A Tabular Format of Pyle's Ageing and Sexing Methods for Landbirds

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ABSTRACT

We present a new method of summarizing Peter Pyle's (1997) ageing and sexing guide into a tabular format that has proven to be extremely useful for both novice and experienced banders. This format allows quick and accurate assessment by a bander to distinguish species, age, and sex criteria. Rapid and accurate processing are essential to the health of birds captured and this effort assists in achieving this goal. We give examples of the "*Tabular Pyle*" for the Hermit Thrush and the Yellow Warbler, as well as a comparison of all *Catharus* thrushes.

INTRODUCTION

When bird banding began in North America in the early 1900s, its sole aim was recoveries. Now, its scientific role has expanded through the collection of detailed demographic information, such as age, sex ratio, productivity, and survivorship. To reach its full potential in determining demographics, we must have complete and clear criteria on ageing and sexing.

Early references (Dwight 1900, Roberts 1955) on ageing and sexing birds in North America were helpful and were poured over by banders. Gradually, specific species accounts for banders were developed by Wood (1969), manuals from the Banding Offices, and separate papers published in several outlets, notably the publications of the Northeastern, Western, Eastern, and Inland Bird-Banding Associations, and later, the *North American Bird Bander.*

Following the lead of Svensson (1970, 1992), who published a comprehensive guide for passerines in Europe, Pyle et al. (1987) published the North American version on ageing and sexing passerines. With his new publication, Pyle (1997) has now raised the bar to an unprecedented level. We strongly urge that every bander in North America have a personal copy. This immense scholarly work covers all North American passerines and near-passerines in great detail.

The admirable level of detail in Pyle (1997) has, however, created a difficulty. It is time consuming to use to check each individual bird, even when one is familiar with the volume's contents. The long processing time, and resultant stress on the birds, contradicts the Bird Bander's Code of Ethics (North American Banding Council 2001). Rather, the bander is tempted to rely upon his or her memory, even when that may be imperfect. To meet this need, we have, over the past ten years, worked with various cooperators to summarize all of the characters in Pyle et al. (1987) and Pyle (1997) for the species of birds we capture. Our objectives have been to lower the threshold for using the information in Pyle by our crews, increase the accuracy, reduce the training time for accurate ageing and sexing, and provide quick comparisons for closely related, difficult to separate, species. All of this reduces processing time and stress on the bird.

The first version of the *Tabular Pyle* was by Mary Kay Waddington at the Colorado Bird Observatory who summarized many species in the early 1990s. We quickly adopted this, and augmented it with

species we encountered on the west coast, as well as eastern migrants we captured in our Costa Rican stations at Tortuguero. After gaining consent from Peter Pyle, we distributed this manual, which we call the "*Tabular Pyle*" to our field crews and, by now, hundreds of cooperators. When Pyle (1997) was published, we realized that this was a quantum leap in scholarship and content, which precluded merely modification. This led to a thorough revision of both format and content of the *Tabular Pyle* for our field crews. We have now revised all of the species accounts and added many others. Here we describe our methods.

Other efforts (Newstrom 1999; Wedeking et al. 2000; S.W. Dana, pers. comm.) have also been put forward to streamline the identification, ageing, and sexing of birds since we began using our original version more than ten years ago. These other efforts will be helpful to some banders in some contexts, but we feel that our method of presentation is complete, and thus faithful to Pyle. It provides more material in a logically organized fashion and is more helpful to our banders, both novice and expert.

METHODS

Putting Pyle's work into a tabular format allows rapid comparisons of ages and sexes by plumage and other characteristics. We have included all items that are in Pyle's species accounts, except those of an experimental nature. Supplemental information was added, using Dickinson (1999), Dunn and Garrett (1997), Sibley (2000), and others. When such material is added, it is identified clearly as being separate from Pyle, whose categorizations are accepted by the Canadian Banding Office and the U.S. Bird Banding Laboratory.

We separate characters into two groups. What we refer to as "salient characters" are displayed first. These are characters which, from Pyle and (to a minor extent) based upon our experience, are diagnostic more than 95% of the time. "Less-diagnostic characters," such as those that rely upon qualitative designation (e.g., "darker brown," "less curved," etc.), are placed further down in the table. Molt limits are quite helpful in many species. But recognizing limits takes considerable practice, and so neatly fall in between salient and less-diagnostic characters. Just as ageing by degree of skull ossification takes practice and must be mastered, so also must be knowledge of molt limits. However, skulling, once mastered for one species, applies fairly generally throughout all passerine taxa. A molt limit, by contrast, is more variable and differs to a certain extent both within and between species. Thus, molt limits, depending upon our own perception of utility, are treated on a spectrum from salient to less diagnostic in *Tabular Pyle*. Others may differ in their opinion.

