

AGE DETERMINATION OF HAIRY AND DOWNY WOODPECKERS IN EASTERN NORTH AMERICA

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Failure to employ dependable sets of alternative age-linked traits has led to some incorrect aging of Hairy Woodpeckers (*Dendrocopos villosus*) and Downy Woodpeckers (*D. pubescens*) in museum collections and correspondingly, no doubt, in banders' catalogues. For example, presence of a male red nuchal patch is inconclusive evidence of an adult or subadult from August to October. The statements of Bent (1939), Roberts (1955) and Wood (1969) notwithstanding, young males acquire much if not all of this nuchal patch during juvenile life.

The present paper stems from a general investigation of the first prebasic (postjuvinal) molt in birds and from observations on three young Hairy Woodpeckers taken from a nest in southern Illinois in 1967. Two of these captive birds survived the juvenile and subadult stages; one, a male, lived eighteen months. Other work included examination of four broods of young Downy Woodpeckers at the time of fledging in southern Illinois, and the study of 72 juvenile and several hundred adult Downy Woodpeckers as well as 29 juvenile and 60 adult Hairy Woodpeckers in the American Museum of Natural History.

The composition of the museum specimens makes it prudent to limit the treatment below to the eastern races of both species: *D. p. medianus* and *D. p. pubescens* and *D. v. villosus*. I have examined relatively few juvenile specimens of the other races. Nevertheless it seems evident that throughout the species' ranges north of Mexico the birds generally follow the same patterns as the eastern races with respect to the aging criteria emphasized in this paper: (1) the differences between the wing molt of juveniles and older birds, and (2) the difference in length of the outermost primary in juveniles as compared to subadults and adults.

Geographically, the coverage below includes the breeding ranges given for the above-named races in the AOU Check-list of North American Birds (1957). Age-class definitions are as follows:

Juvenile—a fledged bird that has not completed the first prebasic molt.

Subadult—a bird that has completed the first prebasic molt but has not begun the second prebasic (first postnuptial) molt.

Adult—a bird that has begun or completed the second prebasic molt (such a bird is at least 14 months of age).

FIRST PREBASIC MOLT

General Description. Some authors (Bent, 1939; Wood, 1969) state that the first prebasic molt in Hairy and Downy woodpeckers is complete, but it is not. The body plumage, rectrices, and all primaries are replaced but all secondaries and some upper wing coverts are retained.

Loss and replacement of the juvenal primaries begins with the innermost (No. 1) and proceeds outward, continuing until the outermost primary (No. 10) is renewed.

If my captive birds provided an accurate index, juvenile Hairy Woodpeckers take roughly four months to complete this molt. Juvenile Downy Woodpeckers apparently require a shorter molting period but juveniles of both species occur on the breeding grounds as late as, and on rare occasions even later than, mid-October, along with adults completing their second prebasic molt.

Abbreviated Juvenal Inner Primaries and the Wing Molt. The inner two primaries of nestling Hairy and Downy woodpeckers are dwarfed (Chapin, 1921) and neither is retained long. Loss of the innermost one (No. 1), which occurs in some birds just before fledging and in others just after fledging, marks the onset of the wing molt. Soon the other dwarfed primary (No. 2) drops out and the new full-sized replacements begin to grow in. Characteristically, the long outer primaries (Nos. 8 and 9) of such birds are sheathed; often, moreover, Primary No. 7 exists in a sheath at this time. Thus fledglings may exhibit four or five sheathed primaries, a condition never seen in adults as far as I am aware.

The sheathed primaries, the sheathed tail, fresh body plumage (summer breeding birds have worn plumage and often a brood patch), and small bill collectively make the juveniles easy to distinguish for some time after they leave the nest. The young males usually have red or pinkish crown feathers and for as long as the birds retain these feathers, they may safely be judged juveniles. Most females, however, lack this feature (Bent, 1939), and as soon as their wings, tail and bill reach near-adult proportions they tend to resemble the adult female. Their flanks may or may not be finely barred. Wood (1969) ascribes barred flanks to all juveniles but this is incorrect, and in any case such bars tend to wear away or disappear in the body molt. Barred flanks have been noted in Hairy Woodpeckers that had completed the first prebasic molt (Kenneth C. Parkes, pers. comm.).

