HOODED ORIOLE NEST FAILURE ASSOCIATED WITH A NOVEL NEST SITE

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ABSTRACT: Ecological traps occur where species are attracted to use a resource that exposes them to greater than normal risk of mortality or reproductive failure. We observed complete failure of Hooded Oriole (*Icterus cucullatus*) nests in streetlights in a south Texas suburb where use of such nest sites was relatively common. This is of concern as streetlights functioned essentially as traps: orioles built their nests within them but all these nests failed, evidently because the eggs were exposed to lethal temperatures. Moreover, Hooded Oriole nesting success on all other substrates in this area was low (31%, $n = 69$). Therefore, sufficient time for multiple nesting attempts is an important component of the oriole's reproductive success, and time lost to nesting attempts in streetlights, with no chance for success, imparts reproductive costs beyond egg losses. Deterring orioles from nesting in streetlights may increase the potential for subsequent nest attempts on more productive substrates. A simple screen installed as a barrier blocking the opening in the shades beneath the lightbulbs eliminates this unnecessary source of nest failure.

Orioles (*Icterus* spp.) normally attach their woven nests to trees and other plants (Baicich and Harrison 1997, Jaramillo and Burke 1999). The Altamira (*I. gularis*), Streak-backed (*I. pustulatus*), and Yellow-tailed (*I. mesomelas*) Orioles, however, sometimes attach nests to telegraph or electric wires (Sutton and Pettingill 1943, Brush 1998, Jaramillo and Burke 1999). In contrast, Hooded Orioles (*I. cucullatus*) rarely attach their shallow-pouched nests (height 10.2 cm, depth 6.4 cm, Harrison 1979) to man-made structures (Komar et al. 2000).

Historically, in southernmost Texas, Hooded Orioles nested extensively in clumps of Spanish moss (*Tillandsia usneoides*) (Sennett 1878). Since the 1920s, most Hooded Oriole nests in southern Texas have been found in palm trees (*Sabal mexicana* and *Washingtonia* spp.; T. Brush, pers. obs.). Since the 1970s, substantial populations of Hooded Orioles established in southern Texas have colonized habitats without significant numbers of palms, such as forests of live oaks (*Quercus virginiana*), but few nests have been found in these habitats (Pleasants and Albano 2001). Use of artificial nest substrates by Hooded Orioles may be fairly recent. About 200 egg sets collected mainly from the 1880s to 1920s were taken only from nests attached to natural substrates, that is, trees (Western Foundation of Vertebrate Zoology, Barbara Pleasants, pers. comm.). Thus, nearly all Hooded Oriole nests are suspended from leaves and branches, with occasional use of eaves and rafters of buildings (Pleasants and Albano 2001).

In southern Texas, by contrast, we observed Hooded Orioles nesting frequently in man-made structures. In Texas, Hooded Orioles now occur almost exclusively in residential areas and reach their highest abundances in suburban habitats (Brush 2000), where we found that they attached nests to buildings, yard decorations, metal cages, and wires inside streetlights.

The use of streetlights was of concern as nests were in direct contact with 100- to 175-watt lightbulbs (Figure 1). We report here on the nest success and substrate use by Hooded Orioles in suburban Ft. Clark Springs, Kinney County, Texas. We also describe a device to deter orioles from nesting in streetlights.

METHODS

As part of a larger study of Bronzed Cowbird (*Molothrus aeneus*) reproduction, Ellison intensively searched for and monitored Hooded Oriole nests in Kinney County, Texas, from 1999 to 2002. Each year, we located nests during the construction stage and monitored their activity every one to four days until the expected date of fledging. We checked the contents of each nest, except those in streetlights, by using a ladder or an extendable pole with a mirror attached. Because nests attached to streetlights were inaccessible for inspection, we determined their status by tapping on the support pole or lamp cover to elicit a response from adults or young. Nests that lacked a positive response to tapping were observed or videotaped for at least 20 minutes to ensure that nests were truly inactive. This technique was justified on the basis of activity rates and adult behavior at the accessible nests on