Measurements and formulae are often time-consuming operations, and so do not meet one of the main goals: that of quick identification. However, sometimes these are very accurate, or can be one of the few reliable characteristics available. Depending upon these criteria, measurements and formulae fall in different positions in the *Tabular Pyle*.

We also developed species identification tables for commonly confused species (e.g., vireos, thrushes, *Empidonax*), again emphasizing conspicuous and salient points to make it easy for our crew to identify species quickly.

For species not covered in Pyle (1997), dichotomous keys developed by the Bird Banding Laboratory (e.g., California Quail), and the Golden Gate Raptor Observatory (e.g., for raptors) were consulted and converted to a tabular form.

A separate page is maintained for each species so that changes can be made as they occur for individual species, rather than update the entire *Tabular Pyle*. We keep our copy in in a three-ring loose-leaf binder in our field kits.

Examples: We present examples of two species typically banded at our stations: the Hermit Thrush (Fig. 1) and the Yellow Warbler (Fig. 2). These are among the more complex (the thrush) to very complex (the warbler) species in Pyle. We suggest that the table can be used most effectively by scanning down the columns, looking for characters which are

different between age and sex classes. This will allow the user to determine rapidly if and how a species can be subdivided.

Within each species account are the following sections:

Reference Data: At the top of each account, we give the AOU number, alpha code, band sizes (in the order of preference suggested by the Bird Banding Offices); and we give the page numbers for the four basic bird references used, when appropriate, including Pyle (1997), Dickinson (1999), Dunn and Garrett (1997), and Sibley (2000).

A "Special Handling Note" is printed in bold face to alert our banders to go to the bottom of the species account for data that should be collected for the particular species (e.g., additional measurements such as crown length in Wilson's Warblers, feather samples for certain research projects or classification of age and sex, identification of subspecies, and plumage colors) or special techniques that are required to process the bird (e.g., swallows have very short tarsi; birds that are to be color banded; and bands that should be placed above the tarsus, as in rails). Many of these notes are specific to a given station.

Physiological Table: At the upper left of the species account, a table has squares or letters indicating timing of events. For skull ossification, closed squares (■) indicate when complete skull ossification occurs at the beginning of that month (e.g., 1 October). Closed half square (or small rectangle) (▬) indicates complete ossification commences in the middle of that month (e.g., 15 October). Open squares (❑) indicate that birds with windows (see text to right of this table) can be present during those months. The letters within the cells describe the general molting pattern (L = limited, P = partial, I = incomplete, and C = complete), as defined by Pyle (1997), with the exception of absence of molt, which we note as blank. Standard ageing codes used by the Banding Offices, and defined in Pyle (1997), are used. The letters and ages indicate the timing of molt in the species. Closed squares for CP/BP indicate the timing of cloacal protuberance and brood patch, respectively.

Physiological notes: To the right of the Physiological Table, we provide more detailed information, such as the size and location of windows on the skull, and on the first and adult pre-basic (PB) and pre-alternate (PA) molts. Specific information on cloacal protuberance and brood patch are placed further down the page under Age and Sex features.

Species notes: We used descriptions from the four references to distinguish among closely related species. Sometimes this is augmented by a note to check a supplemental species identification table (e.g., Fig. 3) for species that are difficult to separate. In these latter tables, we use the same criteria for hierarchical listing of characteristics. We also provide the number of primaries, secondaries, and rectrices, so the bander can determine accurately the location of characters on certain flight feathers (e.g., missing or growing feathers).

Age and Sex features: Here we note the lack of critical features for separation of various age or sex categories. These include notes that Pyle (1997) included as warnings about certain criteria. For example, "...the buffy tipping to the greater coverts can be lacking and wear off in many birds by spring," in the Hermit Thrush (Fig. 1). Further information on cloacal protuberance and brood patch are also provided here.

Basic Table of Characters: This is the heart of the *Tabular Pyle*. Here we compare the critical, diagnostic characters for each age or sex category for the species in basic plumage and in alternate plumage. For species with no plumage differences by sex (Fig. 1), we note that "♂=♀," while for sexually dimorphic species (Fig. 2), male and female have separate columns. Each character is a separate row on the table. For a particular column, if two adjacent cells have identical characteristics, an arrow (➜) is used in the right one of the pair to indicate that the information is carried over from the left hand one. If the characteristics two cells over (to the left) are identical, a double arrow (➜➜) is used.

