MEMORANDUM

TO : All Banders

September 20, 1967
MTAB #9

FROM : Chief, Bird Banding Laboratory
Migratory Bird Populations Station
Laurel, Maryland 20810

SUBJECT: 1. Delays in processing banding data

2. Transmission of species, age and sex criteria -- warblers

1. As most of you know, the staff in the Bird Banding Laboratory has been making a concerted effort to clear up banding data backlogs. After the expenditure of literally thousands of hours of overtime, we were finally (and probably temporarily) able late this summer to declare the Bird Banding Laboratory as being "current." All banding schedules received from banders had been edited and made ready for key punching.

Likewise, "trap sheets" (Form 3-137b) which have accumulated since the late fifties have also been removed from the files, edited and made ready for entry into the computer files.

The splendid cooperation we have received from most banders in insuring that their incoming data were complete, accurate and submitted at the earliest possible date has been of great assistance in enabling us to reach this point.

All recoveries and foreign retraps have been read, coded and transmitted to the Automatic Data Processing Section.

The removal of this backlog from the Banding Laboratory, however, has created serious problems in the Automatic Data Processing Section. This large volume of data has literally swamped the Automatic Data Processing Section's key punch staff.

As most of you know, the Automatic Data Processing Section is a unit separate and apart from the Bird Banding Laboratory. We are only one of several "customers" whose data this unit must handle. The problems associated with handling this tremendous influx of data have also been seriously complicated by the amount of planning and preparation necessary for the impending conversion from a card-oriented to a magnetic tape-oriented computer system which is due to take place later this month.

Despite the fact that we have contracted out to commercial automatic data processing firms the task of punching approximately 1.25 million banding records and despite the fact that Mr. Vieira, the Chief of the Automatic Data Processing Section, has his personnel on a rigorous overtime schedule, a significant backlog of recoveries has "piled up" in the Automatic Data Processing Section.

Generally speaking, most recoveries received at the Bird Banding Laboratory since late spring are caught in this backlog.

We regret very much any inconvenience you may experience as a result of the late receipt of any data pertaining to recoveries of your birds or as a result of your delay in receiving data pertaining to recoveries or foreign retraps you have submitted.

If you have band numbers for which you need data rapidly, please forward them to my attention. We will make every effort to extract the data by hand and return them to you as soon as possible. In most cases, responses of this type will simply consist of the appropriate banding data penciled in the margin of your letter which we will return to you.

Please indicate whether or not you have another letter reporting these same bands caught up in the "backlog." This will eliminate the possibility of our running two reports through for the same band number and also save us much time in attempting to locate your earlier letter which would be very difficult to obtain.

We hope that the backlog we are experiencing will be a temporary one and that we will be able to provide you significantly better service in the very near future.

2. After reviewing many incoming banding schedules, it is apparent that a great variation exists among banders as to their knowledge of techniques for determining age and sex.

We still see many schedules which faithfully report the age or sex of species for which no reliable "age/sex" determination criteria have been developed. Likewise, we see many schedules reporting age or sex as "unknown" for species for which reliable techniques have been developed and, in many cases, published.

We realize that the "monkey is on our back" to assemble and distribute information concerning age and sex determination criteria, etc. As indicated in Subject No. 1 above, we also have other commitments which must be met.

In the March 1966 issue of "Bird Banding Notes," we requested banders to summarize and submit to us techniques or criteria they had found useful in accurately ageing or sexing the species they handled.

The response to this request was overwhelming. By now, however, we have managed to file all the responses we received (all three letters!).

I am once again requesting that banders who have developed techniques to age and/or sex species (even the common ones) please review the plea in the March 1966 issue of "Bird Banding Notes" (page 36) and bring us up to date as to your procedures and techniques.

Recently, while reviewing back issues of EBBA News, I noted three articles which I felt would be of interest to most banders. Although this information may be repetitious to the members of the Eastern Bird Banding Association, it may be new to many non-members.

I have, therefore, slightly edited and reproduced three papers which have appeared in past issues of EBBA News.

Banders should be aware that the "tail feather characteristics" pointed out by Dr. Blake should be used as an "aid to" identification of warblers they have in hand. These characteristics should be considered one more step in the mental "key" you use in identifying these species.

It goes without saying that you should first ascertain that your bird has all of its tail feathers.

Some words of caution with reference to "skulling" are probably also in order. As is pointed out in Mr. Baird's paper, this technique has limitations. It is very difficult to use on large, thick-skinned birds or those species having a large amount of pigment in their skin. This technique has not been proven reliable for all species.

Banders should be extremely careful in attempting to skull birds during late autumn and early winter (from mid to late October on). In many species the birds-of-the-year have only a very small "unossified" area of skull remaining. These small areas are easily overlooked, especially by the person who is inexperienced at "skulling."

Do not hesitate to use "U" to designate the age of birds which fall in the "coin flipper" category.

In our opinion, it requires considerable experience before a bander is able to accurately "skull" a bird without a hand lens. (A general rule-of-thumb is that it should never be attempted without a hand lens.)

We also view with some concern attempts to "skull" birds simply by "blowing on the feathers." You would be surprised how many apparently "unossified" skulls become "ossified" (and vice versa) after the feathers and skin are wetted.

An excellent way to test your ability at "skulling" is to obtain a small sample of dead English sparrows. "Skull" the dead bird. Write down your definition and then with your thumb nail, simply peel the scalp from the skull to check out your identification. If the opportunity presents, it is also highly advisable to attempt to work with a bander who is experienced at "skulling." Here, again, the best bet is to look at a bird, make a mental (or preferably written) note as to your determinations, and then compare notes.

