

## SUSPECTED INFANTICIDE IN THE STARLING<sup>1</sup>

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**Key words:** Infanticide; European Starling; reproductive strategy; aggression; nest usurpation.

Avian adult infanticide (the killing of conspecific young by an adult) has been reported for several species (e.g., Crook and Shields 1985, Loftin and Roberson 1983, Trail et al. 1981). Here we document one case of attempted infanticide and circumstantial evidence for 3 more cases of infanticide in the European Starling (*Sturnus vulgaris*).

These observations were made during an ongoing study of the behavioral ecology of the starling in Piscataway, New Jersey (Power et al. 1981), from 1983 to 1985. Nest boxes were attached to utility poles found along roads and mowed fields. As part of our studies on intraspecific brood parasitism, boxes were censused daily during laying. Adults were captured after all their eggs hatched and marked with numbered U.S. Fish and Wildlife Service bands and unique combinations of color bands.

On 10 May 1984, we banded the breeding female at nest box I-18. On 11 May 1984, we banded the breeding male and again saw the banded female. This pair had three, five-day-old nestlings. Minutes after the male was banded and released at 16:30, we observed an unbanded female fly to the nest box top (starlings can be sexed from a distance by polymorphism in bill color [Bullough 1942]). She entered the nest box, looked out of the entrance hole several times, and then exited to the ground with something in her mouth which she attempted, but failed to eat. (We later found this object to be a fragment of an unhatched egg with dried remains of an embryo.) She then reentered the box, exited quickly, and flew out of sight at 16:40. The breeding adults at this box were not present during this time.

As soon as the unmarked female left, we examined the chicks and found that one nestling had a fresh bloody wound near the auditory opening but appeared otherwise healthy; the other two nestlings were unharmed. We examined the contents of the box during the capture of the adult male at 16:30 and observed no irregularities. Therefore, we conclude that the wound was inflicted by the visiting female between 16:30 and 16:40.

On 18 May 1984, at box I-20 a twelve-day-old nestling was discovered with a wound similar to that of the chick in box I-18, about 80 m away. This wound had to have been inflicted one or more days earlier because the eye nearest to the damaged ear was swollen and infected. Unlike the first nestling described, this nestling died.

On 8 June 1983, a dead chick about five days old was found on the ground between two nest boxes, I-13 and I-14, with a bad wound over its left eye. This chick was too young to have fledged or even crawled out of its nest. Moreover, no chicks were missing from any of our boxes so this chick must have been carried some distance from its nest.

On 5 June 1985, we found a dead four-day-old chick at box III-12. The area below the chick's left auditory opening was covered with blood. This chick's nestmates had

already died by 4 June of apparent starvation. Their mother was banded on 3 June. A male was never captured at this box. On 6 June, an unbanded female was captured in the box and fresh nesting material was present in the nest cup. This female began laying on 12 June.

In all cases, the nature of the wound was the same: a peck mark near one of the auditory openings. Similar wounds have been reported by Crook and Shields (1985), Shelley (1934), and Stacey and Edwards (1983) in the context of infanticide. The possibility that mammals or different bird species may have caused the wounds in the three cases for which we have evidence for infanticide seems remote. The only other bird that has ever been observed to enter one of our starling boxes was an American Kestrel (*Falco sparverius*); it was successfully repelled by the adults at that box. To discourage mammalian predators such as Raccoons (*Procyon lotor*) and Gray Squirrels (*Sciurus carolinensis*), aluminum predator guards have been placed around utility poles below nest boxes. Squirrels still occasionally present a problem. However, they always remove the entire contents of the nest (either eggs or nestlings) and disrupt the nest itself. In addition, similar peck marks have been found around the head and neck of dead adults ( $n = 3$ ) found in nest boxes, and on the faces of pairs of birds that we have captured fighting inside boxes ( $n = 8$  pairs), suggesting that bill stabbing is not uncommon.

In two of the four cases, a female was suspected to have committed an infanticidal act. We suspect that infanticide in our population is related to competition for nest sites, a limiting resource (e.g., see Hrdy 1979). Other reports of female infanticidal behavior have been reported by Loftin and Roberson (1983), and Picman (1977). In both cases, a limiting resource (such as nests, mates or food) has been suggested as a reason for infanticidal acts.

The importance and frequency of avian infanticide is largely unknown primarily because the observation time necessary to document this phenomenon can be prohibitive. As a result, infanticide may have greater biological significance than is implied by the existing literature. We encourage all observers to be cognizant of the possibility of infanticide in their study populations.

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## NEST, EGGS, AND REPRODUCTIVE BEHAVIOR OF THE COCOS FLYCATCHER<sup>1</sup>

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**Key words:** Clutch size; Cocos Island; Costa Rica; eggs; flycatcher; *Nesotriccus ridgwayi*; nest; reproductive behavior; Tyrannidae.

