USE OF EXTERNAL NESTING BOXES BY ROOSTING RED-COCKADED WOODPECKERS

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Red-cockaded woodpeckers (*Picoides borealis*) roost year-round in cavities they excavate in living pine trees. Cavity excavation is a lengthy process (Conner and Rudolph 1995*a*) and sometimes a member of a family group does not have an available cavity for roosting within its resident cluster of cavity trees. Woodpeckers without a cavity either roost in a scar or fork of a live pine tree within their cluster, or they fly daily to another territory to roost in a cluster with a vacant cavity (Hooper and Lennartz 1983, Hooper 1983).

Several types of artificial cavities installed flush into live pine trees are readily used by red-cockaded woodpeckers for nesting and roosting (Copeyon 1990, Allen 1991, Taylor and Hooper 1991). Additionally, Hooper (1983) observed a male red-cockaded woodpecker roosting briefly in an external nest box nailed to the side of a tree. Here we report extensive use of external nest boxes by roosting red-cockaded woodpeckers.

The study was conducted on the Francis Marion National Forest in South Carolina. A large (477 potential breeding groups) and increasing population of red-cockaded woodpeckers existed until Hurricane Hugo destroyed 87% of the cavity trees in 1989 and 63% of the birds (Hooper et al. 1990). A massive installation of artificial cavities was made and the population recovered remarkably from its initial losses (Watson et al. 1995).

In an experiment to reduce interspecific competition for scarce red-cockaded woodpecker cavities, 3 external nest boxes were installed in each of 61 cavity tree clusters (n = 183 boxes) in December 1990 (Loeb and Hooper 1997). Each 28 x 18 x 18 cm box was nailed on the side of a live pine tree 6 m above the ground. The boxes were placed on pines 20-50 m from an active red-cockaded woodpecker cavity.

External nest boxes were not erected to provide roosting sites for red-cockaded woodpeckers. However, from December 1991 to February 1992, we discovered 10 woodpeckers roosting in external nest boxes (Figure 1). The woodpeckers had enlarged the entrances of the nest boxes in which they were roosting (Figure 2). To facilitate roosting in March 1992, we enlarged the entrances of all the nest boxes from a diameter of 4.0 cm to the diameter of artificial cavities made for red-cockaded woodpeckers (4.5 cm).

From October to December 1994, we examined the trees with nest boxes for the occurrence of resin wells—holes pecked through the bark into the sapwood to induce resin flow around red-cockaded woodpecker cavities (Jackson 1977*a*, Hooper et al. 1980). The occurrence of resin wells around the external nest boxes suggested roosting by red-cockaded woodpeckers. To confirm roosting in nest boxes, we returned to clusters with the most active resin wells prior to the woodpeckers leaving their cavities in the morning.

Of the 183 trees with external nest boxes, 142 survived until the fall of 1994; the remainder was lost to wind and lightning. Seventy-seven of the surviving trees with nest boxes (54.2%) had resin wells. The 142 trees were in 53 clusters and in 40 (75.5%) of those clusters; at least 1 tree with a nest box had resin wells.

We found active resin wells (see Jackson 1977*a*, Hooper et al. 1980) on 21 trees with external nest boxes in 15 clusters during the period October to December 1994. We visited the 15 clusters prior to the woodpeckers leaving their cavities in the morning to determine if the boxes were currently being used. Eight of the 15 clusters had 9 red-cockaded woodpeckers roosting in nest boxes. In the 7 clusters where woodpeckers were not roosting in nest boxes at the time of our check, there were at least as many cavities as woodpeckers. Of the 8 clusters where woodpeckers were roosting in nest boxes, 3 clusters had an obvious shortage of cavities, 3 had the same number of woodpeckers as cavities, and 2 had more cavities than woodpeckers. It is likely that for various reasons, all these cavities were not suitable for roosting by red-cockaded woodpeckers. Similar to the roosting in tree forks and scars (Hooper and Lennartz 1983), roosting in nest boxes was probably induced by a temporary shortage of cavities for roosting.

Active resin wells are evidence of roosting by red-cockaded woodpeckers. Red-cockaded woopeckers make resin wells around both their natural cavities (Jackson 1977*a*, Hooper et al. 1980) and artificial cavities. Also, scars and tree forks used for roosting

frequently have resin wells if they are used for extended periods (Hooper and Lennartz 1983). Based on the occurrence of resin wells around nest boxes, we concluded that over half the nest boxes (54.2%) had been used for roosting during a 36-month period. More importantly, roosting in nest boxes had occurred in most clusters (75.5%). However, it appeared that at any given time a relatively small percentage of boxes (<20%) were being used as roost sites.