Again, what we considered the most diagnostic, reliable, and easily used characteristics are listed first and are bold faced. Other less-diagnostic characters are listed below. For example, the shape, amount of wear, color, and the edging of the outer

primary coverts and rectrices are given consistently for most species by Pyle (1997), but are, we feel, best used as ancillary, non-diagnostic, characteristics.

Wing and tail lengths are given towards the bottom. Although males of many species consistently have longer wings and tails, the overlaps are so great that only extremes can be sexed safely, precluding the 95% separation rule. We also include a column for juveniles, but diagnostic information on the plumage of many juveniles is lacking from Pyle (1997).

Figures, tables, and graphs: In each species account we include all those mentioned in the Basic Table. The vast majority of these are taken from Pyle (1997) and include his age and sex bar graph.

DISCUSSION

It is vital that all banders who use our *Tabular Pyle* have a copy of Pyle (1997) at hand. In fact, we require that anyone receiving a copy of *Tabular Pyle* affirm that they also possess Pyle. Also, banders should read and understand the introductory material in the first 38 pages of his book, as well as the section on molt limits.

Comparison: Pyle (pers. comm.) was very conscious of space and chose his format to provide the most information in the fewest possible number of pages. Still, Pyle (1997) is 732 pages long. While very complete, this strategy inevitably leads to difficulties in reading and synthesizing the information on the identification, age, and sex of each bird. In addition, figures that apply to many species are presented only once.

The effort of Wedeking et al. (2000) is most similar to our own and an excellent system. They condensed Pyle's information to one page for each species for ease of use. In our version, more than one page often is necessary so that all characteristics described by Pyle, including figures, tables, and graphs, are presented. A most important distinction of our effort from Pyle (1997) and Wedeking et al. (2000) is that we separate the characteristics into categories. That is, some characters, such as primary coverts, might well have multiple diagnostic features that can be used, such as size, shape, and color. Since some features are much more diagnostic than others, we have separated them by their degree of usefulness in distinguishing species, sex, and age, in order to focus rapidly the bander's efforts. Although this results in two or more pages for most species, our banders will have quick access to all of the information necessary to identify individuals that are difficult to age and/or sex. Users of Wedeking et al. (2000), on the other hand, may have to refer to Pyle for further characters for species that are difficult to age and/or sex. By using and referring to the same figure numbers as Pyle (1997), our banders can easily consult Pyle (1997), if necessary. Wedeking et al. (2000) use their own figures, rather than Pyle's.

There are several other differences between the approach of Wedeking et al. (2000) and ours. They present the age categories in chronological order from Juvenal, HY/SY, and AHY/ASY. Our strategy was to present the most obvious and easiest to recognize member of the species first (adult male) and put the juvenile last. Wedeking et al. (2000) put both male and female together in each age class for sexually dimorphic species, whereas our *Tabular Pyle* has separate columns for each sex. Through extensive testing, we have found that this makes recognition much easier. They opted to combine Basic and Alternate plumages together on one page. We felt that, following the order of Pyle (1997), it was preferable to have two separates tables, when both plumages are likely.

Wedeking et al. (2000) maintain each page (species) in a consistent format, which aids in ease of use. The age/sex characters are presented from general to specific, head to tail. We have elected to present the most diagnostic, salient characteristics first. Our approach makes it unnecessary for the bander to search through the table for the most salient characteristics. We acknowledge that a pitfall of this strategy is that banders might look at the top character only and rely on this single character to age and sex birds. Once a bander is very experienced, this indeed can be done; but those with less exposure to the species should look at characters further down the table, past the first few characters.

We agree with Wedeking et al.'s (2000) recommendation that others create their own version of *Tabular Pyle* based on the needs of their stations. And, in fact, others may find that a combination of our two versions is best for their needs.

Application in the field: We found that the *Tabular Pyle* format is less daunting for beginning banders to learn than Pyle (1997) and the learning curve is reduced greatly. Advanced banders still use our *Tabular Pyle* to age and sex infrequently encountered birds and to review characteristics.

Tabular Pyle will likely always be under construction. Note that errata in Pyle (1997) are posted on the Point Reyes Bird Observatory Website at

http://www.prbo.org/Pyleguide.html

and should be consulted periodically for changes and additions. Order forms are also available here. New information on birds is being published regularly and, as they are recognized by the Bird Banding Offices, they should be incorporated. For example, sexing Northern Saw-whet Owls by wing/weight ratio is accepted by the Offices and can be seen at

http://www.ProjectOwlnet.org/df.html

for further details. The Special Handling Notes will vary not only with station but also with changing research projects.

