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NESTLING AND EGG DESTRUCTION BY HOUSE WRENS[1]

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Competition between organisms has been described as occurring in two general forms: exploitation competition and interference competition (Maurer 1984). Exploitation competition takes place indirectly through individuals using the same resources. The depletion of resources is the only form of inhibition demonstrated in exploitation competition. Interference competition is manifested through direct confrontation between competing individuals. The result of interference competition may be the exclusion of a competing individual from a resource (Ricklefs 1979). Nest-content destruction is a form of interference competition that in small passerines is exhibited mainly by members of the families Mimidae and Troglodytidae (Belles-Isles and Picman 1986).

The destruction of nest contents by House Wrens (*Troglodytes aedon*) has been recorded, at least through circumstantial evidence, since the mid-19th century (Hill 1869, Widman 1905, Wright 1909, Creaser 1925, Sherman 1925, Weigle 1925, Kendeigh 1941). Belles-Isles and Picman (1986) determined experimentally that all of 38 unmated male House Wrens pecked eggs presented to them. The same study also presented evidence for the occurrence of similar behavior by females. The present paper describes observations of the destruction of the contents of a Tree Swallow (*Tachycineta bicolor*) nest by a male House Wren. Evidence is also presented which suggests that similar behavior is exhibited by House Wrens conspecifically as well as towards other noncavity nesters.

METHODS

The observation took place 72 km east of Edmonton, Alberta on the southeast shore of Beaverhill Lake (53°24′N; 112°31′W). The study area contained 208 nest boxes distributed evenly between two habitats: a willow (*Salix* sp.) wetland, and a poplar (*Populus balsamifera, P. tremuloides*) forest. The nest boxes were 25 cm deep and 13 cm wide, with a 3.8-cm diameter hole. The distance between the boxes was 30 m and the boxes were erected 1.2 m above ground level.

The nest box where the House Wren interference was recorded, was visited by the investigators twice daily, once before 09:00 and again after 18:00 for 14 consecutive days. Visits included checking for nest-box contents, observing the ground in the immediate vicinity of the box, and recording the presence of any birds at the nest box for a 0.5-hr period. The 0.5-hr observations were made from an area of heavy vegetation cover at a distance of 20 m from the nest box. House Wrens were color-banded for individual recognition.

RESULTS

DIRECT OBSERVATION

Nesting activity by a pair of House Wrens was recorded in box B2W. The first of eight eggs was observed on 30 May, 1986. On the morning of 5 June, a single Tree Swallow egg was recorded in box A1W, 30 m southwest of box B2W. The box was visited at 18:30 of the same day and a Tree Swallow egg was found on the ground approximately 0.5 m from the, now empty, box. The egg was pierced with a hole that measured 2.7 mm × 2.5 mm. The contents of the egg had not been removed.

A Tree Swallow egg was found pierced and ejected on each of the 2 days following the original observation at box A1W. The next morning the male House Wren from box B2W was observed to leave the Tree Swallow box (A1W) and drop an egg where the previous three had been found. The Tree Swallow laid a fifth egg on 9 June and both the male and female swallows were noted at the nest box during the morning observation. The fifth egg was found pierced and ejected on the evening observation and the Tree Swallow pair was not seen in the area again. During the 6 June to 9 June observation period the male House Wren from box B2W was observed singing within 5 m of box A1W a total of seven times. The female wren from box B2W completed laying a clutch of eight eggs on 7 June and was incubating until 19 June.

The male House Wren from B2W was seen carrying nesting material to box A1W during the observations on 10–12 June. On the morning of 13 June another female House Wren laid an egg in A1W. The male House Wren was observed feeding both females while they were incubating their respective clutches, and both broods once they had hatched. A total of 13 young were fledged, seven from box B2W and six from A1W. The time of overlap between the two incubation pe-

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riods was 1 day, while the overlap between the two nestling stages was 3 days.

INDIRECT OBSERVATION

House Wrens in the observation area were suspected of being engaged in intraspecific nest-content destruction. Egg breakage was never directly observed, but House Wren eggs were found pierced and ejected with the same characteristics of those recorded at the Tree Swallow box A1W. There were nine such cases of suspected interference competition but none of the nine resulted in the boxes being taken over for subsequent polygynous mating. In addition, there were three records of suspected House Wren inflicted mortality on conspecific broods of nestlings 3, 4, and 12 days of age. The attacked nestlings exhibited pecking wounds mainly in the area of the head and neck. Decapitation was recorded in at least one nestling in each case. In two instances, young were found on the ground in front of the nest box. There were no further nesting attempts in the boxes where the mortality had occurred.

Interspecific interference competition in the form of egg destruction was also suspected as having occurred between House Wrens and several noncavity-nesting birds. The evidence for the suspicion was the presence of pierced eggs that displayed the same characteristics as those pierced and ejected at the Tree Swallow nest. Broken eggs were found at nests of Least Flycatchers (*Empidonax minimus,* two cases), Clay-colored Sparrows (*Spizella padilla,* two cases), and an American Robin (*Turdus migratorius,* one case). The observation area was not systematically searched for the presence of open nests, but recorded upon chance location. The number of nests found for each of the above species was 2, 11, and 8 respectively.

DISCUSSION

The House Wren, as a secondary cavity-nester, lacks the morphological adaptations needed to excavate cavities. The primary factor limiting the number of secondary cavity-nesters is thought to be the availability of nest sites (von Haartman 1957, Holroyd 1975, Minot and Perrins 1986). The behavior of egg destruction may have evolved as a form of interference competition to remove other nesting pairs and obtain more cavities, a limited resource. In doing so, a male House Wren may be able to defend more than one nest site in his territory and increase the chance of becoming polygynous.

The destruction of the contents of open-topped nests cannot be explained by the need of a cavity-nesting species to acquire another nest site. Creaser (1925) suggested that food may be a limiting factor of House Wren breeding density. The destruction of open-topped nests may remove competitors in an attempt to acquire a greater portion of the insect food resource. In this case, the House Wren is removing the threat of exploitation competition with the use of interference competition. The food hypothesis assumes that food is limiting and that there is overlap in the food-item selection by the species involved. Both of these assumptions lack quantitative data at present.

An alternative explanation for the aggressive behavior of House Wrens towards nests not built in cavities is that the behavior may be a fixed response stimulated by the calls of nestlings not identified as offspring, regardless of circumstance. In this instance, the behavior need not serve a function in reducing exploitative competition, but may be incidental in that it is misplaced towards open-topped nesters. However, this explanation does not account for the breakage of eggs before any nestlings have hatched. Further information is required to determine what cues elicit the destructive response from House Wrens.

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