Length and Shape of the Juvenal Outermost Primary. This primary (No. 10) is the initial one to grow out fully despite its terminal position in the wing; it is also the last primary to be renewed. It is a small pointed feather in all age classes but in juveniles it is both less lanceolate (Figure 1) and larger than in subadults and adults. In my hand-raised male Hairy Woodpecker, for example, it was more-or-less round-tipped and measured 29 millimeters when badly worn in the juvenal wing. By contrast, its lanceolate replacement measured only 18.5 millimeters when fresh in the subadult wing. The adult tenth primary in this same bird was similarly small and lanceolate.

Table 1 gives the maximum and minimum lengths of the tenth primary in Hairy and Downy woodpeckers of different age classes. In taking these measurements a thin celluloid 50-millimeter ruler was placed beneath the feather (usually on the left wing) and slipped upward until the rule margin firmly met the feather's inserted base.

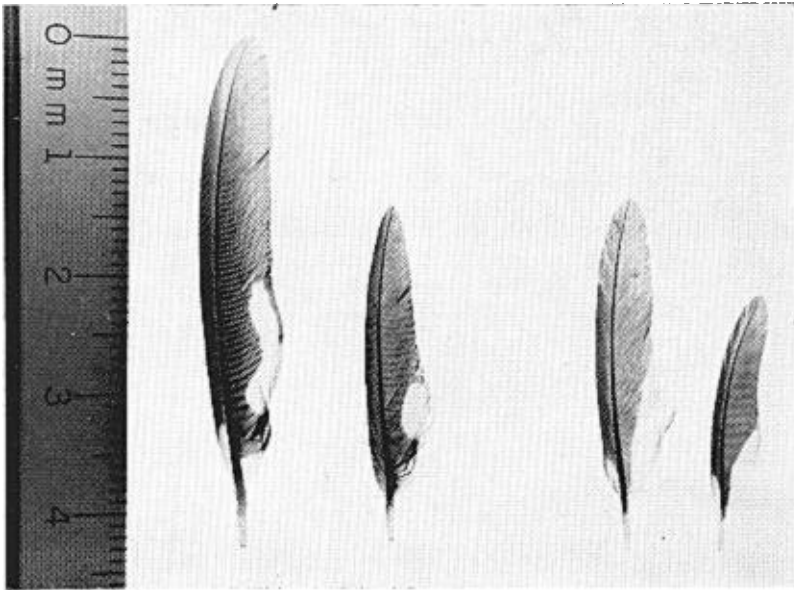


FIGURE 1. Juvenile and adult tenth primaries of Hairy (left side pair) and Downy woodpeckers. The larger of each pair is juvenile.

I obtained, as the table shows, no evidence of overlap between juvenile and adult measurements in either sex of either species. In fact, the juvenile feather is often so conspicuously enlarged as to enable the aging of most young specimens at a glance. However, the

TABLE 1. Length of tenth primary in Hairy and Downy woodpeckers.

	n	Range	Mean \pm S. E.
Hairy Woodpecker			
ad. ♂	25	20 — 28.5 mm	24.96 \pm 0.46
juv. ♂	19	29 — 36	32.95 \pm 0.44
ad. ♀	27	17.5 — 28	23.94 \pm 0.44
juv. ♀	20	30 — 38.5	33.18 \pm 0.45
Downy Woodpecker			
ad. ♂	97	14 — 18.5	15.78 \pm 0.11
juv. ♂	37	19 — 29	23.12 \pm 0.35
ad. ♀	67	14 — 18	15.90 \pm 0.10
juv. ♀	27	21 — 30	24.83 \pm 0.45