In preparing this *Tabular Pyle,* we noted that there were many empty cells where there was little or no information available for that specific character. This was especially noted in juvenile birds, indicating there is still much to be learned from careful field work.

We would caution, as does Pyle, that characters may be applicable only regionally and may have to be modified slightly for your own geographic area. The use of any such guide does not result in complete accuracy of ageing and sexing, and Pyle is no exception. All of our species accounts have had thorough editing at least three times and will continue to be augmented. In the meantime, if any readers would like to take on upgrading, double-checking, and otherwise improving a species or group, please contact the authors, so that we can encourage you and avoid duplication.

Both authors of this paper found that generating these species accounts was an education for each of us. Writing each species account taught each of us many, many salient features that were new to us.

Availability: We can make our version available to banders for the cost of reproduction. Check the website of the Klamath Bird Observatory

http://www.klamathbird.org

for a list of the species available and the cost.

ACKNOWLEDGMENTS

We are in debt to Mary Kay Waddington who devised the major aspects of the format of our approach. We thank the many workers, interns, volunteers, and members of the Klamath Demographic Network, the Klamath Bird Observatory, the Humboldt Bay Bird Observatory, and the Torrtuguero Integrated Bird Monitoring Program for their devotion to detail and help in this process. John Alexander, Bob Frey, Kim Hollinger, and Tina Fabula all contributed species accounts to this effort.

Santa Monica College awarded the first author a sabbatical leave during the fall of 2000, when the majority of the work was accomplished. The Caribbean Conservation Corporation and Point Reyes Bird Observatory helped support our ongoing Costa Rican work.

We thank Steve Russell and Barbara Carlson for helpful comments on the manuscript. We are grateful to Vicki and Glen Sakai, who allowed husband and father to pursue his interests in bird banding.

Most of all, Peter Pyle's vision and energy have earned him a place unparalleled in ornithology. He should be recognized for the true genius that went into his herculean effort.

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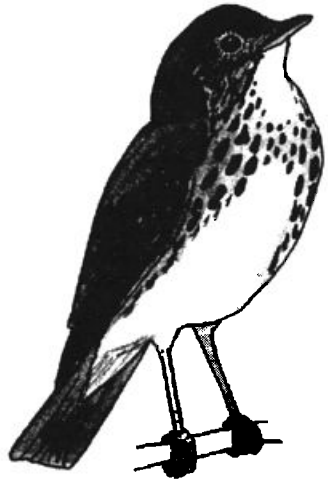


Hermit Thrush
by George West

Figure 1: The Tabular Pyle for the Hermit Thrush, p.1

HERMIT THRUSH

Date: 20 Sep 2002/Edited by: Walter H. Sakai
3 Nov 2000/Edited by: CJ

HETH
Species # 759.0
Band size: 1B

HERMIT THRUSH
Catharus guttatus
Natl. Geogr. p348 Pyle pp399-400
Sibley p409

	J	F	M	A	M	J	J	A	S	O	N	D
Skull Oss.	❑	❑	❑	❑	❑	❑	❑	?			▬	■
HY/SY molt							P	P	P	P		
AHY/ASY molt							C	C	C			
CP/BP				■	■	■	■	■	■			

Skull: Some SYs retain large windows (> 3 mm) at rear of skull through at least Jul. Some ASYs can retain small windows (< 3 mm) there (see Pyle Fig. 11D).
Molt: PBs occur in summer grounds.
1st PB includes some to all median coverts and 0-4 greater coverts but no tertials or rectrices.
PA absent

Species - Upperparts vary from rich brown to gray-brown; complete, often whitish eye ring; reddish tail; buffy breast and off-white belly; spots on breast become fainter as one moves toward belly; p6 emarginated; p9 < p6 (see Pyle fig. 238 below). **See following page for comparisons between Hermit Thrush and Veery, Gray-cheeked Thrush, and Swainson's Thrush.**

Ten primaries (10th reduced), 9 secondaries, and 12 rectrices.

Age - The buff tipping to juvenal greater coverts can be lacking in fall, or wear off in many SYs by spring; however, the other criteria should allow reliable separation of most (> 90%) of these birds from AHY/ASYs, especially in conjunction with p10 characteristics.

