

& 140B). Note: Some intermediates or birds with early molt of the rects, especially in Jan-Mar, may not be reliably aged. The juvenal pp covs apparently(?) are retained through the 2nd PB, although in this species juvenal and adult feathers are very difficult (if not impossible) to distinguish. With caution and experience, occasional SYs and ASYs possibly may be separated by this criterion (see Fig. 158) through Oct. Replacement of the pp without the pp covs in Dec-Apr should indicate HY/SY. Also, look for differences between the age groups in the timing of flight-feather molt (see Molt).

AHY/ASY (Mar-Feb): Lesser covs uniform in coloration (possibly with narrow, pale grayish edging when fresh); med and gr covs tipped pale grayish or olive; outer pp covs broad and truncate (Fig. 138B); unreplaced outer pp and rects truncate (Figs. 139A & 140B) and relatively abraded in Aug-Feb. Note: See HY/SY.

Sex—♀ = ♂ by plumage. CP/BP (May-Sep); the CP is poorly developed. ♀ wg(n100) 75-86, t(n50) 55-69; ♂ wg(n100) 78-90, t(n53) 61-71.

References—Stone (1986), Dwight (1900a), Ridgway (1927), Forbush (1927), Grinnell (1928c), Bent (1942), Roberts (1955), Phillips *et al.* (1964, 1966), Barlow & Rising (1965), Wood (1969), Wetmore (1972), Oberholser (1974), Phillips (1975a), Browning (1977b), Rising & Schueler (1980), Kaufman (1990a), Pyle & McCaskie (1992), McCarty (1996); Pyle (1997a, 1997c, in press); S.F. Bailey, J.D. Rising, G.E. Wallace (pers. comm.); IBP (MAPS) data, PNR data.

Identifying *Empidonax* Flycatchers

We have come a long way since the 1960s, when many, if not all *Empidonax* flycatchers were considered impossible to identify in the hand, unless compared with a series of skins. We also are making progress in identifying vagrants (see Wander & Brady 1984, Keith 1986, DeSante *et al.* 1985, Gibson 1987, Winkler 1988, Haas 1990, Witmer 1991); yet there are still birds that seem to defy certain identification, and separation cannot always be secured without considerable effort (see Winkler 1991). The following accounts should enable users to distinguish almost all *Empidonax* flycatchers in the hand (excepting birds of the "Traill's" and "Western" complexes) and especially will emphasize the separation of similar eastern and western species.

A couple of general points should be mentioned. First, when using the finer details of the wing morphology, note that ♂♂ have wings averaging slightly more pointed than ♀♀, generally resulting in primaries 7-10 being slightly longer in comparison with primaries 4-6. Knowing or surmising the sex of the bird (by breeding condition or wing length), therefore, can help in identifying it. Second, as with ageing and sexing, all criteria should be considered before confirming the identification. Many features are given, and reliable identifications are made when almost all (or if lucky, all) features coincide to one species. This usually should be the case, but note that occasional individuals will not be identifiable by in-hand criteria alone. Table 3 summarizes the more important identifying features and Figure 144 depicts the size, shape, and typical color pattern of the lower mandible of each species. These should be consulted for preliminary identifications, which then should be confirmed with the species accounts. As a final clue to identification, check the pattern and extent of molt, as these generally vary substantially by species. Molt is very complicated and variable in *Empidonax*, (see Dickey & van Rossem 1938, Moore 1940a, Mengel 1952, Johnson 1963b, Pyle 1997c, in press), so caution also should be applied when considering molt-related clues.

TABLE 3. Some key characters for the separation of *Empidonax* flycatchers. Measurements are in mm. See the species accounts for more information. Ranges in measurements are based on 95% confidence intervals (see Figure 3) as determined from measurements on at least 40 of each species (see Pyle 1997a). See text for further details, including those on separating Willow from Alder and Pacific-slope from Cordilleran flycatchers.

