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Predation by a Gray Rat Snake on Red-cockaded Woodpecker Nestlings.—Red-cockaded Woodpeckers (*Picoides borealis*) are unusual in their selection of nest trees because they use only mature living pine trees. In addition to excavating the cavity in a live tree,

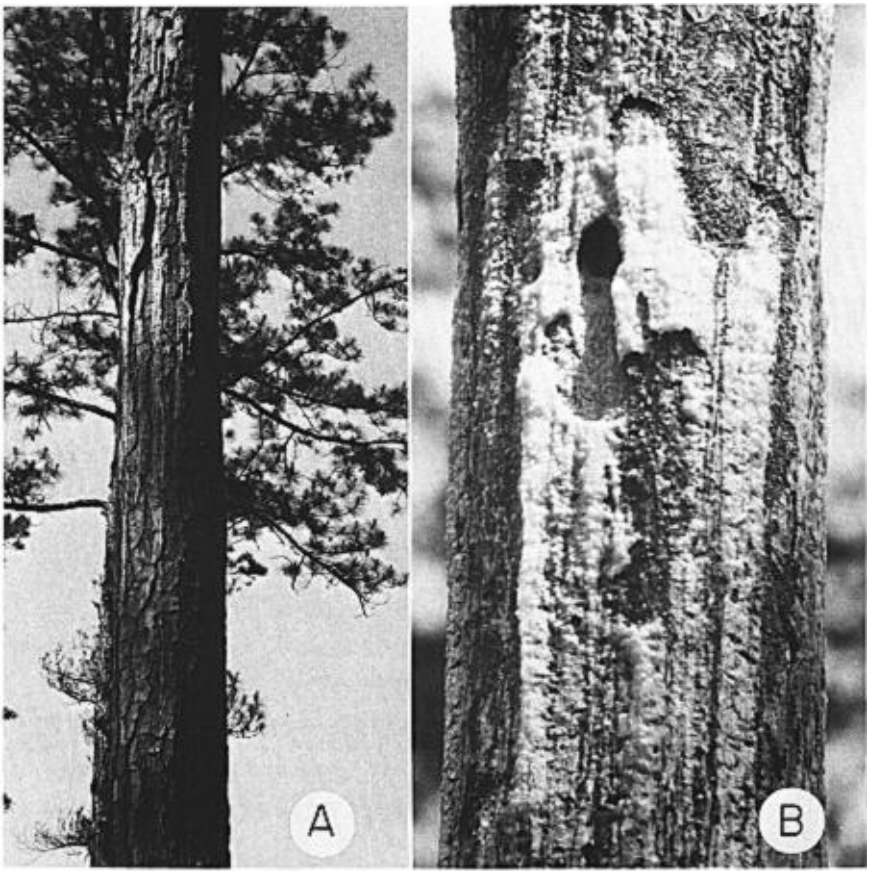

FIGURE 1. A. Gray rat snake climbing over dried gum to gain access to an abandoned Red-cockaded Woodpecker cavity. B. Red-cockaded Woodpecker cavity at which a gray rat snake was successful in preying on nestling Red-cockaded Woodpeckers. Note the excessive accumulation of gum around the entrance and the bare area created when the part of the gum accumulation fell.

they also excavate small holes for a meter or more above and below the cavity. These holes, called resin wells (Jackson and Thompson, 1971), are frequently worked by the birds so that the surface of the cavity tree remains coated with wet, sticky pine gum. Several authors (e.g., Ligon, 1970; Dennis, 1971) have suggested that the gum deters predators, although birds and squirrels readily cross the pine gum barrier. Jackson (1974) demonstrated experimentally that the gum would deter (and sometimes kill) climbing rat snakes (*Elaphe obsoleta*). He hypothesized that Red-cockaded Woodpeckers adapted to frequent fires in prehistoric southern pine forests by excavating their cavities in the more fire-resistant living pines, and that rat snakes also adapted to the fires by retreating into living pines because of a lack of rock shelters in the coastal plain. Because of the growth pattern of pines, the woodpeckers' cavities could only be excavated in the trunk and would usually be below the lowest branch, thus exposing it to immediate discovery by a climbing snake. The wet gum, however, would protect the cavity. Further evidence for this hypothesis was provided by Jackson's (1976) demonstration that the gray rat snake (*E. o. spiloides*) has a greater tendency to climb than does its more northern relative, the black rat snake (*E. o. obsoleta*).

Dennis (1971) observed a yellow rat snake (*E. o. quadrivittata*) as it climbed over dried gum at a Red-cockaded Woodpecker cavity to prey on flying squirrels (*Glaucomys volans*) that were in the cavity. Twice I have seen gray rat snakes successfully climb over partially dried gum to gain access to Red-cockaded Woodpecker cavities without active nests (Fig. 1A).

On 22 May 1976, at Noxubee National Wildlife Refuge, Winston County, Mississippi, I discovered a gray rat snake in a Red-cockaded Woodpecker nest; he had just eaten the young which were near fledging age. The nest tree, a loblolly pine (*Pinus taeda*), was wet with gum flowing from resin wells, but considerable gum had accumulated as a shelf 12 m up and just below the cavity entrance. With continued buildup of the shelf, the dried gum became too heavy and a large segment of the shelf had earlier fallen from the tree leaving a dry, bare pathway through the wet gum to the cavity (Fig. 1B). This was the apparent route taken by the snake in climbing to the cavity because no wet gum was found on the snake's body. Evolution and persistence of such a defense mechanism as the Red-cockaded Woodpecker's resin wells would seem unlikely, because of the energy expenditures required of the birds to maintain the barrier, unless rat snakes are sometimes successful in preying on the young or adults in less well protected cavities as demonstrated here.

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