Also, beware that the Northern Subspecies Group (*C. g. faxoni*) averages paler greater covert tips (in both age groups) than the western subspecies groups (*C. g. guttatus* and *C. g. auduboni*)

Sex - No plumage criteria known; use CP/BP

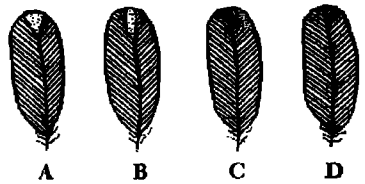
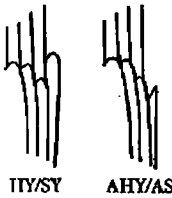
Basic Plumage	AHY/ASY ♂ = ♀ (Sep-Aug)	HY/SY ♂ = ♀ (Sep-Aug)	Juv ♂ = ♀ (Jun-Aug)
Feathers of upperparts	Without buffy tips.	→ (except greater coverts noted below).	With buffy tips
Greater coverts (See Pyle fig. 233)	None with buffy tips. (See Pyle fig. 233C-D)	At least one feather with buffy tip (lacking in 13% birds) (See Pyle fig 233A-C). **Beware:** See above.	With buffy tips.
 Fig. 233. Variation in the pattern on juvenal and adult greater coverts (see text) in *Catharus* thrushes.			Fig. 234. Variation in the shape and size of the reduced outer primary (p10) by age in *Catharus* thrushes. The distance between the tip of p10 and the tip of the longest primary covert varies by age (see text). This figure represents this difference in Veery; the other species have longer or shorter p10s (see accounts) but the relative differences in size and shape are similar.
p10 to primary coverts difference (See Pyle fig. 234)	Measuring -1 to4 mm shorter than primary coverts.	Measuring -5 to 2 mm shorter than primary coverts.	→
p10 shape.	Narrow and tapered.	Broad and rounded.	→

Figure 1: The Tabular Pyle for the Hermit Thrush, p.2

Basic Plumage	AHY/ASY ♂ = ♀ (Sep-Aug)	HY/SY ♂ = ♀ (Sep-Aug)	Juv ♂ = ♀ (Jun-Aug)
Shape & wear of outer primary coverts.	Broad, truncate, relatively fresh.	Narrow, tapered, relatively abraded.	Narrow, tapered, relatively fresh.
Color of outer primary coverts.	Dusky brown	Brownish	→
Edging on outer primary coverts.	Distinct, relatively broad, grayish-brown to rufous-brown edging.	Indistinct and relatively thin, or no pale brownish edging.	→
Shape & wear of primaries.	Truncate and relatively fresh.	Tapered and relatively abraded.	Tapered and fresh.
Shape & wear of rectrices.	Truncate and relatively fresh.	Tapered and relatively abraded.	Tapered and fresh.
Wing (n=100)	♂ 91-110 mm ♀ 78-103 mm	→	Not applicable
Tail (n=100)	♂ 62-79 mm ♀ 58-74 mm	→→	Not applicable

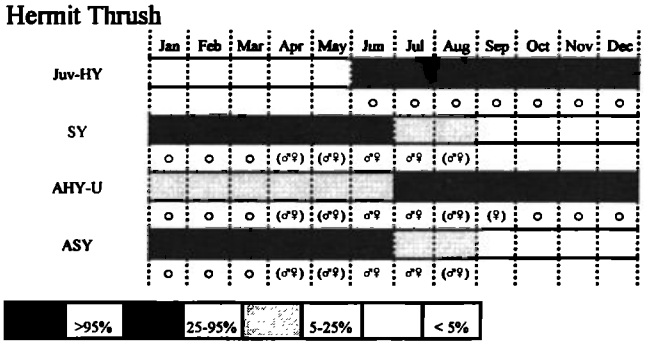


Fig. 11D

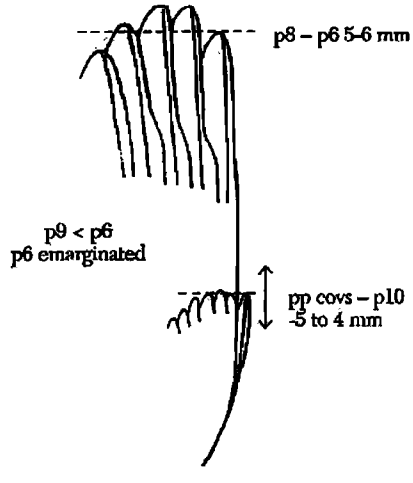


Fig. 238. The wing morphology of Hermit Thrush. See Figure 10 for measurement techniques and *cf.* Fig. 234 for age-related differences in pp covs - p10.

