

practices have begun increasing herbaceous cover. To some extent, then, we may have witnessed repopulation of a formerly depleted habitat.

Acknowledgments.—This study was supported in part by funds from the USDA, Mark Twain National Forest, North Central Forest Experiment Station; and USDI, Missouri Cooperative Wildlife Research Unit, through Cooperative Aid Agreement Number 13-479 with the University of Missouri. We acknowledge contributions by G. E. Probasco to this work.—KIMBERLY I. HARDIN, *School of Forestry, Fisheries and Wildlife, Univ. Missouri, Columbia, Missouri 65211*; THOMAS S. BASKETT, *U.S. Fish and Wildlife Service, Missouri Cooperative Wildlife Research Unit, Univ. Missouri, Columbia, Missouri 65211* AND KEITH E. EVANS, *North Central Forest Experiment Station, Forest Service, USDA, Columbia, Missouri 65211*. Accepted 10 Mar. 1981.

Wilson Bull., 94(2), 1982, pp. 212-213

A double-brooded Eastern Kingbird.—Eastern Kingbirds (*Tyrannus tyrannus*) have not been reported to raise more than one brood per breeding season. Apparently, because of the 3-4-week period of post-fledging parental care, the time and energy needed to raise one brood to independence are too great to allow a second brood (Morehouse and Brewer, *Auk* 85:44-54, 1968). In this note, we report one instance in which a second brood was attempted and discuss reasons for the usual absence of second broods. Our observations were made at the Queen's University Biological Station, near Chaffey's Locks, Ontario, Canada, as part of a study on the factors influencing habitat distribution in the Eastern Kingbird.

For a pair of kingbirds to raise two broods in 1 year they must either lengthen the breeding season by starting earlier or finishing later than usual, thus exposing the adults and young to colder weather and lower insect food levels (see Bryant, *Ibis* 117:180-216, 1975), or begin the second brood before independence of the first brood, thereby risking lower survival of the first brood. The double-brooded pair we observed appeared to employ the latter alternative.

The first brood consisted of four young until the time of fledging (25 June) when three disappeared. The reason for disappearance was not known but was presumed to be the result of predation since the young had shown normal weight gain as nestlings. The single remaining fledgling, which had been color banded as a nestling, was sighted with the two unmarked adults during four checks of the nest area within the next 2 weeks. The female was found incubating a new clutch of three eggs on 8 July, in a nest located 3 m from the first nest. We calculated clutch initiation date as 4 July by backdating 16 days from hatch (20 July). The 9-day period from fledging to initiation of the second clutch was within the normal time for renesting after failed nests (7.7 ± 1.7 days for 15 pairs). These observations indicated that the same female was responsible for both nests.

During incubation of this second clutch, the adults were observed for three 90-min periods. In the first observation period (14 days after fledging), the fledgling was fed twice by the male and not at all by the female. This feeding rate of 1.3/h is much lower than the usual rate for feeding fledglings which have left the nest in the previous 21 days (6.5 feedings/fledgling/h in our study, 5.6 feedings/fledgling/h calculated from the extensive data in Morehouse and Brewer [1968]). During the other two periods (19 and 23 days after fledging) the fledgling was not fed by either adult despite begging and following behavior. The male vigorously chased

the fledgling from the vicinity of the nest on 10 occasions, a behavior not seen in other parent-fledgling groups. Aggression towards the fledgling stopped after the second nest was preyed upon early in the nestling stage, although parents were not seen to resume feeding of the fledgling (28+ days after fledging). Thus, the reduction in parental care to the fledgling included a low rate of feeding and aggression by the male parent. The response of the male parent could have resulted in injury to the fledgling and at least lowered the amount of protection from predators given to the fledgling.

A female's decision whether or not to start a second brood immediately after the first brood fledges should be governed by the probability of rearing young from the second brood compared to the probability of decreasing the first brood's chances of survival. A comparison of first nests with later renesting attempts for 170 kingbird nests found in 1977, 1979 and 1980 indicated that renests had significantly smaller clutch-sizes (3.13 vs 3.74) and nestling growth rate constants (K of 0.426 vs 0.498, see Ricklefs, *Ecology* 48:978-983, 1967). In addition, the percent of nests from which young fledged (24.2% vs 54.8%), and the number of young fledged per successful nest (2.25 vs 2.88) were lower for renests vs first attempts. These data indicate that adults have a more difficult time supplying food to their young later in the season and that predation may be higher at this time. Therefore, the advantage gained by attempting a second brood is unlikely to offset the probability of decreased survival for the first brood. It is worth noting that of 68 pairs with successful first broods during 1977, 1979 and 1980, five others fledged only a single young; none of these attempted a second brood.—PETER J. BLANCHER AND RALEIGH J. ROBERTSON, *Dept. Biology, Queen's Univ., Kingston, Ontario K7L 3N6, Canada. Accepted 13 May 1981.*

Wilson Bull., 94(2), 1982, p. 213

Male Cooper's Hawk breeds in juvenal plumage.—During the summer of 1980 Rosenfield conducted a survey of nesting Cooper's Hawks (*Accipiter cooperi*) in Wisconsin as part of a cooperative study with the Wisconsin Dept. of Natural Resources and the U.S. Fish and Wildlife Service. One objective was to trap and band nesting adults.

On 24 June 1980, while attempting to trap breeding adult Cooper's Hawks in southwestern Dane County, a male in juvenal plumage flew to the nest carrying prey. It dropped the food and flew off, but subsequently returned and was caught. The yearling's eye was a light orange; only five primaries and two rectrices were of adult plumage. The female (not caught) was in adult plumage. There were five young, about 1 week old, in the nest. The nest was deserted by 11 July. We found the remains of two young near the base of the nest tree. The cause of nesting failure was unknown.

Rosenfield observed 20 breeding Cooper's Hawks (12 females, 8 males) at 14 nests; only the above-mentioned male was in juvenal plumage. Meng (Ph.D. diss., Cornell Univ., 1951:47) reported 2 of 36 and Reynolds and Wight (*Wilson Bull.* 90:192, 1978) reported 2 of 34 Cooper's Hawk pairs with females in immature plumage, but reported no known nesting immature males. Kline (*J. California Hawking Club* 5:17, 1975) reported a nesting male Cooper's Hawk in juvenal plumage, paired with a juvenile female, in California. His account and this note are, to the best of our knowledge, the only records of such an occurrence.

We would like to thank R. Anderson and W. Smith for their support of this study and F. and F. Hamerstrom, and H. Mueller for reviewing this note.—ROBERT N. ROSENFELD, *College of Natural Resources, Univ. Wisconsin-Stevens Point, Stevens Point, Wisconsin 54481* AND JONATHAN WILDE, *Rte. 1, Box 69, Belleville, Wisconsin 53508. Accepted 15 June 1981.*