

## EGG LOSSES IN COMMUNAL NESTS OF THE GUIRA CUCKOO

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**Abstract.**—Communally nesting Guira Cuckoos (*Guira guira*) occur in permanent groups of up to 18 individuals, suggesting a potential for strong competition among breeding adults. The pattern of egg losses observed at three nests in Brasília, Brazil, is consistent with the hypothesis that breeding spaces are limited and group members compete for space in the nest. Marked eggs disappeared from nests and were found, sometimes intact, under the nest. During laying, partial clutches were buried by additions to the nest lining. The first eggs in the clutch were the most susceptible to disappearance or burial. These results indicate that the Guira Cuckoo has reproductive strategies similar to other species in the subfamily Crotophaginae.

### **PÉRDIDA DE HUEVOS EN NIDOS COMUNALES DE GÜIRA GÜIRA**

**Sinopsis.**—El cuco güira (*Guira guira*) anida comunalmente en grupos permanentes que alcanzan los 18 individuos, lo que sugiere un gran potencial de competencia entre los adultos que se reproducen. El patrón de pérdida de huevos observado en tres nidos estudiados en Brasília, Brasil, es consistente con la hipótesis de que los espacios para reproducirse están limitados y que los miembros del grupo compiten por espacio en el nido. Huevos que fueron marcados desaparecieron del nido y luego fueron encontrados, a veces intactos, bajo el nido. Durante la época de puesta, parte de camadas fueron enterradas al añadirse al nido nuevo material de construcción. Los primeros huevos en la camada resultaron ser los más susceptibles a desaparecer o ser enterrados. Estos resultados indican que el cuco güira tiene una estrategia reproductiva similar a otras especies de las subfamilia Crotophaginae.

The anis (subfamily Crotophaginae, Cuculidae) have a communal breeding system where several females lay eggs in the same nest (Wilson 1975:450-451). Competition among females for breeding space has been documented for two of the four species in the subfamily. In this paper we present indirect evidence for such competition in a third species, the Guira Cuckoo (*Guira guira*). Anis are widely distributed throughout South and Central America and occur as far north as Florida (de Schauensee 1970). Studies of the Groove-billed Ani (*Crotophaga sulcirostris*) and the Smooth-billed Ani (*Crotophaga ani*) produced evidence of egg destruction by birds of the breeding group (Loflin 1983, Vehrencamp 1976). In Groove-billed Anis, egg-tossing was performed by breeding females, and attributed to competition among them for the limited space in the nest (Vehrencamp 1977). Removal of eggs from communal nests by group members has also been reported for the Ostrich (*Struthio camelus*) and the Acorn Woodpecker (*Melanerpes formicivorus*), and suggested for the

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Pukeko (*Porphyrio p. melanotus*) (Bertram 1979, Craig 1980, Mumme et al. 1983).

The Guira Cuckoo lives in open habitats in Brazil, Bolivia, Uruguay and Argentina (Sick 1985). It breeds communally, and broken eggs are frequently found beneath nests (Davis 1940). Although these data are suggestive, they are not sufficient evidence of competition for space within the nest. Here we report egg losses that are consistent with the hypothesis of destruction by group members.

We studied Guira Cuckoos in Brasília, Brazil, where they occur in groups of up to 18 individuals, which forage on the ground in farms, urban parks and gardens, and roost and nest in isolated trees. The sexes have identical plumage, and sexing requires capture and laparotomy, which we did not perform. The eggs are greenish blue with a relief of white calcifications, and vary in size, shape and markings. We found nests with up to 13 eggs, but were unable to ascertain the number of laying females because eggs could not be assigned to discrete categories. We followed nests daily during egg-laying, and on each visit marked all new eggs using felt-tipped pens. We recorded egg destruction or burial at three clutches in two different nests.

#### NEST 1 (TWO CLUTCHES)

The first nest found with a complete clutch on 14 Oct. 1983, at a height of 8 m in a *Pinus oocarpa*, and was rebuilt the following year. Twelve individuals, of undeterminate sex, were in the breeding group. The first clutch, found in early incubation, held 13 eggs, including four buried under the bottom lining of fresh green leaves. All eggs remained through incubation, but only seven hatched, including one of the buried eggs, indicating a significant constraint on the ability of females to incubate large clutches successfully. The second clutch was found on 17 Dec. 1984 with one egg. Between this date and 27 Dec., we marked 11 more eggs on daily visits; eggs numbered 0, 1, 2, 8 and 10 disappeared during this time. These are minimum estimates, because eggs laid and ejected in less than a day may not have been detected. Marked eggshells were found beneath the nest, in a pattern indicating breakage rather than predation of remains. No visits were made between 27 Dec. and 12 Jan. 1985, and by then only four eggs remained, all previously marked, and the nest had been abandoned.

#### NEST 2 (ONE CLUTCH)

The second nest was found on 2 Feb. 1984 in an orchard, 3 m up in a mulberry (*Morus* sp.) tree. Eighteen Guira Cuckoos, unsexed, were in this group. The nest was discovered with one cold egg inside, and three freshly broken eggs on the ground. Over the next 7 d, we marked 15 eggs in the nest, during daily visits except on 3 Feb. In the first 3 d, eggs numbered 1–4 disappeared; three were found under the nest tree (two whole, one broken). A new lining was placed over the partial clutch before the last five eggs were laid; however, it was dismantled the day after its

reconstruction. Incubation began on 10 Feb., and lasted 11–12 d, during which eggs 6 and 7 were buried by additions to the nest lining. At least seven young hatched, but four nestlings disappeared within a day of hatching, and may have been preyed upon by a group of Curl-crested Jays (*Cyanocorax cristatellus*) foraging in the vicinity. Of the 15 eggs marked, four disappeared, two were buried, at least seven hatched and only two young fledged. Nest success is even lower if we add the three eggs already destroyed on the day the nest was found.

#### DISCUSSION

Our results show that in the Guira Cuckoo two or more eggs can be laid in a nest within 24 h, indicating that clutches are apparently laid by several females. The first eggs in the nest were the most susceptible to burial or disappearance. This observation is consistent with data of Vehrencamp (1976) and Loflin (1983), where egg-tossing or burial were due to the activity of later-laying females. The high rates of egg loss in the second clutch of Nest 1, and in Nest 2 could be due to unstable dominance relationships among the females in the group, similar to those described for Groove-billed Anis (Vehrencamp et al. 1986). Alternatively, Nest 1 could have been attacked by a revisiting predator. However, size of egg remains on the ground and the lack of disturbance at the nest site were not consistent with the behavior of predators in the area.

Egg burial occurred through additions to the nest lining during laying or incubation. It affected mostly the early eggs and those near the bottom, which also tended to be the first-laid. Unlike egg-tossing, however, egg burial can be reversed (Loflin 1983). In the Guira Cuckoo, we observed both successful and failed attempts to bury eggs under the nest lining. In the Smooth-billed Ani, 37.3% of all eggs laid were buried, mostly during the initial states of egg-laying (Loflin 1983). Early-laying females attempted to uncover buried eggs, but were supplanted by late-laying females (Loflin 1983).

Our work demonstrates that both egg ejection and egg burial are commonly used within the same species and within the same clutch. The frequent use of both strategies by the Guira Cuckoo distinguishes it from the Groove-billed Ani, which rarely uses egg burial, and the Smooth-billed Ani, which rarely uses egg-tossing (Loflin 1983, Vehrencamp 1976).

Further studies should determine whether competition among breeding adults in the Guira Cuckoo is as prevalent as our work suggests, and whether nestling competition is a strong force reducing breeding success in the group.

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