ican birds. Vol. 5. Yale University Press, New Haven.
POOLE, K. G., AND R. G. BROMLEY. 1988. Natural history of the Gyrfalcon in the central Canadian Arctic. Arctic 41:31–38.
USPENSKII, S. M. 1969. [Life in high latitudes: a study of bird life.] Mysl Publishers, Moscow.
WALKER, D. A., AND K. R. EVERETT. 1987. Road dust and its environmental impact on Alaskan taiga and tundra. Arc. and Alp. Res. 19:479–489.
WHITE, C. M., AND T. J. CADE. 1971. Cliff nesting raptors and ravens along the Colville River in arctic Alaska. Living Bird 10:107–150.
WHITE, C. M., AND D. G. ROSENEAU. 1970. Observations on food, nesting, and winter populations of large North American falcons. Condor 72:113–115.

The Condor 93:184–185

WHY HOUSE WRENS DESTROY CLUTCHES OF OTHER BIRDS: A SUPPORT FOR THE NEST SITE COMPETITION HYPOTHESIS[1]

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Key words: House Wren; Troglodytes aedon; *egg destruction; cannibalism; competition.*

House Wrens, *Troglodytes aedon,* are notorious for destroying clutches of other birds, including those of conspecifics. The destruction usually involves pecking holes in eggs and removing the soft lining from the nest cup; if small nestlings are present, they may also be killed (Kendeigh 1941). It has been proposed that wrens attack clutches 1) to acquire suitable cavities for their own use, 2) to consume the contents of broken eggs, 3) to force other birds to breed farther away, hence reducing competition for food, and 4) to free potential mates (in case of conspecific nests), thereby increasing chances of becoming polygamous (Belles-Isles and Picman 1986). Because little evidence for the hypotheses is available (see Quinn and Holroyd 1989), we report several cases of clutch destruction followed by a cavity takeover, and provide evidence against the egg consumption hypothesis.

Observations reported here are part of a long-term study of the House Wren breeding ecology being conducted in the Mer Bleue Bog conservation area near Ottawa, Ontario, Canada. In May–July 1989, we conducted two tests in which we offered breeding House Wrens nesting boxes with experimental clutches (unpublished data). The nesting boxes were made of plywood and each was attached to a stake 1.5 m above ground. Wren responses to those boxes provide data on the plausibility of two of the above hypotheses for the function of egg-destruction by House Wrens.

In the first test, we introduced five nesting boxes near each of 25 active House Wren nests (125 boxes in total). The boxes were placed 20 m apart along a transect receding from the House Wren nest; the first box was 20 m from the wren nest. Each nesting box contained a dry-grass nest with one quail (*Coturnix chinensis*) egg. The wren nests contained either eggs or small nestlings of the first brood. The nesting boxes were checked after 6 hr, 1 day and 3 days. During the three-day period, males in six of 25 (24%) territories started building a nest in one of the boxes (males build a rough twig nest which females complete with soft lining; Kendeigh 1941). The males first punctured and removed the quail egg, then removed the grass nest, and finally started bringing in twigs. Five males brought in several centimeters of twigs, one male completed three-quarters of the nest. The males chose boxes which were 20 m (one bird), 80 m (one bird) and 100 m (four birds) from their nests. We assume that the majority of the males were resident males because a) in a separate experiment, we equipped a nesting box with a trap and placed it 20 m from several active House Wren nests (seven out of ten (70%) trapped wrens were resident males); and b) the transects of nesting boxes used in this test were always directed away from neighboring House Wren nests.