Earl B. Baysinger

Attachments

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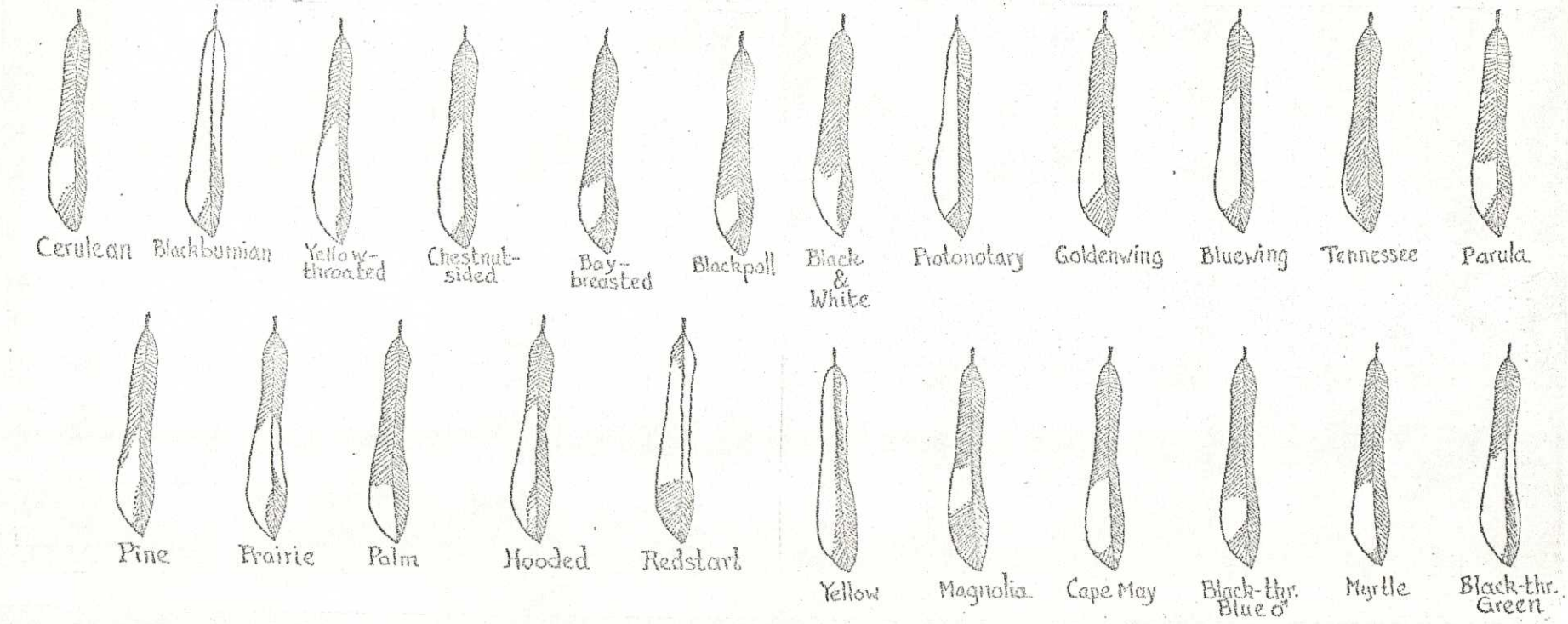
WARBLER TAIL SPOTS -- Charles H. Blake

(From EBBA News -- Vol. 29, No. 2)

Many of our warblers have white (or yellowish) areas in, at least, the outer tail feathers. They are wanting in: Swainson's, Worm-eating, Orange-crowned, Nashville Warblers, Seiurus, Oporornis, Yellow-throat, Chat, Wilson's, Canada Warblers. Experience indicates that these spots in the outer tail feathers, when present, can be useful as auxiliary characters for confirming the identification of fall warblers. The accompanying diagrams show the patterns of eastern warblers, except the three great rarities: Bachman's, Kirtland's and Sutton's Warblers. These species have no special winter plumage.

Some further remarks are in order. Closely related species (Bay-breast and Blackpoll) tend to have nearly identical patterns. Differences caused by age or sex seem to be fairly minor (exception: spots almost wanting in female Black-throated Blue). Measurement of spot length in 447 Myrtles, disregarding age and sex, shows a range of 15 to 27 mm. but the mean is 20.4±1.6 mm. The span from 19 to 22 mm. includes 74 per cent of the birds, so the distribution is well peaked and the tails rather small. The white may extend to the tip (Palm) or stop short (Cape May, Myrtle). There may be a subterminal dark area next to the rhachis (Black and White) or no such area (Palm). A few species have white extending across the outer vane (Black-throated Green, Blackburnian, Prairie). Very narrow white margins on either vane are frequent in fall. These appear to wear away rather soon and are not here considered as part of the pattern.

Outer Tail Feathers of Eastern Warblers.