Figure 2: The Tabular Pyle for the Yellow Warbler, p.1

YELLOW WARBLER — Date: 20 Sep 2002/Edited by: Sakai/Ralph

YWAR
Species #652.0
Band size: 0-0A-(1C)

YELLOW WARBLER
Dendroica petechia
Natl. Geogr. p382 — Pyle pp459-62
Dunn & Garrett p210, pl.8,9 — Sibley p432

	J	F	M	A	M	J	J	A	S	O	N	D
Skull Oss.										▬	■	■
HY molt					P	P	P	P	P			P-I
SY molt	P-I	P-I	P-I	P-I								
ASY molt	P	P	P	P								P
AHY molt						C	C	C	C			
CP/BP				■	■	■	■	■				

Skull: As early as 15 Sep in populations of CA
Molt: PBs occur on summer grounds; some AHYs occasionally suspend flight-feather replacement during fall migration.
1st PB (largely underway before fledging) includes some to all median coverts, 3-10 (~89%) inner greater coverts, and 1-3 (~77%) tertials, but no rectrices.
1st PA includes 3-10 (~22%) inner greater coverts, usually 1-3 (~87%) tertials, ~22% s6, and ~8% s5, but no rectrices.
Adult PA includes 8-10 inner greater coverts and 2-3 tertials but no rectrices.
PAs may involve continuous, limited by replacement on winter grounds, from Oct-Apr, but greater coverts & tertials are largely replaced in Mar-Apr.

Species - Green to yellow-green or yellowish olive above and yellow below; dark eye prominent on uniformly yellow face; reddish or chestnut streaks below distinct in ♂♂ but faint or absent in ♀♀. Unique yellow tail spots.

From all warblers by medium-large size (wing 55-68 mm, tail 38-50 mm); indistinct eye ring present, but other facial features lacking; distinct wing bars lacking; **outer rectrices (r5-r6) with unique yellow pattern (See Pyle fig. 263)**

Nine visible primaries, 9 secondaries, and 12 rectrices.

Age - Intermediates will occur which are not reliably aged.

Sex - Only dullest HY/SYs, with indicative short wings, should be sexed. Many bright HY/SY ♀♀ (possibly half or more) overlap in plumage with dull HY/SY ♂♂ and should be left unsexed; HY/SYs that lack red streaks are not necessarily ♀♀. Sexing is more reliable on HY/SY of known subspecies (e.g. Hobson et al, 2000. NABB 25(1):8-12).

Duller HY/SY ♂♂ (up to half) can overlap in plumage with HY/SY ♀♀, although known, basic plumaged HY/SYs with reddish streaks on breast are reliably sexed ♂.

Basic Plumage	AHY/ASY ♂ (Aug-Mar)	AHY/ASY ♀ (Aug-Mar)	HY/SY♂ (Aug-Mar)	HY/SY ♀ (Aug-Mar)	Juv ♂ = ♀ (May-Aug)
Color of r5-r6	Dusky with extensive amount of yellow on inner webs (see Pyle fig. 263C)	Dusky with moderately extensive to extensive amount of yellow on inner webs (See Pyle fig. 263B-C)	Brownish with relatively little to moderate amount of yellow on inner webs (See Pyle fig. 263A-B)	Brownish with relatively little yellow on inner webs (See Pyle fig. 263A)	In some juv, ♂ = ➔➔ ♀ = ➔

Figure 2: The Tabular Pyle for the Yellow Warbler, p.2

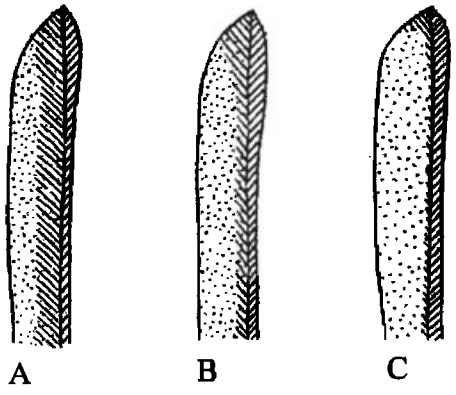
Basic Plumage	AHY/ASY ♂ (Aug-Mar)	AHY/ASY ♀ (Aug-Mar)	HY/SY♂ (Aug-Mar)	HY/SY ♀ (Aug-Mar)	Juv ♂ = ♀ (May-Aug)
	 A B C				
Underparts	Brightish yellow with moderately distinct to distinct, red streaking on breast & flanks.	Pale to brightish yellow, usually with few very indistinct, reddish streaks on upper breast.	Pale to brightish yellow, sometimes with few (but often no) indistinct, reddish streaks on upper breast.	Pale yellow, without reddish streaks.	In some juv, ♂ = ➜➜ ♀ = ➜
Upperparts	Washed yellowish; no streaking.	➜	➜	➜	Washed brownish, obscure dusky-olive streaking.
Forecrown	Brightish yellow with moderate green wash.	Dull to moderately bright yellow, often washed heavily with greenish.	➜	Dull greenish yellow or grayish yellow.	Brownish
Molt limits among greater coverts	Uniformly adult, dusky with indistinct tips.	➜	Occasionally, retained outer coverts worn & brownish yellow with distinct, lemon tips when fresh, contrasting with slightly fresher, duskier, & indistinct tipped inner coverts.	➜	Uniformly juvenal, fresh, brownish yellow with distinct lemon tips.
Contrast between tertials & middle secondaries	Uniformly adult.	➜	1-3 tertials, often replaced contrasting with older s4-s6.	➜	

