

## Instances of successful raising of three chicks by Sarus Crane *Grus antigone* pairs

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Successful breeding pairs of cranes in the genus *Grus* characteristically raise one or two chicks each season, since their clutch size is generally one or two eggs. Very few nests have three or four eggs (Walkinshaw 1973, Johnsgard 1983, Littlefield 1995, Allan 1996, Meine and Archibald 1996). Studies on the breeding biology of Sarus Cranes *Grus antigone* in India have shown that this species rarely has clutch sizes of three (Walkinshaw 1973, K. Kathju *in litt.* 2006) or four (Sundar and Choudhury 2005), and breeding pairs characteristically raise one or two chicks each year (Sundar and Choudhury 2003). Here I describe two instances of pairs fledging three chicks successfully.

### OBSERVATIONS

On 12 December 1998, I observed a Sarus Crane pair in its breeding territory foraging with three immatures near Bhartana town, Etawah district, Uttar Pradesh (Plate 1). All three chicks were sufficiently old that they had clearly hatched in the 1997 nesting season (usually July–October in the region). This region has a large population of breeding Sarus Cranes that defend discrete, perennial territories and engage in regular antagonistic displays with neighbouring pairs. Detailed observations on families with colour-banded young during 1998–2002 showed that pairs are aggressive to chicks that are present in neighbouring territories, and adults generally remain near young birds. The family with three chicks observed were not near wetlands that held congregations of non-breeding adults.

On 26 January 2006, I observed another pair with three newly fledged chicks in Kheda district, Gujarat (Plate 2). The three chicks were foraging together. The juveniles

were sufficiently young that they had clearly hatched in the 2005 nesting season (usually July–October in this region). There have been no studies in this region involving colour-banded birds, although it is known that breeding pairs maintain territories that are abandoned during the dry season when birds congregate at reservoirs (Mukherjee 1999, K. Kathju *in litt.* 2006).

### DISCUSSION

Observations of pairs with three chicks of apparently similar age have been made in breeding pairs and migrating flocks of Sandhill Cranes *G. canadensis* (Drewien *et al.* 1995, Nesbitt *et al.* 2001), and in migrating flocks of Sarus Cranes in Cambodia (G. W. Archibald verbally 2006). In addition, observations of Sandhill Cranes with chicks of clearly different ages in their territories have also been made in Wisconsin (J. Barzen and M. Hayes *in litt.* 2006).

Three hypotheses have been offered to explain this phenomenon: (1) the three chicks were siblings raised by the same pair; (2) one or two chicks were 'adopted'; or (3) one or two chicks joined a different family after being separated from their parents. In the observation of Sandhill Cranes by Nesbitt *et al.* (2001) and the present observations, the three chicks in both instances were in their natal territories and of similar ages, suggesting that the first explanation is most likely.

Three-egg clutches in Sarus Crane nests have been observed in Rajasthan (Walkinshaw 1973) and Gujarat (Kathju submitted). Only one nest with four eggs is known from Uttar Pradesh (Sundar and Choudhury 2005). In the observations in Gujarat and Uttar Pradesh, the adults abandoned additional eggs after the hatching of two chicks,



**Plate 1.** Sarus Crane pair (foreground and far right) with three immatures, 12 December 1998, Etawah, Uttar Pradesh, India.



**Plate 2.** Sarus Crane pair (preening on the left) with three newly fledged chicks, 26 January 2006, Kheda district, Gujarat, India.

even though the additional egg was fertile in one case (Sundar and Choudhury 2005, Kathju in prep.). In Sarus Crane pairs that successfully raise two chicks, the adult birds usually forage with one chick each (personal observations) suggesting that three chicks might be difficult to raise. Observations on foraging by the three-chick families would be interesting, but were not possible during these two observations. Additionally, space-utilisation models show that clutches of 1–2 eggs appear to be optimal for cranes to incubate (see Sundar and Choudhury 2005), suggesting that three- or four-egg clutches, and hence occurrences of crane pairs raising more than two chicks, will be very rare.