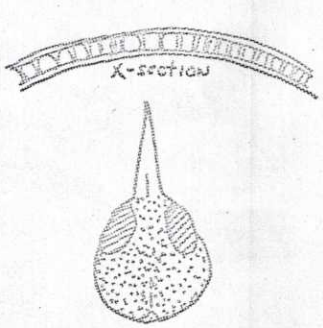


ON AGEING BIRDS BY SKULL OSSIFICATION - James Baird
(Reprinted from EBBA News - Vol. 27, No. 4)

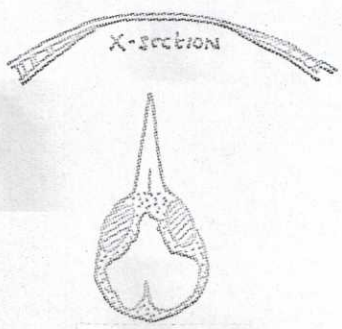
In the January 1961 issue of Bird-Banding (32:55-57), Dr. Robert A. Norris presented banders with an almost foolproof method of ageing small birds in the late summer, fall and early winter. This simple technique requires only a hand lens (10X) and good light, and can be applied to nearly all passerines. The following is basically an abstract of Norris' paper:

"The skull of a passerine bird when it leaves the nest is made up of a single layer of bone in the area overlying the brain; at least, the covering appears single when viewed microscopically. Later the brain case becomes double-layered, the outer layer being separated from the inner layer by an air space across which extend numerous small columns of bone. It is not necessary to section the bone to determine the condition. Externally the skull of the immature bird appears uniform and pinkish in live and freshly-killed specimens. The skull of the adult is whitish, due to the air space, and also it is finely speckled as a result of the dense white bony columns between the layers." (ed.-Miller, Bird-Banding 17:33-35, 1946)."

Miller points out that "the double condition is attained progressively and in some species, more rapidly than in others." He says further that "in many passerine species of the north temperate region one may rely on evidence of immaturity persisting in the skull through September and October. Often they may be detected later. Experience must be gained separately with each species in order fully to evaluate the evidence." In the English Sparrow (Passer domesticus), Nero (Wilson Bull., 63:84-88, 1951) found that the double condition "had been attained in one specimen 181 days old, but (that) another specimen 221 days old still showed small clear areas." In some species (such as the Pigmy Nuthatch, Sitta pygmaea) the clear areas may have diminished to small size (2 or 3 mm. in diameter) by the first week in November. In others (such as the Savannah Sparrow, Passerculus sandwichensis) comparable diminution in size is not seen, as a rule, until early December.



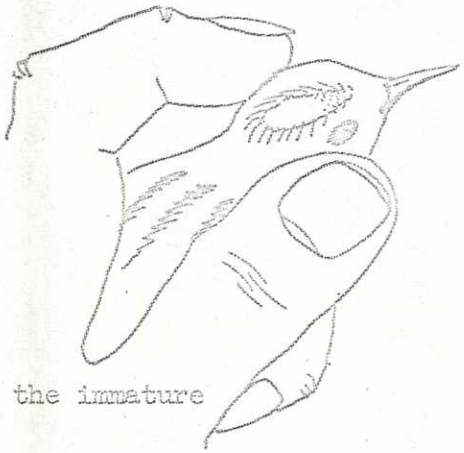
Ossified



Partially Ossified

Miller's method involved cutting the skin, Norris' method was to pluck the feathers and look through the skin, but it was soon discovered that in most instances all that was required was to wet the feathers on the side of the head, part them and then look through the skin.

If the bird's head is held between the thumb and the index finger, the loose skin can be moved back and forth thus enabling one to see, with the use of a hand lens, the many white dots of the adult or the boundary between the whitish ossified and the clear pink unossified areas.* The use of a hand lens is essential, if the results are to be as accurate as the potential of the technique. Since the ossification proceeds centripetally and anteriorly, be sure to examine the area between the eyes of all birds with ossified skulls, the make sure that they aren't "birds-of-the-year" showing an "advanced" stage of ossification.



* In the immature

A GUIDE TO THE AGEING AND SEXING OF WOOD WARBLERS (PARULIDAE) IN FALL - Chandler S. Robbins

(Reprinted from EBBA News -- Vol. 27, No. 5)

The purpose of this guide is to encourage banders to ascertain the age and sex of warblers that they band during fall migration. A great deal still remains to be learned about characters for ageing and sexing these birds. It is hoped that at some future date it will be possible to determine the age and sex of every warbler banded. In the meantime, the present summary can be used: (1) to show at a glance which species can be aged and sexed from characters presently available; (2) as a quick reference to detailed descriptions and colored illustrations of each species and (3) to determine the age and/or sex of those species for which this information is known.

Knowledge of the age and sex of banded birds greatly increases the value of banding records, while large scale banding of unaged and unsexed birds contributes relatively little information. On the other hand, erroneous reporting of age or sex makes banding records utterly worthless. For this reason, it is extremely important that ageing and sexing be conducted seriously and accurately.

Reference books and field guides for the identification of birds have been written primarily for species identification, not for the determination of age and sex. It is risky to use colored plates in themselves for the ageing and sexing of birds because in almost all cases the artist does not show all possible plumages, but selects certain ones to be illustrated. One must read detailed descriptions of molts and plumages to learn the distinguishing characters of the various age and sex groups as well as the months of the year when the various plumages are worn.

All field guides have some errors in labeling of plumages and the accuracy of colors is frequently lost in the printing, so banders are urged to consult several references and to read descriptions rather than simply matching their bird to a single colored picture and recording on their forms the caption on that picture. Even museum skins frequently are mislabeled and this greatly complicates the task of determining reliable age and sex characters. Comparatively few museum labels distinguish between adult and immature birds, although state of ossification of the skull could have been used in all cases for ageing specimens of fall warblers. Specimens of known age and known sex are gradually becoming available, especially through efforts of people who salvage specimens from ceilometer and television tower casualties. From these specimens we hope to determine the most diagnostic characters for ageing and sexing each species as well as the normal amount of variation in these characters.

The following summary is based on examination of museum skins while referring to several texts, principally Chapman (1907), Roberts (1932), and Ridgway (1902). Many characters that are mentioned in these books have not been included in the present summary because they refer to relative differences that overlap between the various age and sex groups. For example, the brilliant yellow of the adult male Pine Warbler is completely unlike the drab immature female; but plumage characters of the adult male overlap with those of the immature male and adult female, and characters of these overlap with the immature female.