Fig. 263. Variation in the amount of yellow and brown in the outer rectrices (r4-r6), by age and sex (see text), in Yellow Warbler.

Figure 2: The Tabular Pyle for the Yellow Warbler, p.3

Basic Plumage	AHY/ASY ♂ (Aug-Mar)	AHY/ASY ♀ (Aug-Mar)	HY/SY♂ (Aug-Mar)	HY/SY ♀ (Aug-Mar)	Juv ♂ = ♀ (May-Aug)
Shape of outer primary coverts	Broad, truncate, fresh.	→	Narrow, tapered, somewhat abraded.	→	Narrow, tapered, fresh.
Color of outer primary coverts	Dusky brown.	→	Brownish.	→	
Edging on outer primary coverts	With relatively distinct & broad, yellow-olive.	→	With indistinct, narrow or no buffy-yellow	→	Distinct buffy-yellow.
Shape of r5-r6	Fresh, truncate.	→	Relatively abraded, tapered.	→	Relatively fresh, tapered.
Wing	58-68 mm	55-64 mm	→→	→→	Not applicable
Tail	41-50 mm	38-47 mm	→→	→→	Not applicable
Color of base of lower mandible.	Black	→	Flesh (Sep-May?)	→	→

Alternate Plumage	ASY ♂ (Mar-Jul)	ASY ♀ (Mar-Jul)	SY ♂ (Mar-Jul)	SY ♀ (Mar-Jul)
Yellow on inner web of r5-r6	With extensive yellow. (See Pyle fig. 263C)	With moderately extensive to extensive yellow. (See Pyle fig. 263B-C)	With moderate amount of yellow. (See Pyle fig. 263A-B)	With restricted yellow. (See Pyle fig. 263A)
Forecrown & back	Forecrown bright yellow, sometimes tinged orange or red, & usually contrasting in coloration with greener back.	Forecrown yellow greenish wash, not showing well-marked contrast with back coloration..	→→ Except forecrown bright yellow, usually without orange tinge.	→→
Molt limit among greater coverts	Sometimes occurs, at most 2 generations present: retained adult outer coverts dusky brown with moderately worn edging, contrasting slightly (in wear only, not color) with recently replaced inner coverts.	→	2-3 feather generations present, retained: juvenal outer coverts (if present) worn & brownish, contrasting markedly with fresher, dusky, & yellow-edged, recently replaced inner coverts with 3-7 intermediate 1st basic coverts often present.	

Figure 2: The Tabular Pyle for the Yellow Warbler, p.4

Alternate Plumage	ASY ♂ (Mar-Jul)	ASY ♀ (Mar-Jul)	SY ♂ (Mar-Jul)	SY ♀ (Mar-Jul)
Shape of outer primary coverts.	Broad, truncate, relatively fresh.	→	Narrow, tapered, relatively abraded.	→
Color of outer primary coverts.	Dusky brown.	→	Brown.	→
Edging on outer primary coverts	Usually with distinct but narrow grayish edging.	→	Little or pale edging.	→
Shape of r5-r6	Relatively fresh, truncate.	→	Relatively abraded, tapered.	→
color of r5-r6	Brownish dusky.	→	Brownish.	→
Red streaking on underparts	Bold & distinct.	Narrow & moderately indistinct.	Broad & moderately distinct.	Narrow & indistinct, or lacking.

Special Handling: One outer tail feather can be taken and taped to the reverse side of the data sheet under "note" to facilitate sexing of HY/SY birds *(with permits?)*