Song similarities suggested that the Cocos Flycatcher (*Nesotriccus ridgwayi* Townsend, Tyrannidae), endemic to Cocos Island, Costa Rica, is closely related to the Mouse-colored Tyrannulet (*Phaeomyias murina*) (Lanyon 1984a, see also Kroodsma et al., in press) and their plumages are similar. However, their bills are strikingly different (Sherry 1985), and this difference thwarted early attempts to understand the origin of *N. ridgwayi*. In this paper, I describe for the first time nest and egg characteristics of the Cocos Flycatcher, which support Lanyon's (1984a) conclusions about its systematic position. I also present data suggesting a typical clutch size of one egg, and I report observations on *N. ridgwayi* reproductive participation of the sexes.

### NEST AND EGG DESCRIPTIONS

Cocos Island, Costa Rica, is a lushly rainforested, uninhabited island approximately 500 km southwest of Costa Rica in the tropical eastern Pacific Ocean (5°32'57"N, 86°59'17"W). It contains within a 46.2 km<sup>2</sup> area an impoverished and largely endemic avifauna (Slud 1967, Sherry 1985); besides *N. ridgwayi*, the only resident land birds are the Cocos Finch (*Pinaroloxias inornata*), Cocos Cuckoo (*Coccyzus ferrugineus*), and Yellow Warbler (*Dendroica petechia aureola*). In nine months of residence on Cocos Island, I discovered four nests of *N. ridgwayi*. All were well concealed, compact cup nests in distal branch tips in the canopy or subcanopy vegetation. The first nest, found on 29 February 1980, was approximately 25 m above ground in a *Saccoglossis holdridgei* (Houmeriacaceae) tree growing on a steep slope just southwest of the ridge between Chatham and Wafer Bays. This nest was built on a small, horizontal twig and anchored to several leaf petioles, such that it was covered by surrounding leaves, within 10 cm of an outer canopy branch tip. Two adults were feeding one or two nestlings. I was not able to return to this nest on subsequent days.

The second nest (specimen #114,953, Western Foundation of Vertebrate Zoology) was found on March 18 1980, in a *Hibiscus tiliaceus* (Malvaceae) thicket near the Wafer Bay beach. The nest was 10.5 m above ground, again near the distal tip of vegetation (Fig. 1a). It was constructed largely of fine, black fungal filaments (rhizo-

morphs of *Marasmius crinisiqui*—F. G. Stiles, pers. comm.) and was lined with feathers. This nest had spider egg-cases attached to the outside of the nest (Fig. 1b). Pale fibers of undetermined plant origin were used to support and attach the *Hibiscus* nest to vegetation. It had inside and outside diameters, respectively, of 4.0 to 4.5 cm and 7.0 to 7.5 cm, and inside and outside depths, respectively, of 2.5 cm and approximately 5.0 cm. It was saddled on a 3 to 6 mm diameter *Hibiscus* twig at an angle of 30°, but was anchored in addition to an *Ipomoea* (Convolvulaceae) vine (Fig. 1a). An adult was incubating one egg, which broke during my attempt to collect the nest. The egg was unmarked and uniformly creamy white.

Nests 3 and 4 were also discovered near the Wafer Bay beach on 16 and 21 February 1984, respectively. The third,

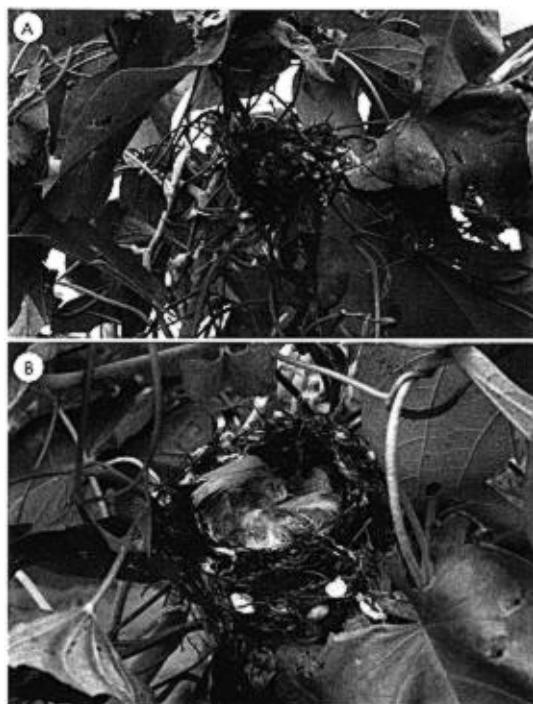


FIGURE 1. a. Nest location of Cocos Flycatcher in distal branch of *Hibiscus tiliaceus* tree. b. Close-up view of nest in Figure 1a showing details of nest construction, interior, and attachment.

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