Banders can contribute significantly to improving our knowledge of characters for ageing and sexing birds. They have the unique opportunity to capture returns of known age and also to recapture banded birds during the progress of their molts. Also, by watching for changes in eye color and mouth color they have an opportunity to discover characters that cannot be seen on museum skins.

How to Use this Summary

First, become familiar with the contents of this summary before you start your fall netting or trapping. Obtain reference books. If possible, examine specimens so you will recognize the differences that are described.

Second, be sure your identification to species is correct, as this is not a key to species. The "Quick Reference List" gives page references to illustrations and to descriptions in several of the books that are best for verifying species identification.

Third, check the "Quick Reference List" to see whether the Species Summaries that follow have any information that will be helpful in ageing or sexing a particular species.

Fourth, determine if possible whether your bird is an adult with a completely ossified skull or an immature with an incompletely ossified skull (see Norris, Bird-Banding 32: 55-57, Jan. 1961). If you are not familiar with the "skulling" technique, try it first with warblers that can be aged by plumage characters. Once you have mastered the art of skull examination you should be able to age all fall warblers from this character alone.

Fifth, whether or not you have been able to age your bird by "skulling," refer next to the Species Summaries for age and sex characters. If the "Quick Reference List" indicates that the bird in question can be aged and sexed and if you are still uncertain as to the age or sex of your bird, consult the references.

Sixth, watch for additional distinguishing characters and record these to improve the summaries for your own use. Also, please be sure to report additions and corrections so that other banders can benefit from the results of your experience.

Quick Reference List (Table 1)

This list contains the AOU numbers and the names of all species of warblers that occur regularly in the United States and/or Canada. The species are listed in 1957 Check-List order. The first species in each genus is capitalized. Closely related or similar species are grouped together by means of horizontal lines to facilitate finding a given species on the list.

An "X" in the "No info" column means that there is no species summary for that species in this guide. These birds may be aged by checking skull ossification and when the age is known it may be possible in some cases to sex those individuals with extreme measurements or extreme plumage characters. It may also be possible to sex some individuals by direct comparison with correctly labeled museum skins.

A "P" in the "Sex all birds" or "Age all birds" column means that plumage characters for sexing or ageing are given in the species summaries. Beacuse of individual variation in the birds as well as in the experience of banders there may be some individuals that cannot be aged or sexed with certainty by plumage characters. The importance of checking skins and references and working with experienced banders cannot be overemphasized.

An "S" in the "Age all birds" column means that ageing must be done by skull examination. Even those birds marked "P" should have their age verified by skull examination if possible.

Under "Can do by plumage" are listed certain birds that can be recognized by plumage. These may or may not be in addition to birds checked in other columns.

Page references to colored illustrations and to plumage descriptions in five standard texts are listed in the right half of Table 1. See the first section of References (page 215) for the titles of these books by Chapman, Forbush, Peterson, Roberts, and Griscom.

Table 1. Quick Reference List of Fall Warblers

AOU	Species	No info	Sex all birds	Age all birds	Can do by plumage	Page numbers in standard references: Illustrations Cha	For	Pet	Rob	Gri	Descriptions Cha	For	Pet	Rob
636	BLACK-AND-WHITE		P	S	AHYM, HYM	38	196	186	65	32	38	197	184	677
637	PROTHONOTARY		P	S	AHYM	50	196	195	65	25	54	200	185	668
638	SWAINSON'S	X		S		64		183		37	44		185	
639	WORM-EATING			P		64	196	183		32	48	203	185	
642	GOLDEN-WINGED		P	S	AHYM, HYM	72	206	187	65	52	60	207	188	677
641	Blue-winged			S	HYF	72	206	187	65	52	65	205	188	666
640	Bachman's		P	P		64		187		37	77		189	
647	Tennessee			P		86	206	195	66	64	83	223	189	684
646	Orange-crowned	X		S		86	206	195	66	64	86	221	190	669
645	Nashville			S	AHYM	86	206	195	66	64	92	218	191	669
644	Virginia's	X		S		98		262W		57	98		249W	
647.1	Colima	X		S				262W		57			249W	
643	Lucy's	X		S		98		262W		57	100		250W	
648	PARULA		P	S		104	196	194	65	69	103	225	191	671
649	Olive-backed	X		S		104		262W		84	109		250W	
651	OLIVE			S	AHYM	98		262W		89	110		251W	
652	YELLOW			S	AHYM	Fr	228	194	67	96	113	230	191	672
657	Magnolia			S	AHYM, HYF	126	242	194	67	101	121	242	192	674
650	Cape May		P	S	AHYM, HYM	214	228	194	66	116	128	228	192	675
654	Black-thr. Blue		P	P		112	228	195	67	121	133	233	193	676
655	Myrtle			S	AHYM, HYF	118	228	194	67	128	141	237	193	680
656	Audubon's	X		S		118	228	247W		128	147	241	253W	
665	Black-thr. Gray			S	AHYM, HYF	152	254	247W		133	151	262	253W	
668	Townsend's		P	P		170		247W		148	154	267	253W	
667	Black-thr. Green			S	AHYM	162	254	194	68	160	157	264	196	678
666	Golden-cheeked			S		162		247W		133	162	263	254W	
669	Hermit			S	AHYM	170		247W		148	167		255W	

