

tive parameters of this species. We recommend special care in employing these methods for nest examination and suggest that other types of nest perturbation in other species may have similar, but as yet unquantified, results.

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## Snail Kite Kleptoparasitism of Limpkins

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Kleptoparasitism is defined as the stealing of food from an individual by another individual (Rothschild and Clay 1952). Interspecific kleptoparasitism occurs in many animal groups but is particularly widespread among birds, especially when individuals of different species regularly congregate at feeding areas (Brockman and Barnard 1979). Here we re-

port our observations of kleptoparasitism of Limpkins (*Aramus guarauna*) by Snail Kites (*Rostrhamus sociabilis*) at shallow lagoons near Crooked Tree (17°45'N, 88°35'W), Belize, Central America, from 7 to 21 May 1983. We relate the occurrence of this parasitic behavior to an apparently diminishing resource base shared by these two species.

Snail Kites feed almost exclusively on *Pomacea* snails (Beissinger 1983, Snyder and Kale 1983) captured in flight by extending a foot and grabbing the mollusk near the water surface with their long toes. The kite then perches to extract the body from the shell with its thin, sharply hooked bill. Two modes of hunting have been described (Snyder and Snyder 1969, Haverschmidt 1970, Beissinger 1983). Still-hunting kites visually search from a perch and capture snails after a short, quick flight; course-hunting kites fly 3-5 m above the water, usually facing into the wind, and scan for prey. Course-hunting was the prevalent foraging pattern of the kite population (>50) at Crooked Tree Lagoon. When the lagoon's water level dropped dramatically during a 2-week period, leaving an estimated one-third to one-half of the surface area dry, kites used a third, and previously unreported, hunting method: kleptoparasitism of Limpkins.

Many aquatic and shore birds occur in Crooked Tree Lagoon (Tilson and Miller 1983). Limpkins were especially abundant and were widely distributed along the lagoon's edges and islands created by the lower water level. At these sites, Limpkins fed in typical manner (Snyder and Snyder 1969).

As the lagoon dried, the availability of snails may have declined. We base this assumption on the observations that the Limpkins spaced themselves at greater distances (50-60 m) from each other and showed more aggressive interactions when individuals approached each other. We did not measure snail availability at the lagoon (e.g. Beissinger 1983), but the frequency of probing appeared to increase and successful extraction of snails by Limpkins decrease as water levels dropped, possibly indicating reduced food availability.

At this time we first noted kleptoparasitic interactions. On 8 separate occasions we observed a Snail Kite perching on a small snag and surveying the foraging Limpkins. When a Limpkin picked up a snail, the kite swooped in from behind, struck the Limpkin, and stole the snail from the Limpkin's beak or picked it up when dropped on the vegetative mat. The kite immediately flew back to its perch and extracted the snail. Limpkins reacted by calling loudly and flapping their wings but never attempted to retrieve the snail. Kites were unsuccessful in a dozen piracy attempts when they flew towards a Limpkin from the front or the side. On each attempt the Limpkin saw the oncoming kite and escaped. Snail Kites did not pursue fleeing Limpkins. This suggests that surprise from behind may be essential to effective

kleptoparasitism. During the period when Snail Kites were pirating snails, they also were searching for and finding snails in the shallow waters.

A general model (Brockmann and Barnard 1979) for the ecological conditions that facilitate the evolution and expression of kleptoparasitism requires a large number of available hosts; food items to be pirated should be relatively large, numerous, and highly visible; the host should have predictable habits; and kleptoparasitic behavior should occur more frequently when the food resource base is decreasing in availability. At Crooked Tree these conditions were met by the presence of numerous Limpkins, the relatively large size and conspicuousness of *Pomacea* snails, the visibility of foraging Limpkins and their prolonged extraction procedure once a snail was captured, and the suspected decrease in food availability when the water level of the lagoon dropped. Most studies of kleptoparasitism have been made at or near breeding colonies (Brockmann and Barnard 1979). These observations support the contention that food thievery may emerge whenever individuals of different species regularly congregate at feeding areas.

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