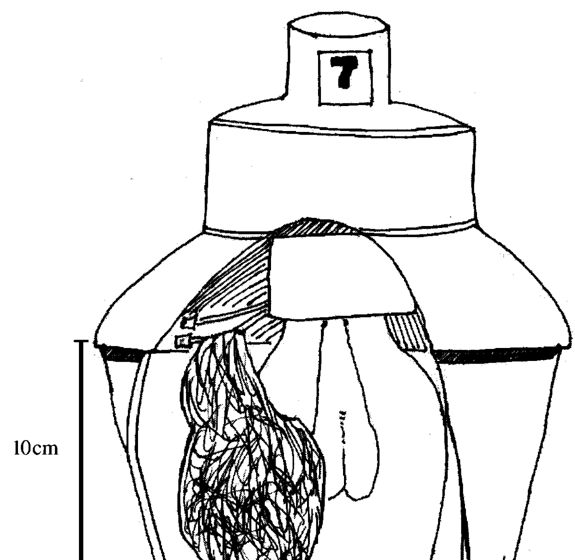

Figure 1. Placement of a Hooded Oriole nest in a streetlight. Streetlight is depicted in cross-section to illustrate nest attachment to loose wire ends and nest placement relative to light bulb.

other substrates (n = 67). We defined successful nests as those that produced at least one fledgling oriole or cowbird.

The streetlights used as nest sites were McGraw–Edison NEMA model lights that consist of a bottomless cylindrical glass shield around a high-pressure sodium bulb of 100 to 175 watts (Figure 1).

RESULTS

From 1999 to 2002, we located a total of 104 nests and determined the fates of 93 nests. At Ft. Clark Springs, Hooded Orioles nest almost exclusively in suburban habitats, as only one of 104 nests was within natural habitat. In the suburban habitats, the majority (72.1%) of nests were in trees, most of which were ornamental palms. Nests in trees experienced a 26% success rate (n = 64). Twenty-nine nests (28%) were placed on a variety of artificial substrates; 24 on streetlights, two each on large yard decorations and buildings, and one inside a windsock. The overall rate of success for the nests on artificial substrates was 17% (n = 29). All nests in streetlights (83% of the nests on artificial substrates) failed, while the five nests on all other substrates were successful. Thus, if nests in streetlights are excluded, 31% (n = 69) of nests were successful.

Once the outer shell of the nest was constructed, nests in streetlights were tended by adults for an average of 12.9 days (range 2–14 days; n = 15), as determined by flushing adults and videotaping interactions with Bronzed Cowbirds at nests. In contrast, successful nests on natural substrates were tended for up to 36 days (mean 14.8 days, n = 20), including attendance at the nest site prior to egg laying.

Three nests removed from streetlights for inspection were singed and burned through at the nest pouch, the point at which each nest contacted the streetlight bulb (Figure 2). Hooded Oriole nests are relatively thin-walled, <1 cm thick (n = 126), and the shells of the eggs within nests in streetlights were brittle and in one case charred black. The yolks of these eggs were dried and solid. None was beyond 1–2 days of embryonic development (see Lokemoen and Koford 1996).

DISCUSSION

Hooded Orioles nest primarily in palms and therefore are most common in residential areas with ornamental palms (Brush 2000, Pleasants and Albano 2001). Similarly, we found that breeding densities of Hooded Orioles in Kinney County were higher in suburban habitats than in surrounding areas with natural vegetation. Ellison detected Hooded Orioles at a rate of 0.97 ± 0.95 birds per 27-ha census (n = 60 censuses) within a suburban area from 2000 to 2002. Likewise, elsewhere in the lower Rio Grande valley Hooded Orioles are essentially restricted to suburban habitats (Brush 2000, S. G. Monk and Brush, unpubl. data). Palms in these suburban areas occur in irrigated "artificial oases," which may offer additional benefits beyond nesting substrates (e.g., greater availability of food, water, and nesting material), enhancing their attractiveness. This habitat presents Hooded Orioles with novel sites on which nests may be attached. Beyond the artificial sites listed

