Toward more effective age determination of banded birds

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In recent years there has been an increased emphasis by banders on developing and using methods to better determine the age of passerines and other commonly banded birds. Publication of Merrill Wood's A Bird-Bander's Guide to Determination of Age and Sex of Selected Species drew attention to certain known material. Prof. Wood contributed other new material and also made known some of the voids. More recently the Bird Banding Laboratory of the U.S. Fish and Wildlife Service circulated proposed age- and sex-determining schemes to a number of banders for comment. Subsequently these were published as part of the North American Bird-Banding Manual. This increased interest in age determination has sent banders back to classical identification texts to search out and use information contained therein. Some banders have taken a new look at the birds they handle and have discovered other plumage characteristics that allow separation of age groups.

To the new bander some of this information may appear complex and mysterious, if not overwhelming. To the more experienced bander familiar with this information, there is a recognition that much still remains to be learned. With these divergent views in mind, I shall try to approach age determination from a different perspective using a more basic approach to the methods involved. I would hope this will help the beginner to better apply current knowledge and will challenge and encourage all banders to seek out new, useful age-determining clues from individuals that they frequently handle.

Typically, some banders approach age determination of birds on a species-by-species basis. However, to better understand the basics, it pays to momentarily ignore the species and concentrate on the methodology. From such sources as Wood's guide (1969), the Bird-Banding Manual (1976, 1980), T. S. Roberts' A Manual for the Identification of Birds of Minnesota and Neighboring States, J. Dwight Jr.'s The Sequence of Plumages and Molts of Passerine Birds of New York, and some miscellaneous sources, I have gathered below a list of some frequently used morphological criteria that separate hatching-year-/second-year (HY/SY) birds from after-hatching-year/after-second-year (AHY/ASY) birds. For each criterion, some representative species examples are cited. The list given here is for illustrative purposes and is not intended to be an all-inclusive collection of criteria or exemplary species.

The 12 criteria fall into two main classes: 1) those related to some manifestation of molt; and 2) those which relate to differences in the color of the soft parts of the head, i.e., eye area, mouth, and gape. The molt criteria further divide into two groups: 1) those in which a part of the retained juvenal plumage differs from that of the second and subsequent basic (postnuptial) plumages; and 2) those in which the first basic (postjuvenal) plumage differs from subsequent basic (postnuptial) plumages.

Molt related

a) Tertial feather marking—Most passerines do not molt the tertials at the time of their first prebasic (postjuvenal) molt. Therefore, they carry these 3 feathers for the first 14–16 months of life. In some species the markings on these juvenal tertials are different from tertials that have undergone renewal at a subsequent molt. Examples: Evening Grosbeak (HY males have a grey or smokey inner edge on their white tertials while AHY-M's are all white); Dark-eyed Junco (HY has brown outer edges in contrast to the grey of the newer greater coverts; AHY has uniform grey on the tertials and the greater coverts); and Ovenbird and Northern and Louisiana Waterthrushes (HY's are buff tipped; AHY's are not).

b) Primary feather shape or size—In the few cases where this difference between HY and AHY birds is applicable, it involves the outer primaries. Differences in shape caused by notching of the outer 2 to 4 primaries separate HY (not notched) from AHY (notched) Eastern, Western, and Cassin's Kingbirds. The length of the tenth

primary (longer and rounded in HY, shorter and pointed in AHY) separates Bushtits. This also applies to Hairy and Downy Woodpeckers, but only to the extent that it can separate juveniles. When these juveniles undergo their first prebasic (postjuvenal) molt, the primaries are molted and the HY and AHY become indistinguishable in this regard.

c) Wingbar color—Wingbars are generally created by the edgings of the middle coverts and/or greater coverts. In one instance, this distinction separates only the juvenile, as in the case of the Pine Siskin (buffy juvenal greater covert edges, whitish thereafter). In others, it separates HY from AHY. Examples: Eastern Phoebe, *Empidonaces*, and American Goldfinch (buffy HY greater covert edges; whitish in AHY); Red and White-winged Crossbills (buffy HY; lacking in AHY); Pine Grosbeak (buffy middle and greater coverts in HY; white in AHY); and Vesper Sparrow (middle coverts edged with dusty chestnut in HY; bright chestnut in AHY).

d) Retained coverts—Most passerines of both the HY and AHY age groups molt the greater coverts at the prebasic (postjuvenal or postnuptial) molt. However, some of the HY's of some species undergo this renewal incompletely. In those cases where the juvenal greater coverts are distinctly different from the basic greater coverts, those individuals may be easily recognized. Examples: the juvenile *Hylocichlid* thrushes and juvenile Dark-eyed Junco have distinctly spotted greater coverts which are variably retained into the first winter; while HY Blue Jays occasionally retain outer juvenal greater coverts which are dull blue-grey and tipped with white, lacking the brighter blue and black striping of the renewed coverts. These retained coverts appear to be completely renewed at the following prebasic (post-nuptial) molt.