Yellow Warbler

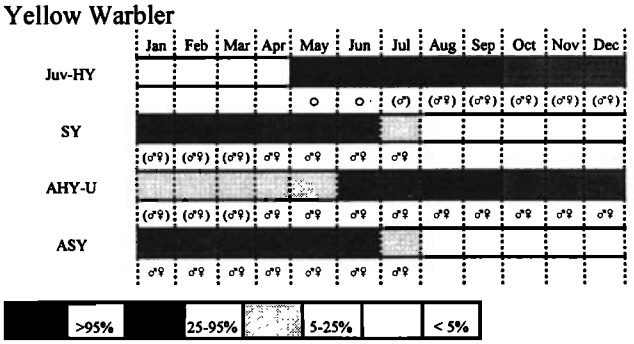


Figure 3: Species Identification Table for the *Catharus Thrushes*, p.1

COMPARISON OF THRUSHES

Dated: 20 Nov 2002/Edited by: Walter H. Sakai

	Veery	Gray-cheeked	Swainson's	Hermit
p6 emargination	Slightly	Usually	Not	**Emarginated**
p9 to p6	p9 > p6	→	→	**p9 < p6**
pp covs - p10	-2 to 9 mm	3-12 mm	-3 to 8 mm	-5 to 4 mm
p8 - p6	5-7 mm	5-10 mm	7-12 mm	5-6 mm
p8 - p5	10-14 mm	12-18 mm	13-18 mm	11-13 mm
p8 - p1	23-29 mm	27-35 mm	27-30 mm	20-22 mm
Upperparts and tail	Uniformly reddish to reddish-brown	Uniformly brownish or grayish olive.	Uniformly brown with reddish tinge or olive brown to grayish olive.	Brown to grayish-brown, contrasting with **rufous tail and upper covs.**
Cheeks	Grayish	Grayish	Buffy or whitish	
Eye ring	Not distinct and grayish.	Lacking or partial and white.	Distinct and buffy.	Distinct and white.
Auriculars		Streaked whitish	Streaked buffy	
Throat		White	Tinged buffy	
Breast	With pinkish wash with indistinct reddish brown to brownish spotting confined to upper breast	With distinct blackish, triangular spotting.	With fairly distinct, large, oval, and brownish spotting.	Variable
Flanks	Washed pale gray	Brownish-gray to brownish olive.	Brownish or olive brown, contrasting moderately with creamy white belly.	Variable.

ATTENTION: Species: Pacific coast ssp of SWTH can have tinged rufous uppertail covs and tail like HETH. Color of VEER upperparts can approach overlap with Pacific coast SWTH ssp.

Figure 3: Species Identification Table for the *Catharus* Thrushes, p.2

COMPARISON OF THRUSHES

Dated: 24 Mar 2002/Edited by: Walter H. Sakai

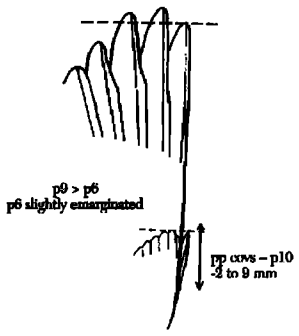


Fig.232. The wing morphology of Veery

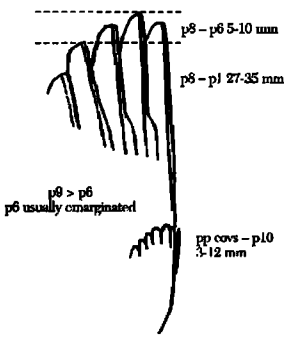


Fig. 235. The wing morphology of Gray-cheeked Thrush

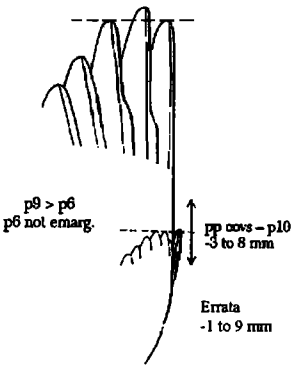


Fig. 237. The wing morphology of Swainson's Thrush

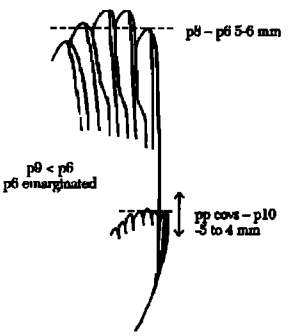
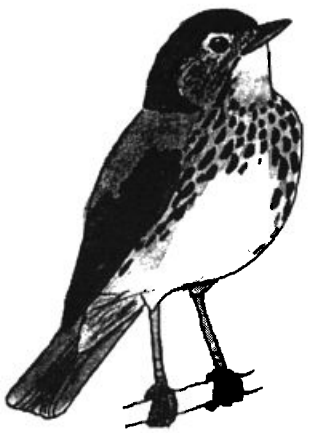


Fig. 238. The wing morphology of Hermit Thrush

Figs. 232, 235, 237, 238. See Fig. 10 for measurement techniques and *cf.* Fig. 234 for age-related differences in pp covs - p10



Swainson's Thrush
by George West