Artificial cavity technology has been very successful in the restoration of stressed populations of red-cockaded woodpeckers (Watson et al. 1995, Gaines et al. 1995, Richardson and Stockie 1995). However, trees suitable for artificial cavities have specific requirements that are not met by smaller and younger trees (Copeyon 1990, Allen 1991, Taylor and Hooper 1991). Where suitable trees are scarce, the use of nest boxes in conjunction with artificial and natural cavities might help survival of specific groups of red-cockaded woodpeckers. This is a management tool that could be used in rare cases of small populations for which extreme measures are warranted. It is by no means recommended to replace natural or artificial cavities. Enlarging the entrances of nest boxes to 4.5 cm and using human-made resin wells as described by Copeyon (1990), Taylor and Hooper (1991), and Allen (1991) should increase the use of external nest boxes for roosting.

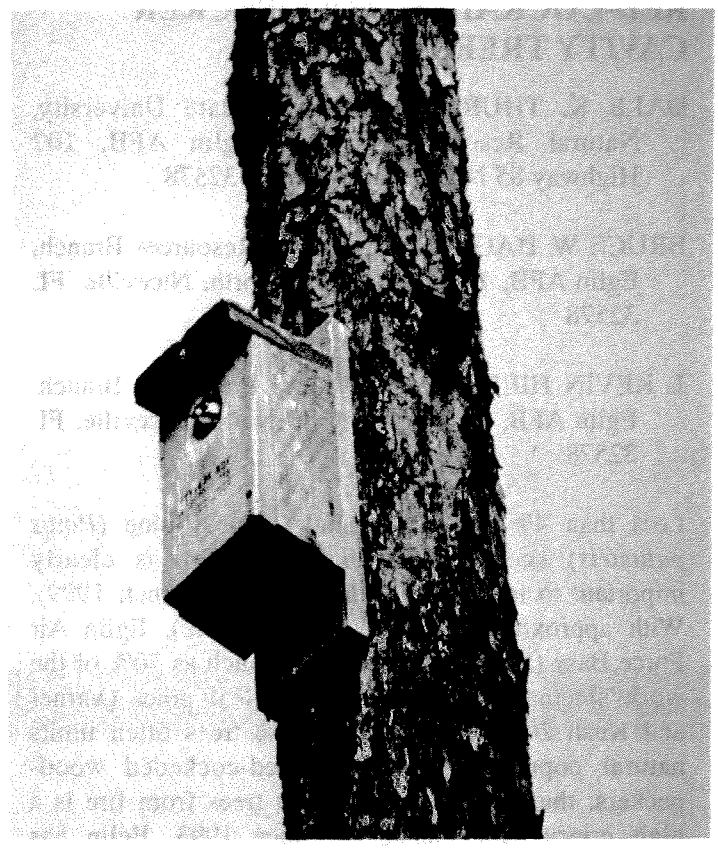

Figure. 1. Red-cockaded woodpecker using external nest box as roosting site.

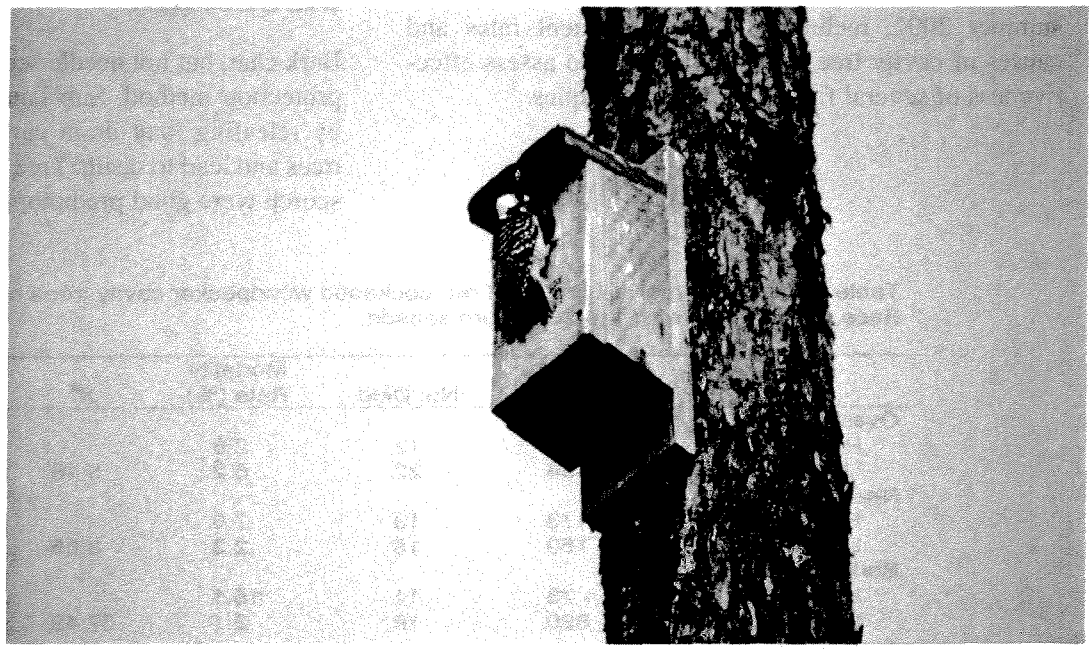

Figure 2. Red-cockaded woodpecker enlarging entrance of external nest box.

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