AGE CHARACTERISTICS OF RED-COCKADED WOODPECKERS

By Jerome A. Jackson

Characteristics that can be used to separate juvenile from adult birds are of paramount importance to the population ecologist who must work with known age birds but who cannot remove nestlings for marking. Because of its endangered status and habits of nesting in a cavity in a living pine and excavating resin wells such that the surface of the tree is covered with sticky gum, the Red-cockaded Woodpecker (*Picoides borealis*) poses difficult or impossible problems in banding nestlings. Fledged birds, however, can be caught in a net as they leave the roost hole (Jackson, 1977). I present here a summary of characteristics that can be used to distinguish juveniles from adults.

STUDY AREAS AND METHODS

My work with Red-cockaded Woodpeckers has included banding studies at (1) Noxubee National Wildlife Refuge in Oktibbeha, Winston, and Lowndes counties, MS; (2) Fort Benning, Chattahoochee Co., GA; and (3) the Savannah River Plant, Aiken and Barnwell counties, SC. The banding studies in Mississippi began in 1971 and are continuing; those in Georgia and South Carolina began in 1976 and 1977, respectively. In addition to the field studies, I have examined specimens in the Mississippi State University Zoological collections, at the University of Kansas Museum of Natural History, the U.S. National Museum, the Museum of Vertebrate Zoology at the University of California at Berkeley, and the Museum of Zoology at Louisana State University. Between 1971 and 1978, I banded 31 adult, 13 hatching-year, and 59 nestling Red-cockaded Woodpeckers at Noxubee National Wildlife Refuge. At Fort Benning during 1976 and 1977, I banded 10 adults and 1 nestling, and at the Savannah River Plant during 1977 and 1978, I banded 8 adults and 2 nestlings. At each site I have made multiple recaptures of banded birds. At capture or recapture each bird was examined for plumage condition and molt. Previous studies have indicated the possible use of the size of the 10th primary (George, 1972; pers. obs.), iris color (Wood, 1969; Wood and Wood, 1973), and extent of the eyering (Lawrence, 1967) as indicators of age in other species of *Picoides* woodpeckers. Thus, these features in particular were examined. I plucked the 10th primary from the right wing of many birds for subsequent comparison and analysis. Length and maximum vane width of plucked 10th primaries were measured with dial calipers graduated to 0.05 mm. A quantitative measure of feather "pointedness" was obtained by matching feather tip outlines with a series of 8.5 mm ellipses (10°, 15°, 20°, 25°, and 30°) (RapiDesign template No. 73). When possible, I compared iris color of birds with color chips in Smithe (1974). Capitalized color names refer to specific colors in Smithe (1974).

RESULTS

Length of 10th Primary

As with many other species of North American woodpeckers (pers. obs. of museum skins), the 10th primary of juvenile Red-cockaded Woodpeckers is generally longer, broader, and more rounded than that of adults (Fig. 1). Measurement data for the 10th primary of adult and juvenile Red-cockaded Woodpeckers are summarized in Table 1. No significant differences were found between adult males and females for any of the three measured characteristics (t-tests, $P > .1$). Comparisons of adults with juveniles revealed highly significant differences in all three features (t-tests, $P < .001$). Because primary 10 is the last to be molted, this feather alone can be used to identify most juveniles until near the completion of the first prebasic molt. Known hatching-year Red-cockaded Woodpeckers at Noxubee Refuge retained their juvenal