AOU	Species	No info	Sex all birds	Age all birds	Can do by plumage	Page numbers in standard references: Illustrations Cha	For	Pet	Rob	Gri	Descriptions Cha	For	Pet	Rob
658	Cerulean			P	AHYM	112	242	183	68	153	170	246	196	681
662	Blackburnian		P	P		50	254	194	68	153	175	256	197	673
663	Yellow-throated	X		S		152		186		69	180	259	197	
664	Grace's	X		S		152		247W		89	185		255W	
659	Chestnut-sided			S		138	242	194	69	180	187	248	200	679
660	Bay-breasted			S	AHYM	138	242	194	69	165	192	251	200	675
661	Blackpoll			S	HYM, AHYF	38	254	194	69	165	196	254	201	680
671	Pine			S		296	268	194	68	160	201	267	201	667
670	Kirtland's	X		S		126		186		185	206	267	202	
673	Prairie		P	P		Fr	268	194		185	209	273	203	
672	Palm	X		S		214	268	194	72	192	213	270	203	671
674	OVENBIRD			P		226	268	183	72	197	219	276	204	682
675	No. Waterthrush			P		226	268	183	70	197	230	280	204	683
676	La. Waterthrush			P		226	268	183	70	197	226	284	205	682
677	KENTUCKY			P	AHYM	236	286	187		212	235	286	205	
678	Connecticut			P	AHYM	236	286	195	71	217	241	289	205	678
679	Mourning		P	P		244	286	195	71	217	244	292	206	679
680	MacGillivray's		P	P		244		262W		217	249		259W	
681	YELLOWTHROAT		P	P		252	286	195	71	224	251	294	206	669
683	YELLOW-BR. CHAT	X		S		264	286	183	70	229	264	298	207	671
690	RED-FACED	X		S		296		262W		249	285		260W	
684	HOODED		P	S		264	302	195		212	269	302	207	
685	Wilson's		P	S		280	302	195	70	244	274	305	207	668
686	Canada			S	AHYM	280	302	195	70	244	280	307	208	674
687	AM. REDSTART		P	S	AHYM, HYM	288	302	183	72	256	287	309	208	676
688	Painted Redstart	X		S		288		262W		249	295		261W	

Species Summaries

BLACK-AND-WHITE WARBLER

AHY Male. Cheek black. Sides distinctly streaked with black. Under-tail coverts not buffy.

HY Male. Cheek pale gray. Sides distinctly streaked with black. Under-tail coverts not buffy.

Female. Cheek buffy or pale gray. Sides with blurry streaks. Under-tail coverts buffy. Female is difficult to age except by skull examination.

PROTHONOTARY WARBLER

AHY Male. Brilliant yellow of head contrasts sharply with greenish back. Skull ossified.

AHY Female. No sharp contrast between head and back. Skull ossified.

HY. Like adult female but skull not ossified.

WORM-EATING WARBLER

AHY. Tertials uniform color throughout. Skull ossified.

HY. Tertials lightly tipped with rusty. Skull not ossified.

GOLDEN-WINGED WARBLER

AHY Male. Throat and chin black.

HY Male. Throat black or black tipped with grayish, but chin white, connecting the white stripes on the sides of the throat.

Female. Throat gray; determine age by skull examination.

BLUE-WINGED WARBLER

AHY Male. Forehead and much of crown yellow, contrasting with olive-green hindneck and back. Eye-stripe black. Skull ossified. Not always separable from AHY female.

HY Male. Forehead yellow. Eye-stripe black or dusky. Skull not ossified.

AHY Female. Forehead yellow. Eye-stripe black or dusky. Skull ossified. Birds with ossified skulls and with dusky eye-stripes can safely be called AHY female.

HY Female. Forehead greenish like back; patch of diffused yellow on crown. Dusky eye-stripe. Skull not ossified.

BACHMAN'S WARBLER

AHY Male. Breast black, feathers tipped with yellow or grayish. Crown feathers black, broadly tipped with gray.

HY Male. Breast as in AHY male. No black on crown.

AHY Female. Dusky wash (rarely black patch) on upper breast, yellow on lower breast. Belly pale buffy.

HY Female. Like AHY female but lower breast and upper belly dusky yellowish; lower belly brownish. Lores just tinged with yellow.

TENNESSEE WARBLER

AHY Male. Head gray or brownish. Wing 64 mm. or more. Skull ossified.

HY Male. Head bright green, back very green, wing 64 mm. or more. Skull not ossified.

AHY Female. Head gray or brownish. Wing 62 mm. or less. Skull ossified.

HY Female. Head bright green, back very green, wing 61 mm. or less. Skull not ossified. (Goodpasture)

NASHVILLE WARBLER

AHY Male. Much reddish-brown on crown, not completely veiled by gray tips of crown feathers. White eye-ring, bright yellow underparts. Gray on sides of head. Skull ossified.

HY Male. Reddish-brown crown patch small but distinct; usually completely veiled. Eye-ring, sides of head, and underparts much as in AHY male. Skull not ossified.

AHY Female. Crown with little or no reddish-brown. Plumage duller than AHY male. Skull ossified.

HY Female. No concealed reddish-brown on crown. Skull not ossified. (Tordoff and Mengel).

OLIVE WARBLER

AHY Male. Head, neck, and breast orange-brown. Skull ossified.

AHY Female. Head, neck and breast dull olive-yellow. Skull ossified.

HY. Like AHY female but skull not ossified.

PARULA WARBLER

AHY Male. Distinct dark breast band present. Skull ossified.

HY Male. Dark breast band present. Skull not ossified.

AHY Female. Breast yellow with very little if any indication of dark band. Skull ossified.

HY Female. Breast yellow with very little if any indication of dark band. Skull not ossified.

YELLOW WARBLER.