length of the tenth primary should be used with great caution as an aging criterion and only after both wings have been examined, for in some specimens (my data indicate 40%) considerable asymmetry exists with respect to the length of this feather. Juveniles with a relatively long tenth primary in one wing and a much shorter one in the other are rare, but I have encountered several such cases. To cite one extreme example, a juvenile male Hairy Woodpecker (AMNH No. 363129) from Tadousac, Quebec, exhibits on the right side a tenth primary of 38.5 mm in length (indicating a juvenile) and on the left side a feather measuring 24 mm (indicating an adult); furthermore the latter primary is adult in shape. Though an aberrant bird, this specimen signifies the hazard of relying on a single measurement or a single observation. The usual case of asymmetry involves only two or three mm of difference in length, which is more than sufficient to prove misleading in the case of some birds, especially in older juveniles with badly worn outer primaries. Such birds, as well as specimens exhibiting a tenth primary in either wing of less than 30 mm in the Hairy and 21 millimeters in the Downy probably should be aged according to another aging character, namely the presence or absence of molting secondaries.

Retention of Juvenal Secondaries. As mentioned earlier, subadults and adults shed their secondaries in the prebasic molt, whereas juveniles do not. Hence any bird that displays both sheathed primaries and sheathed secondaries is in its second or later prebasic molt.

Order of molt of the secondaries is indicated in Table 2. The initial secondaries to be lost in the Hairy Woodpecker evidently are Nos. 8 and 10 and in the Downy Nos. 7 and 8 (the outermost secondary is No. 1, the innermost No. 10). The last ones to be molted in the Hairy are Nos. 4 and 5, and Nos. 2 and 5 in the Downy. Birds molting the ninth and tenth primaries invariably have molting secondaries. Moreover, in typical specimens the last remex to be molted is a secondary; therefore a fall bird with a complete set of fresh primaries but with a sheathed secondary is an adult and not a bird-of-the-year.

Replacement of Juvenal Outer Primaries and Development of Male Red Nuchal Patch. In juvenile male Hairy and Downy woodpeckers, the red nuchal patch partly comes in and is conspicuous before replacement of the ninth and tenth primaries. In my hand-raised male Hairy, the juvenal red crown feathers commenced to vanish at about the time of replacement of primary No. 7, with the red nuchal patch coming in *before* the loss of the ninth primary and the tenth primary. This is the developmental stage which no doubt generates the greatest number of incorrectly aged specimens in collections. Regrettably, the length of the tenth primary in birds with a red nuchal patch can aggravate the tendency to age the specimens incorrectly, because the loss of the tenth primary typically occurs before the new subadult ninth primary grows in fully and then the new tenth primary completes its growth before the ninth fully sheds its sheath. Thus at the terminal stage of the first pre-

TABLE 2. Correspondence between loss and replacement of primaries and secondaries in the second (and subsequent prebasic molts of Hairy and Downy woodpeckers.

		Primaries								
		1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10 ^a
Hairy Woodp.										
Secondary	8, 10	3, 8, 10	3, 6, 7, 10	1, 2, 3, 6, 7, 10	1, 2, 3, 6, 7	2, 6	2, 6, 1, 4	1, 4	4	
Downy Woodp.										
Secondary	7, 8	3, 4, 6, 7, 8, 10	3, 4, 6, 7, 9, 9	4, 6, 7, 8, 9, 10	1, 6, 7, 8, 9, 10	1, 3, 7	2, 3, 5, 7	2, 3, 5	2	

^aIn Hairy Woodpeckers secondary No. 5 is renewed after renewal of all primaries. In Downy Woodpeckers secondary No. 2 may still be sheathed after complete renewal of the primaries.

basic wing molt, a juvenile with a partial red nuchal patch may exhibit a small tenth primary and on that basis be mistakenly judged an adult completing the second or later prebasic molt. The way to avoid committing this error is to examine the wing for the presence of sheathed secondaries and to be guided accordingly.