	Yellow-bellied	Acadian	"Western"	"Traill's"	Least	Hammond's	Dusky	Gray
Upperparts	green	olive	olive	brownish olive to green	grayish olive	grayish olive to grayish	grayish olive to brownish	pale gray or tinged olive
Wing	60-72	65-80	56-72	61-77	56-67	62-75	61-73	63-76
Tail	46-55	52-62	50-63	48-61	49-61	52-62	57-68	55-66
Wing-d	12-19	12-21	6-15	7-20	6-13	11-19	3-12	8-16
Bill from nares	7.0-9.4	9.2-10.1	7.7-9.2	7.6-10.3	6.3-8.4	6.0-8.0	6.5-8.9	7.6-10.4
Bill width	4.8-5.6	5.3-6.3	5.0-5.8	5.0-6.1	4.4-5.1	4.0-4.6	4.2-5.3	4.4-5.8
<i>Wing Morphology</i>								
Longest p - longest s	10.3-17.5	13.3-23.5	8.6-17.1	10.2-17.4	9.0-15.7	13.3-20.6	9.2-15.2	9.0-16.9
Longest p - p6	2.2-6.7	5.2-9.3	0.2-4.4	1.7-7.4	0.8-3.7	1.8-5.5	0.0-3.0	0.9-4.6
P5 - p10	1.9-6.3	-2.9-1.7	4.7-9.8	-1.4-7.0	2.7-7.0	2.8-8.0	6.0-10.8	4.1-8.1
P3 - p5	5.8-11.5	8.6-14.4	2.8-9.8	4.7-11.6	3.4-7.8	5.6-11.6	2.2-5.5	3.5-8.8
P5 emarginated?	variable	no	yes	no	yes	yes	yes	yes

The inexperienced also should beware of Hutton's and HY White-eyed vireos (which see), surprisingly often mistaken in the hand for *Empidonax* flycatchers (and vice versa), both in banding labs and museum skin trays.

Good summaries or information on general *Empidonax* identification have been compiled by Snyder (1953), Phillips *et al.* (1964, 1966), McBriar (1968), Phillips & Lanyon (1970), Robbins (1972), Phillips (1979), Whitney & Kaufman (1985-1987), McKinney (1988), and Kaufman (1990a). Also, see Benson & Benson (1988) for discriminant function analyses useful in separating eastern *Empidonax* flycatchers, and Pyle (1997a) for 95% confidence intervals of the wing and tail morphology in all species. Note, however, that most of these treatments were based on specimens, and criteria can differ, to some extent, on live birds in the hand. Finally, beware of hybrids (which hopefully will be left unidentified if encountered!); fortunately, hybrids appear to be rare between species of *Empidonax* (see Johnson 1963a, Phillips 1966b).

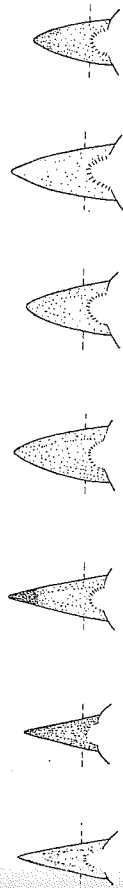


FIGURE 144. The relative sizes and shapes of the bills, and the color of the lower mandibles in *Empidonax* flycatchers. See Table 3 for ranges of bill widths at the tip of the nares.

contrasting markedly with the rest of the tail; tail slightly notched (r6 - r1 1-4 mm); bill long (Table 3) and straight, the lower mandible pale pinkish to yellowish, with a distinctly defined dark tip (Fig. 154); legs blackish.

From most other species of *Empidonax* (Table 3), by the combination of the long wg and bill (Table 3), uniformly pale and grayish-washed upperparts, relatively pale underparts, blackish legs, and lower mandible pattern (Fig. 144). From Dusky Flycatcher (which see for separation from Least and Hammond's flycatchers) with caution, especially with HYs in autumn: useful criteria include longer bill, wg - tl and p9 - p5, and shorter p6 - p10 (Table 3, Fig. 154), slightly paler upperparts, and distinctly defined color differences in molt strategies and limits for further identification clues.

Geographic variation—No subspecies are recognized. See Johnson (1966b).