AHY Male. Birds with appreciable reddish-brown streaking below and ossified skulls can safely be called AHY males. Some AHY males lack the streaking, so birds with little or no streaking cannot be sexed.

HY. Aged only by incomplete ossification.

MAGNOLIA WARBLER

AHY Male. Upper tail coverts black. Cap and nape gray. Nearly all back feathers with large black central spots (nearly concealed). Prominent black streaks on sides of breast and sides of belly (streaks wider than width of tarsus). Skull ossified.

MAGNOLIA WARBLER (cont.)

HY Male. Similar to AHY female and best told from it by unossified skull. Upper tail coverts black, broadly tipped with green but with much black showing. Cap and nape brownish.

AHY Female. Upper tail coverts black, broadly tipped with gray but with much black showing. Cap and nape gray with slight brown wash. Feathers of upper back without black centers. Feathers of lower back (just anterior to yellow rump) with large black central spots. Narrow black streaks (narrower than width of tarsus) restricted mostly to sides of lower belly. Green of back extends up to neck where it contrasts with brownish-gray head. Skull ossified.

HY Female. Upper tail coverts with dusky or black centers, broadly tipped with gray or greenish so the black is mostly concealed. Cap and nape brownish. Black of back feathers lacking or nearly so. Indistinct streaks on sides. Skull not ossified.

CAPE MAY WARBLER

AHY Male. Crown feathers black, tipped with gray. Some chestnut on ear patches. Single broad white wing-bar. Skull ossified.

HY Male. Crown olive-gray. Ear patches mostly olive-gray but generally with some yellow. Single broad white wing-bar. Breast yellow with black streaks. Skull not ossified.

AHY Female. Little yellow on breast. Head grayish-olive. Two narrow dusky wing-bars. Skull ossified.

HY Female. Little if any yellow on breast. Head grayish-olive. Two narrow dusky wing-bars. Skull not ossified.

BLACK-THROATED BLUE WARBLER

AHY Male. Blue back and black throat. Alula covert edged with blue. Skull ossified.

HY Male. Like AHY male, but alula covert edged with greenish. Chin often (perhaps always) with some white feathers. Skull not ossified.

AHY Female. Dusky olive-green above. Underparts pale buffy yellowish. Facial mask gray, eye-stripe whitish, forehead and bend of wing bluish, undertail coverts cream. Skull ossified.

HY Female. Like AHY female but facial mask dark olive, eye-stripe buffy, forehead greenish, no blue at bend of wing, undertail coverts yellowish. Skull not ossified.

MYRTLE WARBLER

AHY Male. Forehead generally bluish (feathers black in center with edges mostly bluish gray). Yellow spots at side of breast. Lower back (just anterior to yellow on rump) bluish gray. Upper tail coverts black with blue-gray edging. Upper wing bar whitish. Skull ossified.

HY Male. Forehead brown. Yellow spots at side of breast. Streaking on back and underparts distinct. Upper tail coverts black with blue-gray edges. Upper wing bar whitish. Skull not ossified.

AHY Female. Forehead brown. Yellow spots at side of breast. Streaking on back and underparts distinct. Upper tail coverts with reduced black center and with brownish-gray edges. Upper wing bar brownish white. Skull ossified.

MYRTLE WARBLER (cont.)

HY Female. Forehead brown. Spot at side of breast small and pale orange-yellow. Streaking on back, breast, and sides indistinct (blurred). Upper tail coverts brown or with black center reduced or absent. Upper wing bar brownish white. Skull not ossified.

BLACK-THROATED GRAY WARBLER

AHY Male. Black throat, chin, cheek and crown. Back gray, faintly tinged with brown, sparsely streaked with black. Skull ossified.

HY Male. Chin white. Throat black, mottled with white. No white on secondaries. Black crown largely concealed by grayish-brown edges. Back feathers with broad black centers. Cheek black, gray, or a mixture of black and gray. Skull not ossified.

AHY Female. Chin white. Throat black, mottled with white. No white on secondaries. Black crown largely concealed by grayish-brown edges. Back feathers with broad black centers. Cheek black, gray, or a mixture of black and gray. Skull ossified.

HY Female. Cheek grayish-brown. Crown feathers with narrow central black streak, concealed by grayish-brown edges. Sides with narrower streaks. Back strongly tinged with brown and with little or no black streaking. Skull not ossified.

TOWNSEND'S WARBLER

AHY Male. Crown black, largely concealed by olive-green tips. Cheeks black with narrow greenish tips. Broad white wing-bars. Chin, throat and upper breast feathers black, edged with yellow.

HY Male. Cheeks and crown olive. Chin, throat and breast mostly yellow. Narrow white wing-bars.

AHY Female. Cheek olive. Crown black, nearly concealed by broad olive edges. Chin and breast bright yellow. Throat mottled black and yellow. Broad white wing-bars.

HY Female. Crown and cheek olive. Dull yellow wash on chin and breast. Throat dusky. Two narrow wing-bars.

BLACK-THROATED GREEN WARBLER

AHY Male. Throat and chin black, tipped with white or yellowish. Skull ossified.

AHY Female. Chin and upper throat mostly yellow or whitish. Skull ossified.

HY. Chin and upper throat mostly yellow or whitish. Skull not ossified.

HERMIT WARBLER

AHY Male. Throat black, veiled with whitish. Skull ossified.

AHY Female. Throat buffy. Skull ossified

HY. Throat buffy. Skull not ossified.

CERULEAN WARBLER

AHY Male. Crown bright blue. Partial or complete breast band. Sides streaked. Much black on upper tail coverts. Skull ossified.