Figure 2. Exterior view of Hooded Oriole nest singed by streetlight bulb in Kinney Co., Texas. The exterior of the nest pouch has burned through (at arrow), exposing the nest lining of other plant, animal, and/or synthetic fibers.

above, we found nests attached to houseplants, banana trees, and several attempted though not completed on window screens.

Streetlights can represent a reproductive trap (*sensu* Dwernychuk and Boag 1972) because orioles are attracted to nest within them, only to suffer complete reproductive loss. The orioles' not tending streetlight nests beyond 14 days implies they abandoned them during the pre-laying period (normally 2–6 days) or incubation period (14 days) (Pleasants and Albano 2001). Though we did not measure egg temperatures directly, eggs were at most 2 cm from a light bulb whose temperature of 400° C (American National Standards Institute) is far beyond the lethal temperatures (41–48° C) recorded for an array of avian eggs (Baldwin and Kendeigh 1932, Lundy 1969, Bennett and Dawson 1979, Grant 1982). Orioles may not recognize streetlights as poor sites because they construct nests by day and are not exposed to the heat emitted by lightbulbs until they commence roosting on the nest or incubating by night.

There are many examples of birds' nesting in artificial situations reducing nesting success (Peck and James 1987). In particular, birds nesting in structures such as pipes (Thurber et al. 1987), rain gauges (Ellison 1936), dry-cleaning vents (T. J. Underwood pers. comm.), tin roofs, mailboxes, and lights (Peck and James 1987) often risk nest failure by exposing clutches to extraordinary temperatures. Purple Martins (*Progne subis*; Loucks 1895), House Sparrows (*Passer domesticus*; Loucks 1895, Peck and James 1987), and House Finches (*Carpodacus mexicanus*; G. E. Hill pers. comm., Ellison unpubl. data) have nested in lighting structures. Only Hill (unpubl. data) monitored fates of such nests and did not note extraordinary nest failure among 37 House Finch nests in streetlights in Ann Arbor, Michigan. In Hill's study the streetlights were of a different design with nests located farther from the bulbs.

Barring orioles from nesting in streetlights, a sure source of nest failure, can improve the chance for successful nesting. Time for successful nesting is important because Hooded Orioles need a prolonged breeding season for repeated nesting attempts to ameliorate the costs of parasitism (Pease and Grzybowski 1995). In our study the low reproductive success of Hooded Orioles was due to brood parasitism and egg damage by Bronzed Cowbirds (85% of 66 failed nests were parasitized). Theoretically, during the Hooded Oriole's breeding season in southern Texas, typically of 80 days, each female has time for three nesting attempts. Therefore, even without other sources of nest failure, the loss of 12.9 days per nesting attempt in a streetlight represents a significant fraction (16%) of the time that might otherwise have been devoted to nest attempts on more productive substrates.

To keep birds from nesting in streetlights, Rio Grande Electric Cooperative personnel installed protective screens that barred access to the lamp housing (12 in 2000, 40 in 2001). The barrier, consisting of a circular piece of 0.5-cm wire mesh with an approximate diameter of 30 cm, was cut to fit the bottom of the lamp housing. The screen was then attached to the inside and outside of the housing's lip by crimping tabs of mesh cut at 11-cm intervals.

This note is intended to alert communities and wildlife managers to the threat streetlights may pose to some bird species. Indeed, such a novel nest site did not readily appear to detract from oriole nest success until studied more closely. Electricity companies should be encouraged to maintain sealed streetlights or place screens under lamps to enhance oriole reproduction and reduce the maintenance costs of removing nest materials.

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