Molt—PB: HY partial (Aug-Nov), AHY complete (Jul-Nov), PA: SY partial-incomplete (Mar-May), ASY limited-partial (Mar-May). All molts occur on the winter grounds. The 1st PB includes 3-7 inner gr covs, usually (in ~92% of birds) 1-3 terts, and occasionally (in ~17% of birds) 1-2 central rects (r1). The 1st PA includes some or all med covs, 0 (9%) to 6 inner gr covs, usually (in ~95% of birds) 1-3 terts (occasionally s6 as well), and sometimes (in ~36% of birds) 1-2 central rects (r1). The adult PA includes 0 (63%) to 5 inner gr covs and sometimes (in ~50% of birds) 1-3 terts, but no rects; occasional replacement of s6 during the adult PA might indicate retention of this feather during the adult PB; more study is needed.

Skull—Pneumatization completes in HY/SY from 15 Oct. Some SYs (and ASYs?) can retain windows (> 2 mm; see Figs. 11D & 204) through spring.

Age—Juv (May-Sep) has olive-washed upperparts, buff-washed wing bars, and a stronger lemon wash to the underparts; juv ♀ = ♂.

Juv-HY/SY (Aug-2nd Oct): Wing bars and edging washed buff; molt limits occur among the wing covs and terts (Fig. 133B-E; see Molt), with three generations of feathers often present in Apr-2nd Oct (see Fig. 135); retained outer covs brown with buff to whitish tips, contrasting markedly with the duskiest and olive-tipped to lemon-tipped, replaced inner covs; 1-3 terts usually contrastingly fresh (Fig. 133D-E), rarely retained (juv) and relatively abraded; outer pp covs narrow, brownish, and relatively abraded (Fig. 138); pp and rects relatively fresh in the 1st Aug-Sep, not molting in Sep-Nov (except occasionally 1-2 central rects), and relatively worn in Nov-2nd Oct; rects narrow and somewhat tapered (Fig. 139A), the central rects (r1) occasionally (Aug-Mar) to sometimes (Mar-2nd Oct) contrastingly fresh. Note: HYs are separated from SYs in Aug-Oct by incompletely pneumatized skulls (see Skull), more green in the coloration of the upperparts, uniformly buff wing bars, more yellow in the underparts and (especially) much fresher flight feathers, which are very abraded on SYs at this time.

AHY/ASY (Nov-Oct): Wing bars and edging lemon to whitish (Nov-May), or whitish to worn off (Jun-Oct); wing covs and terts uniformly adult (Fig. 133F; Nov-Mar), or molt limits sometimes present among the med and gr covs in Apr-Oct (Fig. 133A-D; see Molt), but at most only two

generations of feathers present, and the replaced, adult terts and inner covs contrast only slightly with the adjacent ss and outer covs; outer pp covs broad, dusky, and relatively fresh (Fig. 138); pp and rects relatively worn in Aug-Sep, molting in Sep-Oct, and relatively fresh in Nov-Jul; rects uniformly adult, broad, and somewhat truncate (Fig. 139A).

Sex—♀ = ♂ by plumage. CP/BP (May-Jul); the CP is poorly developed. ♀ wg(n55) 63-73, tl(n20) 55-63; ♂ wg(n61) 66-76, tl(n20) 57-66. A wing-morphology formula probably can be used to sex some birds, as in other *Empidonax* flycatchers; more study is needed.

Hybrids reported—Dusky Flycatcher.

References—Ridgway (1907), Phillips (1939, 1944b, 1959b, 1966b, 1979), Moore (1940a), Bent (1942), Johnson (1963a, 1963b, 1966b), Phillips *et al.* (1964, 1966), Phillips & Lanyon (1970), Oberholser (1974), Whitney & Kaufman (1985a, 1985b), Kaufman (1990a), Pyle (1997a, 1997c); A.R. Phillips (pers. comm.); IBP (MAPS) data, PRBO data.

WESTERN FLYCATCHER

WEFL
Species # 4649
Band size: 0-0A

PACIFIC-SLOPE FLYCATCHER

Empidonax difficilis

CORDILLERAN FLYCATCHER

Empidonax occidentalis

PSFL
Species # 4641
COFL
Species # 4640

Species—"Western" Flycatcher (in the broad sense) separated from the other species of *Empidonax* with caution (Table 3). Medium in size with a relatively long tl (hence, short wg - tl) and a moderately short wing morphology (Table 3, Fig. 155); upperparts greenish olive (brownish olive in some juvs); complete eye ring wide, whitish or yellowish, and almond shaped; pp and ss brownish, contrasting relatively indistinctly with the dull whitish, brownish-white, or buff wing edging; p6 emarginated; underparts (including the throat) variably washed yellow, with the breast band and flanks sometimes washed brownish to brownish olive but not contrastingly greenish; lower mandible usually entirely yellow or flesh-colored (Fig. 144); mouth lining orangish; legs gray.