AHY Female. No breast band. Greenish back, unstreaked. No streaks on sides. No black on upper tail coverts. Yellow wash on belly. Skull ossified.

HY. No trace of breast band. Suggestion of streaked sides. Black on upper tail coverts. Skull not ossified.

BLACKBURNIAN WARBLER

AHY Male. Prominent black streaks on sides (streaks wider than width of tarsus). Crown and hindneck black, feathers narrowly (narrower than width of tarsus) margined with yellow-brown. Yellow spot at center of crown.

HY Male. Sides with distinct narrow streaks (narrower than tarsus). Crown feathers with black centers, broadly margined (wider than tarsus) with yellow-brown. Yellow spot in center of crown. Shoulders dull black.

AHY Female. Sides with indistinct (blurry) streaking. Crown olive-brown; dull black, if present on head feathers, restricted to tiny spots near shafts. Crown spot pale yellow, nearly concealed. Shoulder gray. Basal quarter of outer web of outer tail feather white.

HY Female. Like AHY female, but shoulder olive-brown. Basal quarter of outer web of outer tail feather dark. Plumage variable. Possible some individuals cannot be aged by these characters. Check skull ossification to be sure.

CHESTNUT-SIDED WARBLER

AHY Male. Considerable chestnut on flanks. Skull ossified. Not safely separable from AHY female.

HY Male. Chestnut on flanks very restricted or lacking. Skull not ossified. Those individuals with trace of chestnut on sides and unossified skulls can safely be aged and sexed.

AHY Female. Chestnut on sides restricted or lacking. Safely told only when chestnut is lacking. Skull ossified.

HY Female. Chestnut always lacking. Skull not ossified. Not safely separable from some HY males.

BAY-BREASTED WARBLER

AHY Male. Patches of chestnut on crown, breast and sides. Secondaries edged with gray or dull white. Skull ossified.

AHY Female. No chestnut in crown. Greenish cast to edges of secondaries. Generally some chestnut on flanks but absence of chestnut is not diagnostic. Skull ossified.

HY. No chestnut in crown. Greenish cast to edges of secondaries. Male generally has chestnut tinge on flanks, female generally does not, but this is not presently considered a safe character for sexing. Males generally have more distinct streaking on back than females. Skull not ossified. HY Bay-breasts should not be sexed unless all plumage characters are present and measurements are extreme.

BLACKPOLL WARBLER

AHY Male. In most AHY males the alula covert is edged with white or clear gray. Primary coverts and greater secondary coverts dark sooty. Rump and upper tail coverts with dark centers to most of the feathers, forming streaks which are wider and sharper than those on the lower back. Some females have the same character so sexing should not be attempted unless wing chord measures 75 mm. or above. Skull ossified.

HY Male. Alula covert always (?) edged with green. Primary coverts brownish, contrasting with dark sooty greater secondary coverts and alula. Rump and upper tail coverts with dark centers to most feathers, forming streaks which are wider and sharper than those on the lower back. Skull not ossified. Birds with these characters are believed safely ageable and sexable as HY males.

AHY Female. Primary coverts and greater secondary coverts dark sooty. Rump unstreaked and no more than six blurred or hair-like streaks on the upper tail coverts. Skull ossified. Birds with the above characters are believed ageable and sexable.

HY Female. Primary coverts brownish, contrasting with dark sooty greater secondary coverts and alula. Rump unstreaked and no more than six blurred or hair-like streaks on the upper tail coverts. Skull not ossified. Since some HY males have the characters described for HY female, it is not safe to sex HY females unless the wing chord is 66 mm. or less. (Baird)

PINE WARBLER

AHY. Skull ossified. Birds with bright yellow breasts can safely be sexed as males, those with very dull breasts as females. Birds in intermediate plumage should not be sexed.

HY. Skull not ossified. Birds with bright yellow breasts are safely males, those with very little or no yellow are females. Except for birds in extreme plumage, sexing should not be attempted.

PRAIRIE WARBLER

AHY Male. Face yellow with black markings. Prominent reddish-chestnut spots on back.

HY Male. Face gray or white; with concealed chestnut spots on back.

AHY Female. Face yellow with olive markings. Back spots absent or small and inconspicuous.

HY Female. Face gray or white. Back without concealed spots.

OVENBIRD

AHY. Tertials without rusty tips. Skull ossified.

HY. Tertials with rusty tips. Skull not ossified.

NORTHERN WATERTHRUSH

AHY. Tertials without narrow buffy or rusty tips. One or more outer tail feathers on each side with narrow white tips on inner web (best seen from above, against dark background); white tips more conspicuous in males than in females, but not a safe character for sexing. Skull ossified.

HY. Tertials with narrow buffy or rusty tips. White generally lacking from tips of outer tail feathers.

LOUISIANA WATERTHRUSH

AHY. Same characters as Northern Waterthrush.

HY. Same characters as Northern Waterthrush.

KENTUCKY WARBLER

AHY Male. Crown feathers black, broadly tipped with gray; only a faint tinge of brown in feather tips. Velvety black stripe on sides of neck extending down nearly to bend of wing. Skull ossified.

HY Male. Crown feathers black, broadly tipped with olive-brown. Small dull black area below eye. Some birds may be indistinguishable from HY female. Skull not ossified.

AHY Female. Crown like AHY male, but duller black. Area below eye gray-black with narrow greenish feather edgings. Skull ossified.

HY Female. Crown olive-brown. Facial line olive (no black). Some birds may be indistinguishable from HY male. Skull not ossified.

CONNECTICUT WARBLER

AHY Male. Throat and upper breast slaty gray, feathers faintly tipped with brownish. Eye-ring white.