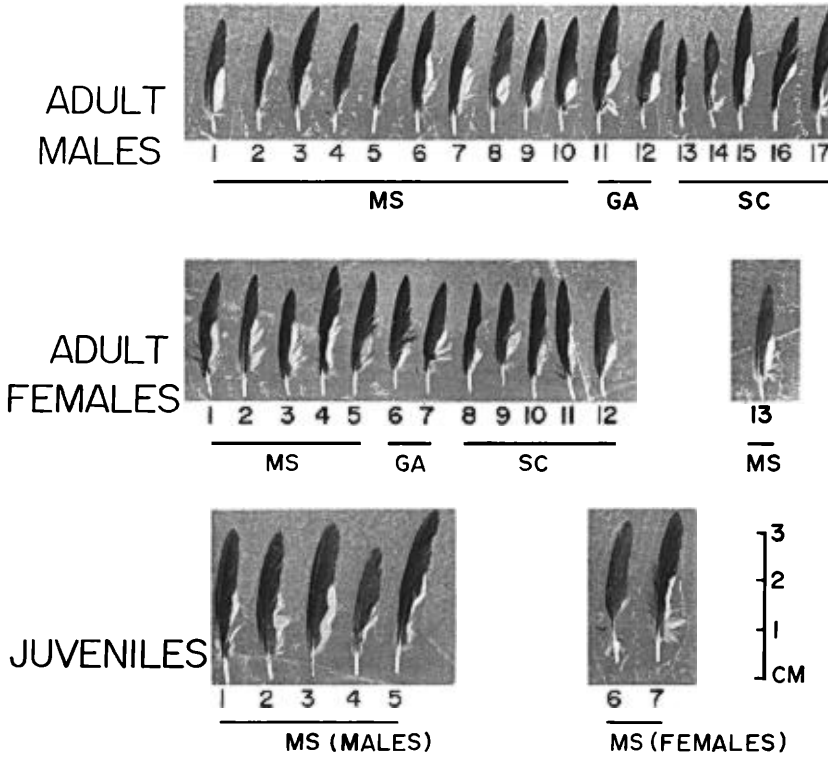

FIGURE 1. Examples of 10th primaries from adult and juvenile Red-cockaded Woodpeckers from Mississippi, Georgia, and South Carolina. Much variation occurs among 10th primaries within age groups, but little overlap occurs between age groups. Feather number 13 of an "adult" female from Mississippi is from a hatching-year bird following the first prebasic molt.

TABLE 1.
Characteristics of Primary 10 of Red-cockaded Woodpeckers with juvenal and adult plumage.

Plumage	Sex	N	Primary 10 length (mm) Mean ± SD (range)	Primary 10 width (mm) Mean ± SD (range)	Primary 10 pointedness (°) Mean ± SD (range)
Adult	Male	27	24.1 ± 2.61 (18.9–28.5)	4.3 ± .62 (2.8–5.2)	12.6 ± 2.6 (10–15)
Adult	Female	15	22.9 ± 1.86 (19.1–25.9)	4.5 ± .40 (3.3–4.9)	12.3 ± 3.2 (5–15)
Adult	Both	42	23.7 ± 2.41 (18.9–28.5)	4.3 ± .56 (2.8–5.2)	12.5 ± 2.8 (5–15)
Juvenal	Both	7	30.3 ± 2.38 (26.3–33.7)	5.7 ± .57 (5.1–6.7)	22.1 ± 3.9 (20–30)
Juvenal	Male	5	30.6 (26.2–33.7)	5.8 (5.1–6.7)	23.0 (20–30)
Juvenal	Female	2	29.6 (28.8–30.3)	5.4 (5.3–5.4)	20.0

10th primary as late as 14 September, and it seems likely that some may keep it until early October. A juvenile from Tift County, Georgia (LSU #76022) still had the juvenal 10th primary when collected on 20 September 1941. Some adults from all three study areas were still molting primaries into the middle of October. Although the statistics in Table 1 and the photographs in Figure 1 may safely allow a researcher to age birds, I recommend that one of the 10th primaries be plucked from each banded bird for later comparison. Mengel and Jackson (1977) have described significant geographic variation in wing length of Red-cockaded Woodpeckers, and the measurements of primary 10 might also vary geographically. The three areas from which birds were examined for this study are all at approximately the same latitude, and specimens from these approximate areas were not found to vary significantly in wing length (Mengel and Jackson, 1977).

George (1972) cautioned that some Downy and Hairy woodpeckers (*Picoides pubescens* and *P. villosus*) show asymmetry in the size and shape of their 10th primary. Although he acknowledged that this was generally minor, he did find some cases where the 10th primary of one wing would lead the observer to identify the bird as a juvenile, whereas the 10th primary of the other wing would suggest the bird was an adult. I also found minor asymmetry (1–3 mm difference between wings). The only case of extreme asymmetry was a juvenile from which I had previously removed the right 10th primary. A new feather that was adult in appearance had replaced it. It would be judicious to examine both wings when basing age decisions on 10th primary size and shape alone.

Iris Color Change

As with Downy Woodpeckers (Wood and Wood, 1973) a change in iris color was found from nestling to adult. All nestlings handled have had dark irides with a distinct Buff-Yellow to Smoke Gray component. Fledglings by August had irides that were darker, with less of a yellow component, but that were still separable from the irides of adults because they were more Fuscous, lacking the red component that is typical of adult birds. The irides of adults were a very deep chestnut. I have not been able to distinguish most juveniles from adults by iris color beyond mid-September. In my opinion, while real, these iris color differences are difficult to work with and useful only as a supplemental source of information to support age determination suggested by other characteristics. Use of iris color as a key to age requires good light conditions.

