three times during the 2005 breeding season, with two-egg clutches each time. The pair re-used a 2004 nest site, and laid its first clutch on c.29 July 2005. Heavy rains in the second week of August washed away the nest and eggs. The pair built a new nest c.15–20 m away on a dyke between two paddyfields, and laid a second clutch on c.20 August. This clutch was accidentally destroyed by a farmer. A third nest was then built 70 m from the second in a flooded fallow field, and the female had laid two more eggs by 26 August. One egg hatched on 29 September and the chick fledged successfully, while the fate of the second egg remained unknown.

DISCUSSION

Clutch size

The most frequent clutch size of Sarus Cranes is two, with one-egg clutches also known (Meine and Archibald 1996). Three-egg clutches have been recorded in Keoladeo–Ghana National Park, Rajasthan (Walkinshaw 1973), and suspected in Gujarat (Mukherjee 1999), and one nest with four eggs was recorded in Etawah–Mainpuri districts, Uttar Pradesh (Sundar and Choudhury 2005). In the case of the three-egg clutch I recorded, it is unlikely that the additional egg was laid by an intruding bird parasitising the nest: no other individual was seen during my visits, Sarus Cranes are highly territorial, and nest parasitism has not been documented for any crane species.

Although the third egg was laid six days after the second, it hatched just two days after the first chick

emerged. However, this is within the variation known for the species: intervals of 1–8 days between egg-laying, and incubation periods of 26–35 days have been recorded (K. S. G. Sundar *in litt.* 2006).

Sarus Cranes do not usually eject addled eggs, and may continue to incubate them for over 40 days (Sundar and Choudhury 2003). In the nest I observed, it is likely that the unhatched egg was abandoned soon after the two chicks had hatched: they were seen with the adults c.40 m from the nest two days after the second egg had hatched.

Egg-concealment behaviour

Neither wild nor captive cranes have been previously recorded concealing eggs from potential predators (Ellis *et al.* 1996, Meine and Archibald 1996), although such behaviour is known in other species e.g. grebes, tinamous, Least Seedsnipe *Thinocorus rumicivorus*, White-fronted Plover *Charadrius marginatus*, Common Eider *Somateria mollissima*, etc. (Welty and Baptista 1988). In my observation of Sarus Crane, it is unlikely that vegetation was used to keep the eggs warm (a conceivable alternative explanation) since the behaviour was only seen in response to the approach of humans to the nest. The principal cause of loss of eggs in previous studies of Sarus Crane is known to be humans (Mukherjee 1999). However, in my study area, flooding was the most important cause of egg loss with only three instances (4.1% of 73 nests) of humans taking or destroying the eggs. Egg-concealment behaviour might therefore be expected (and perhaps more frequently) in other populations of Sarus Crane that suffer higher egg-losses to predators.

Renesting

Although renesting is known to occur in most crane species (Meine and Archibald 1996), and in Sarus Cranes in Gujarat (Mukherjee 1999), there are very few detailed records. Producing three clutches in a season has rarely



Plate 1a and b. Sarus Crane *Grus antigone* placing vegetation over its eggs to conceal them, September 2005, Thol village, Gujarat, India.

been documented (K. S. G. Sundar *in litt.* 2006). The case I observed was probably facilitated by the destruction of the second clutch early in incubation, and the heavier than normal rains in September 2005 that gave the pair sufficient time to nest for a third time. In captivity, cranes can be induced to lay up to eleven clutches in a row by removing eggs from the nest (Ellis *et al.* 1996). Cranes have been documented to re-nest only if the eggs or nest are lost, but there have been no records of successful re-nesting once the eggs have hatched.

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Greater Spotted Eagles *Aquila clanga* in central Thailand

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Greater Spotted Eagle *Aquila clanga* breeds from eastern Europe to China, and winters from Europe, central and east Africa, across the Middle East to Japan and south to Malaysia and Sumatra in Indonesia. It typically breeds in lowland forests near wetlands. On migration and in winter it occurs in a wide variety of lowland open habitats, particularly wetlands. The global population has been estimated at no more than 10,000 birds and is thought to be declining mainly as a result of habitat destruction, disturbance and hunting, so that the species is classified as Vulnerable (BirdLife International 2001, Meyburg *et al.* 2001). Within Thailand it is an annual winter visitor and passage migrant between October and April.

The wintering population in Thailand has been estimated at 10–100 birds, occurring primarily in the lower central plains (BirdLife International 2001), although the actual numbers observed in recent years prior to 2003 have been in single figures (e.g. Round and Jukmongkol 2001–2002). Since 2003, there has been a significant rise in numbers recorded in central Thailand as a result of fieldwork that has led to greater awareness of habitat preferences and roosting behaviour. I present here information on Greater Spotted Eagle in Thailand based mainly on observations I made in 2003–2004.

METHODS

I made field observations of Greater Spotted Eagles in central Thailand during November 2003–March 2004,

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spending 26 days looking for the species in the lower and upper central plains and in the northern part of the peninsula (Fig. 1), covering the provinces of Phetchaburi, Chachoengsao, Prachinburi, Nakhon Sawan, Ayutthaya, Chainat, Lopburi, Saraburi and Prachuap Khiri Khan. A vehicle was used to cover large areas and locate potentially suitable sites, which were then searched using minor roads and tracks, with frequent stops to scan the sky, trees and ground. At the most-visited location (Khao Yoi), photographs of individuals helped to estimate the minimum number of birds using the site. Elsewhere, notes on plumage differences between individual birds also helped to estimate the minimum number of birds using a single site. When possible, individuals were aged using criteria in Forsman (1999). Notes were taken of any crops being grown at the time of each visit, including in areas not holding Greater Spotted Eagles. A one-day follow-up visit to Phanom Sarakham–Sri Mahosot was made in December 2005.

RESULTS

During November 2003–March 2004, Greater Spotted Eagles were found at six sites (Table 1). There were 117 sightings, but the actual number of individuals was likely much lower than this figure.

Habitat preferences

Greater Spotted Eagles wintered in large expanses of rice fields, which they occupied from harvest time to the