AHY Female. Upper breast olive-brown. Paler on throat. Eye-ring white.

HY. Upper breast olive-brown. Paler on throat. Eye-ring buffy. Sexes of HY birds hard to determine.

MOURNING WARBLER

AHY Male. Breast black, throat gray. No eye-ring.

HY Male. Breast and throat yellowish with grayish feathers laterally. Eye-ring incomplete, narrow, whitish.

AHY Female. Breast and throat gray-brown. Eye-ring incomplete, narrow whitish.

HY Female. Breast and throat yellowish, breast dusky-olive laterally. Eye-ring incomplete, yellowish or buffy.

MACGILLIVRAY'S WARBLER

AHY Male. Crown bluish-slate, tipped with brownish. Throat mottled with black, gray and white. Lores black. Broken eye-ring white.

HY Male. Crown olive-brown without slate. Lores grayish or brownish. Throat and breast brownish-gray or yellowish-gray. Eye ring?

AHY Female. Crown and lores gray. Throat pale gray. Broken eye-ring white.

HY Female. Crown olive-brown without slate. Lores pale buffy-gray. Broken eye-ring tinged with buff. Throat and breast buff with little or no gray.

YELLOWTHROAT

AHY Male. Black mask present with pale gray feather edgings. Forehead black, margined above with gray. Lores black. Throat bright yellow. Skull ossified.

HY Male. At least traces of black mask unless bird is still in juvenal plumage. Forehead brown or rusty. Lores brownish or blackish with faint yellow tinge. Throat bright yellow. Skull not ossified.

AHY Female. No trace of black mask. Throat yellow. Skull ossified.

HY Female. No trace of black mask. Throat orange-yellow. Skull not ossified.

HOODED WARBLER

AHY Male. Complete black hood. Skull ossified.

HY Male. Complete black hood. Skull not ossified.

AHY Female. Black hood absent or incomplete. Skull ossified.

HY Female. Black hood absent or incomplete. Skull not ossified.

WILSON'S WARBLER

AHY Male. Complete black cap (more than 11 mm. front to back), with or without narrow greenish feather edgings. Skull ossified.

HY Male. Like AHY male but generally with narrow greenish feather edgings on black cap. Skull not ossified.

AHY Female. Black cap lacking or concealed or restricted to about 8 mm. or less. Possibly a few individuals have a complete black cap; any with full black cap and wing under 52 mm. should be questioned. Skull ossified.

HY Female. Like AHY female but skull not ossified.

CANADA WARBLER

AHY Male. Distinct black speckles on forehead and crown. Very prominent black necklace (spots narrowly tipped with yellow). Skull ossified.

AHY Female. Forehead greenish. Necklace blurred. Skull ossified.

HY. Forehead greenish. Necklace blurred, sometimes very indistinct. Skull not ossified.

AMERICAN REDSTART

AHY Male. Black head and back; patches on wings, tail and sides of breast salmon-red as in spring. Skull ossified.

HY Male. Patches at side of breast generally orange-yellow, contrasting with yellow underwing. Some individuals have rusty cast on back. Skull not ossified.

AHY Female. Breast patches lemon yellow (more green than orange), matching yellow underwing. Skull ossified.

HY Female. Breast patches lemon yellow (more green than orange), matching yellow underwing. Skull not ossified.

References

References in Quick Reference List

Chapman, Frank M. 1907. The Warblers of North America. D. Appleton & Co., New York (out of print).

Forbush, Edward H. 1929. Birds of Massachusetts and Other New England States, Part III. Mass. Dept. of Agriculture, Boston. $5.

Peterson, Roger Tory. 1958. A Field Guide to the Birds. "W" after page number refers to page in A Field Guide to Western Birds, 1961. Houghton Mifflin, Boston. $4.95 each.

Roberts, Thomas S. 1932. The Birds of Minnesota, Vol. II. Univ. of Minnesota Press, Minneapolis (out of print). Keys and descriptions published separately as Manual for the Identification of the Birds of Minnesota and Neighboring States, 1932; still available, Minn. Mus. Nat. Hist., Minneapolis. $3.50.

Griscom, Ludlow, Alexander Sprunt, Jr., et al. 1957. The Warblers of North America. Devin-Adair, New York. $15.00.

Detailed Description of all Species of Wood Warblers

Ridgway, Robert. 1902. The Birds of North and Middle America. Bull. 50, Part II. U. S. National Museum, Washington (out of print).

Coues, Elliott. 1882 (6th ed., 1927). Key to North American Birds. Page Co., Boston (out of print).

State and Regional References

Many State bird books and regional guides contain descriptions and/or color plates of all species normally found in certain areas. You should be familiar with those for your part of the country.

Special Studies

Goodpasture, Katherine A. 1963. Age, sex, and wing length of tower casualties: fall migration, 1962. Bird-Banding 34(4):191-199. (Tennessee and Kentucky Warblers).

Graber, Richard R. and Jean W. Graber, 1962. Weight characteristics of birds killed in nocturnal migration. Wilson Bulletin 74(1):74-88. (Weights of 10 species of warblers, all aged and sexed).

Nisbet, I. C. T., W. H. Drury, Jr. and James Baird. 1963. Weight loss during migration. Bird-Banding 34(3):107-159. (Weights, flattened wing lengths, and plumage descriptions of Blackpoll Warbler).

Tordoff, Harrison B. and Robert M. Mengel. 1956. Studies of birds killed in nocturnal migration. Univ. Kans. Publ., Mus. Nat. Hist. 10(1):1-44. (Weights of 20 species of warblers; especially good series of Orange-crowned, Nashville and Mourning Warblers and Yellowthroat).