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## Some significant bird records from the Cardamom Mountains, Cambodia, including the first recent record of Silver Oriole *Oriolus mellianus*

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The Cardamom Mountains of south-west Cambodia have been the subject of significant international attention in recent years. The 401,000 ha Central Cardamom Protected Forest (CCPF) was declared in July 2002. The flanking 334,000 ha Phnom Samkos and 254,000 ha Phnom Aural Wildlife Sanctuaries have been proposed for the Cambodian government's list of tentative World Heritage Sites, and the combined area covers three Important Bird Areas (Seng Kim Hout *et al.* 2003). In 2004, the Forestry Administration created the 145,000 ha Southern Cardamom Protected Forest, almost connecting the CCPF to the 170,000 ha Botum Sakor National Park, to form a near-contiguous 1.3 million ha corridor.

The status and distribution of Cambodia's avifauna is better known than that of any other faunal group, and is

### REFERENCES

- Allan, D. G. (1996) A review of the biology and conservation status of cranes. Pp. 13–51 in R. D. Beilfuss, W. R. Tarboton and N. N. Gichuki, eds. *Proceedings 1993 African Crane and Wetland Training Workshop*. Baraboo, Wisconsin, U.S.A.: International Crane Foundation.
- Drewien, R. C., Brown, W. B. and Kendall, W. L. (1995) Recruitment in Rocky Mountain greater sandhill cranes and comparison with other crane populations. *J. Wildl. Manage.* 59: 339–356.
- Johnsgard, P. A. (1983) *Cranes of the world*. Indiana, U.S.A.: Indiana University Press.
- Kathju, K. (in prep.) Observations of unusual clutch size, reneating and egg concealment by Sarus Cranes *Grus antigone* in Gujarat.
- Littlefield, C. D. (1995) Demographics of a declining flock of greater sandhill cranes in Oregon. *Wilson Bull.* 107: 667–674.
- Meine, C. D. and Archibald, G. W. (1996) *Cranes: status survey and conservation action plan*. Gland, Switzerland and Cambridge, U.K.: IUCN.
- Mukherjee, A. (1999) Ecological study on the Sarus Crane *Grus antigone* in Gujarat state. PhD thesis submitted to Saurashtra University, Rajkot, Gujarat, India.
- Nesbitt, S. A., Folk, M. J., Schwikert, S. T. and Schmidt, J. A. (2001) Aspects of reproduction and pair bonds in Florida sandhill cranes. *Proc. North Am. Crane Workshop* 8: 31–35.
- Sundar, K. S. G. and Choudhury, B. C. (2003) The Indian Sarus Crane *Grus a. antigone*: a literature review. *J. Ecol. Soc.* 16: 16–41.
- Sundar, K. S. G. and Choudhury, B. C. (2005) Effect of incubating adult sex and clutch size on egg orientation in Sarus Cranes *Grus antigone*. *Forktail* 21: 179–181.
- Walkinshaw, L. H. 1973. *Cranes of the world*. New York, U.S.A.: Winchester Press.

now well enough understood to set conservation priorities with confidence (Seng Kim Hout *et al.* 2003, Thomas and Poole 2003). However, most biological surveys in the south-west of the country have taken place either in the heights of the Cardamom Mountains (e.g., Eames *et al.* 2002) or at low elevations to their south-east (Net Neath and Tan Setha 2001, Kong Kim Sreng and Tan Setha 2002). The southern foothills of the Cardamom Mountains have thus been poorly surveyed.

As part of an effort to fill in this knowledge gap, from 12 to 18 December 2002 a team of six field scientists, of which the two authors formed the ornithological component, conducted preliminary surveys south of the Central Cardamom Protected Forest in conjunction with the Department of Forest and Wildlife. We report here on significant bird records from these surveys.