"Cheek" Color

Nestling and fledgling Red-cockaded Woodpeckers have a distinct gray area in the ocular-auricular regions (Fig. 2). This is most intense immediately behind the eye and in nestling birds, but is sufficiently distinct in some juveniles through early September that they can be identified as such at a distance with binoculars. A juvenile from Tift

FIGURE 2. A juvenile male Red-cockaded Woodpecker photographed on 16 September 1978 at Aiken, SC. Note the gray area in the cheek patch just behind and below the eye, the abbreviated superciliary stripe, and the white feathers extending toward the crown from the beak.

County, Georgia (LSU #76022) collected on 20 September 1944, has new auriculars that are still partially ensheathed. The gray appearance is a result of (1) some entirely pigmented ocular feathers that emerge from just below the eye and extend postero-dorsally, and (2) pigmented tips on the barbs of some auriculars. These wear somewhat and the auricular area begins to appear whiter even before the first prebasic molt. Following the first prebasic molt, the "cheek" feathers are entirely white.

Superciliary Stripe

The white superciliary stripe of juvenile Red-cockaded Woodpeckers does not connect with the white of the auricular region (Fig. 2). Following the first prebasic molt the superciliary stripe is longer and is often continuous with the white cheek. One male juvenile was beginning to molt auriculars on 6 August 1972. At that time primaries 1 through 7 were new, new primary 8 was ¼ in and primaries 9 and 10 were still old. The shortness of the superciliary stripe may also be of use in identifying a juvenile in the field. I have observed that juvenile Downy and Hairy woodpeckers also have an abbreviated superciliary stripe, although this characteristic was not mentioned by George (1972).

Extent of the Eye Ring

I was unable to identify any consistent difference between juvenile and adult Red-cockaded Woodpeckers in the extent of the white ring around the eye. Adults often had a complete white eye ring and juveniles generally did not. However, I found no juveniles—banded birds or study skins—that completely lacked white feathers.

Crown Pattern

Juvenile male Red-cockaded Woodpeckers invariably have a patch of red feathers centered on the forehead as do young of some other *Picoides*. They lack red feathers where the cockades of adult plumage will appear. Thus, for a time, young males can easily be identified in the field. Juvenile females lack the red feathers, but generally have a few white feathers on the forehead. These white feathers cannot be used as a reliable indicator of age, however, since some adults have similar markings. Crown molt in juveniles begins at about the time primary 8 is lost. Some hatching-year males with adult cockades can still be aged by the size and shape of primary 10.

General Plumage Condition

Juvenile Red-cockaded Woodpeckers (and also other juvenile *Picoides*) have a dull plumage that is browner than that of adults. The adult plumage, while not iridescent, appears smoother, shinier, and blacker—even in worn adults—than does that of juveniles. Dwight's (1900: 106) comments on the juvenal plumage of passerines also holds true for these woodpeckers: "The body plumage is softer and the feathers less dis-

tinctly pennaceous than those of the adult while the remiges and rectrices although frequently appearing identical with adult feathers are regularly less pigmented and suffer more from wear probably because of their less compact margins."

George (1972) suggested that some adult feathers of Downy and Hairy woodpeckers may have more barbs per unit of shaft length than do juvenal feathers. I examined the central rectrices of four juvenile (1♀, 3♂) and eight adult (4♀, 4♂) Red-cockaded Woodpecker specimens in the collection at Louisiana State University. Barb counts were made midway along the rachis with a 25× binocular microscope. Barbs of both vanes were counted. Juvenal rectrices had an average of 4.35 barbs per mm of rachis (4.6, 4.4, 4.2, 4.2 barbs/mm) and adult rectrices had an average of 4.75 barbs per mm (5.0, 5.0, 4.8, 4.8, 4.8, 4.6, 4.6, 4.4). Barb counts for upper breast feathers (ones with black spots) averaged 3.77 barbs/mm for 3 juveniles (4.5, 3.5, 3.3) and 4.47 barbs/mm of rachis for 3 adults (4.5, 4.5, 4.4). Whereas these data are minimal, they do support George's suggestion. As with iris color, differences in barb counts between juveniles and adults appear to be real, but in themselves are not of major importance in identifying the age of a bird. However, they are likely the reason for the overall fluffier, more ragged appearance of a juvenile.

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Department of Zoology, Mississippi State University, Mississippi State, MS 39762. Received 23 March 1978, accepted 7 August 1978.