In a similar though not identical sense the lesser coverts may serve to separate ages. In the case of the Redwinged Blackbird, it is clear that the lesser coverts are renewed at the first prebasic molt; however, they are a distinctly different pale red in the HY/SY and bright red in the AHY/ASY. In the case of the American Goldfinch, the lesser coverts after the first prebasic molt are distinctly different (greenish buff) in the HY male from those in the older male (bright yellow); however, it is not clear to me whether this is the result of retention of the juvenal coverts or molting to an intermediate covert color that lasts only one year.

e) Alula color—Some species possess fine edgings to one or more feathers of the alula. In at least two cases, the color of this edging changes with age. Examples: Black-throated Blue Warbler (HY-M has a green edge on blue; AHY-M has no green) and Northern Parula (HY's have green edge on blue; AHY's have no green).

f) Covert/flight feather contrast—There are many dark-winged species which possess a juvenal wing plumage that is less intense in color than that of subsequent adult wing plumages. At the first prebasic (postjuvenal) molt, the less intensely colored primaries, primary coverts, and secondaries are normally retained, while the lesser, middle, and greater coverts are renewed. These renewed tracts assume a more intense coloration which produces a contrast between them and the retained primaries, secondaries, and primary coverts. Examples: Northern Oriole, Black-and-white Warbler, many of the *Dendroica* warblers, Scarlet Tanager, Rose-breasted Grosbeak, Evening Grosbeak, Rufous-sided Towhee, and Grey Catbird. Primary coverts in the Indigo and Lazuli Buntings provide similar contrast. The HY's are grey and the AHY's are blue. Even in a light-colored species such as the Yellow Warbler (also a member of the *Dendroica*), the yellow edging of the primaries, secondaries, and greater coverts is uniformly bright in the AHY/ASY's while in the HY/SY's the brighter edges of the newer coverts contrast with the duller edges of the older primaries and secondaries.

g) Underwing covert color—Few banders appear to pay much attention to the underwing plumage, but at least one species shows a color change in the underwing coverts. Male Brown-headed Cowbirds show dull grey-brown coverts in HY's and metallic black in AHY's.

h) Rectrix shape—There is a tendency for juvenal retrices of some species to be more pointed than those of the AHY's which have undergone at least one renewal. This tendency manifests itself in several ways. In the case of the Bobolink, sharper taper to the edges of the nearly symmetrical central pair in the HY distinguishes it from the less sharp AHY pair. In other species the retrices are lanceolated to give the appearance of pointedness. In still others such as Scarlet Tanager and American Goldfinch, the appearance of pointedness is created by a different curvature of the tip of the inner, wider vane. This aspect is illustrated in L. Svensson's Identification Guide to European Passerines.

Soft part color

a) Eye color—Many species exhibit changes in the eye color that differentiate HY's from older birds. In some, a brown or grey-brown eye either becomes red or undergoes reddening. Examples: Hairy and Downy Woodpeckers, Northern Flicker, Dark-eyed Junco, White-throated Sparrow, Song Sparrow, Red-eyed Vireo, Grey Catbird, and Cedar Waxwing. In others, the change involves intensification of a yellow or white coloration. Examples: Northern Mockingbird, Brown Thrasher, and White-eyed Vireo.

b) Eye ring color—In at least one species, a fleshy eye ring changes color with age: Black-billed Cuckoo (yellow in HY, red in AHY). In some other species, the feather tract round the eye, known as the orbital ring, exhibits differences: Connecticut Warbler (buffy in HY, white in AHY), and Mourning Warbler (incomplete white in HY-M and none in AHY-M; incomplete yellow or buff in HY-F and incomplete white in AHY-F).

c) Gape color—Banders who handle nestlings are familiar with how many of them have fleshy gapes at the base of the bill. Often they are yellow, though not always. Some species undergo changes in color of the gape as they mature. Examples: Yellow-billed and Black-billed Cuckoos (HY yellow changes to AHY grey); House, Winter, and Carolina Wrens (HY yellow to AHY brown); and white-throated Sparrow (HY yellow to dull bluish grey of flesh in AHY). An example of color change not involving yellow is the Blue Jay, where HY white changes to AHY black.

d) Mouth color—The fleshy lining of the mouth and bill differs in HY and AHY members of some species. Several different color combinations exist. Examples: Yellow-billed and Black-billed Cuckoos (HY grey to AHY black); American Crow (HY pink to AHY black); Blue Jay (HY white to AHY black); Eastern Kingbird (HY intense yellow to AHY flesh); and Purple Martin (HY yellow to AHY horn).

(All of the species names referred to herein are consistent with the terminology of the AOU Check-list, 6th Edition, 1983.)

Additional plumage differences that rely on shape, size, and relative lengths of feathers, and feather marking, are covered in Svensson's (1975) European guide. I recommend its use as a reference on the species and their near relatives, that we in North America share with Northern Europe; and for the overall, unique approaches that it uses for species identification and age and sex determination. It illustrates some valuable methodology that should find applicability even though many of the species are different. It may be ordered directly from the Natural History Museum in Stockholm, Sweden, or from the British Trust for Ornithology.

Equipped with this recognition of these age-determining criteria, more banders will, I hope, examine eye color, feather shape, etc. in the species they frequently handle. Banders who recapture returning breeding birds have the opportunity to compare adults of known age with each year's crop of young. Returning wintering species offer the same opportunity, because many of them arrive early enough in the autumn or winter when the degree of skull pneumatization allows recognition of the young. Even some transient autumn migrant populations are readily separated into groups of young and old.

In those cases where this separation can be done reliably, it pays to examine these birds for further age-determining clues. Then, once skull pneumatization is complete and may no longer be relied on from autumn through the next breeding season, these plumage and soft part criteria may be used to determine the age of spring migrants and breeding populations. Another advantage of reliable plumage characteristics is the time they save in the handling of autumnal migrants by eliminating the need to perform the often more time-consuming task of skull examination.

In any event, enjoy the search. It is not always easy, but discovering something useful adds a rewarding dimension to one's banding endeavor.

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