In the second experiment, a nesting box was successively introduced into territories of 11 males. Each nesting box contained a House Wren nest and one House Wren egg. The nests and eggs were obtained from failed nesting attempts of other pairs. The males were either unmated males defending a territory, or mated males whose females were incubating. We directly observed all 11 males enter the box and remove the egg, usually by carrying it in their beaks through the entrance and then dropping it below the box, or flying a short distance and dropping it into vegetation. Each male, except two, spent less than 8 sec inside the box; one male spent 11 and one 23 sec. The fact that all eggs were removed from the nests and dropped into vegetation, and that the males remained inside the nest for a short time suggests that conspecific eggs are not

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pecked to access egg contents. Instead, breakage may facilitate grasping and removal of the egg, or simply render the egg inviable. Consumption of egg contents demands time, and the benefits of leaving immediately may outweigh the nutritional gains. The resident male guards his territory against intruders (Johnson and Kermott 1989) and checks the nesting cavity during the female's absence (i.e., when the female is foraging; S. Pribil, personal observation). If the intruder is confronted inside the cavity, it may sustain injuries or may even be killed by the resident male, as was suspected in two cases reported by Belles-Isles and Picman (1987).

Nesting cavities suitable for House Wrens are limited in our area. This is evident from the fact that the introduction of nesting boxes was followed by a dramatic increase in size of the study population from less than 2–4 pairs to 38–45 pairs in different years (J. Picman and S. Pribil, unpublished data). The observations of egg destruction followed by a cavity takeover support the hypothesis that the egg destroying behavior in House Wrens may have been favored by intense competition for nesting cavities. We cannot, however, establish the plausibility of the remaining hypotheses because a) the test specifically examined the nest site competition hypothesis; b) results of the test are not inconsistent with the other hypotheses; and c) the four hypotheses are not mutually exclusive. On the other hand, the fact that House Wrens apparently failed to consume contents of the broken eggs (i.e., spent a minimum amount of time handling the broken eggs) argues against the egg consumption hypothesis. Tests of the remaining hypotheses will require more information on the degree of foraging similarity between House Wrens and sympatric passerines, the movement of birds whose nests are destroyed by House Wrens, and the chance that the intruding male has to mate with the female whose nest the male destroyed.

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LITERATURE CITED

BELLES-ISLES, J. C., AND J. PICMAN. 1986. House Wren nest-destroying behavior. Condor 88:190–193.

BELLES-ISLES, J. C., AND J. PICMAN. 1987. Suspected adult intraspecific killing by House Wrens. Wilson Bull. 99(3):497–498.

JOHNSON, L. S., AND L. H. KERMOTT. 1989. Territorial intrusions in the House Wren *Troglodytes aedon*: evidence for the sperm competition hypothesis. Ornis Scand. 20:89–92.

KENDEIGH, S. C. 1941. Territorial and mating behavior of the House Wren. Ill. Biol. Monogr. 18(3): 1–120.

QUINN, M. S., AND HOLROYD, G. L. 1989. Nestling and egg destruction by house wrens. Condor 91: 206–207.

The Condor 93:185–189

MITOCHONDRIAL DNA VARIATION INDICATES GENE FLOW ACROSS A ZONE OF KNOWN SECONDARY CONTACT BETWEEN TWO SUBSPECIES OF THE BROWN-HEADED COWBIRD[1]

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Key words: mitochondrial DNA; Brown-headed Cowbird; gene flow; hybridization.

The dynamics of gene flow are often easily observed and analyzed where differentiated taxa meet and interbreed in hybrid zones (Endler 1977; Barton and Hewitt 1985, 1989). In most studies, the amount of introgression of various traits or alleles is directly measured within and around such zones. However, few studies have historical data on the timing of secondary contact such that actual *rates* of introgression can be calculated (Endler 1977, Rand and Harrison 1989). Studies with historical data often involve species with well-documented range extensions (e.g., Gill 1980, Cooke et al. 1988, Fleischer and Rothstein 1988, Echelle and Connor 1989). Our studies of geographic variation in morphometric and colorimetric characters in the brown-headed cowbird have indicated recent and extensive gene flow between the differentiated subspecies *Molothrus ater obscurus* and *M. a. artemisiae* in the

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