Eyering in Hairy Woodpeckers—Adult, subadult, and fledgling Hairy Woodpeckers display an eyering composed of small black and white or gray feathers. The fledglings soon lose these feathers and for a period lasting about seven weeks (during replacement of primaries Nos. 3 through 8) only blackish bare skin is present around the eye. A conspicuous white eyering then begins to appear as a series of separate specks; these are augmented by a series of intercalated black feathers, with the resulting eye-encircling plumage reaching completion at about the time of replacement of the ninth and tenth primaries. A reader wishing other details should consult Lawrence (1967) who comments: "Because the missing white eyering enables the observer to separate young from old Hairy Woodpeckers in the field, especially useful in the case of females, a further more specialized investigation might be of interest."

EYE COLOR

Nestling Hairy and Downy woodpeckers in southern Illinois exhibit a pale gray or olive iris that becomes brown before or soon after a bird fledges, usually by the time juvenal primary No. 3 is replaced. Keys given by Wood (1969) indicate that juveniles of both species have an olive-colored iris, but Wood probably intended his diagnosis to refer only to very young specimens.

According to this same author, a "deep red iris" characterizes the adults in both species. Some living birds, probably including subadults, certainly exhibit such an iris, but seasonal, sexual, geographic, and age variation of iris color in Downy and Hairy woodpeckers seems not to have been investigated in sufficient detail to allow acceptance of Wood's categorical statement.

DISTINGUISHING BETWEEN SUBADULTS AND ADULTS

A method of distinguishing subadult and adult Hairy and Downy woodpeckers ultimately may be worked out from studying, in marked birds of known age, juvenal feathers retained by subadult specimens. My two hand-raised Hairy Woodpeckers retained the juvenal greater upper primary coverts associated with primaries Nos. 6, 7, 8, and 9. Faded and worn, these coverts composed by fall a kind of wing "speculum," standing out in sharp contrast to the darker pigmentation of the fresh primaries. Examination of fall-collected museum material revealed, both in Hairy and Downy woodpeckers, many such specimens. However, few birds collected in winter, spring or early summer exhibit a "speculum," possibly because with the passage of time the primaries wear and fade, masking the original conspicuousness of the old coverts. Possibly the old coverts are replaced during the non-breeding months. Yet

I have never seen an October-to-June specimen that shows the greater upper primary coverts in molt.

According to Robert C. Leberman, some adults display worn coverts; he writes (pers. comm.) "On a number of occasions I have handled fully adult Downy Woodpeckers that have shown "brown" or badly worn primary coverts contrasting with the black primaries, including one individual that had been banded seven years earlier."

A second possible means of separating adults and subadults could result from thorough studies of the remiges, especially of the secondaries. Plucked subadult and adult secondaries in my possession appear indistinguishable in pattern and measurements, but a preliminary investigation indicates that the adult feathers possess more barbs per unit of shaft length than do the subadult examples. A technique based on barb counts is perhaps feasible.

SHORT KEY TO AGE DETERMINATION OF HAIRY AND DOWNY
WOODPECKERS BETWEEN JUNE AND NOVEMBER

The effect of dehydrated wing tissues on the measurements given below is probably negligible; however, discrepancies between measurements of remiges in living and preserved specimens have been noted in some species (Vepsalainen, 1968). This fact should be borne in mind when handling living birds, the tissues of which are readily subject to compression and displacement.

A. Plumage of Head.

At least some crown feathers reddish, yellowish, or white-spotted.....juvenile
No reddish or yellowish crown feathers (crown black).....B

B. Length of Tenth Primary.

Hairy Woodpecker.

Primary 29 mm or longer.....juvenile (but see text)
Primary less than 29 mm.....C (but see text)

Downy Woodpecker.

Primary 18.5 mm or longer.....juvenile (but see text)
Primary less than 18.5.....C (but see text)

C. Presence of Sheathed Primaries and Secondaries.

Sheathed primary (-ies) present but no sheathed secondary (-ies).....juvenile
Sheathed secondary (-ies) present.....subadult or adult

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