The greenish-olive upperparts, the presence of a complete, almond-shaped eye ring, the yellow or flesh lower mandible, and the gray leg coloration eliminates the other *Empidonax* of N.Am except for Yellow-bellied and Acadian flycatchers. From Acadian Flycatcher by smaller size (wg, tl, and bill) and much shorter wing morphology (Table 3, Fig. 155), emargination of p6, and mouth coloration brighter. From Yellow-bellied Flycatcher by wing morphology (Table 3, Fig. 155), especially, p10 usually < p5 (by -0.3 to 4.4 mm), upperparts duller green or olive, eye ring almond shaped, indistinct breast band brownish or olive, and pp and ss browner with duller edging. Also, see differences in molt strategies and limits for further identification clues. Pine Flycatcher (*E. affinis*), a potential vagrant to se.AZ, can be separated from Western by having bill width at tip of nares ≤ 4.5 mm (< 5/8 bill nares to tip, vs > 5/8 in Western); p6 - p10 9-14 mm (vs 5-10 in Western; see Table 3); p5 > p10 by 3-8 mm (vs p5 < p10 or p5 > p10 by 0-2 mm in Western Flycatcher); wing edging bolder and yellower; underparts darker olive.

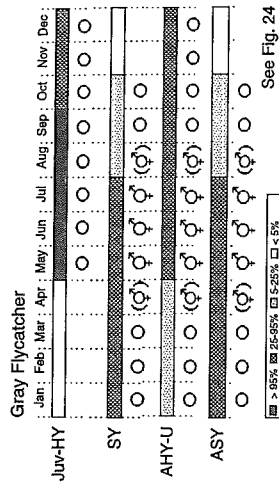
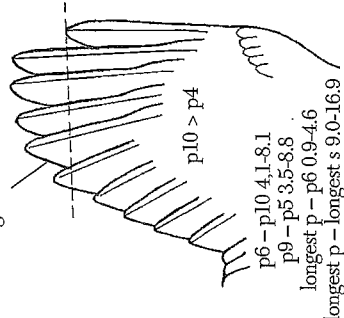


FIGURE 154. The wing morphology of Gray Flycatcher. See Figure 10 for measurement techniques.



The separation of Pacific-slope from Cordilleran flycatchers by in-hand criteria alone should be performed with extreme caution and the realization that many individuals cannot be identified. In addition to subtle (and overlapping) plumage features and differences in bill size (see Geographic variation), Pacific-slope Flycatchers average slightly smaller and shorter wing morphology (see Pyle 1997a), especially p9 - p5. The best formula known using a combination of measurements is: $(lp6 - p10) + [\text{longest } p - \text{longest } s] + [wg - tl] \times (p9 - p5) = 61.7-283.5$ mm in Pacific-slope and 157.8-331.0 mm in Cordilleran, allowing separation of about 60% of individuals. Within each sex, this formula results in 75-216 mm for ♀ and 88-299 mm for ♂ Pacific-slope Flycatchers, and 156-279 mm for ♀ and 191-346 mm for ♂ Cordilleran Flycatchers, allowing separation of about 70% of individuals of known sex. This formula is based on specimens and the values may differ somewhat on live birds; more study is needed. There likely are other formulas (e.g., including bill measurements; see Geographic variation) that can help distinguish even larger proportions of individuals. Also, see differences in the average placement of molt limits.

Geographic variation—Generally weak, although most ranges are well defined. Subspecies taxonomy (of both species) follows Traylor (1979a); see Ridgway (1907), Brodkorb (1935c, 1949), Moore (1940a, 1940b), Behle (1948), Phillips *et al.* (1964), Phillips (1966b, 1966c, 1994a), Hubbard & Crossin (1974), Weske (1976), Johnson (1980, 1994), Whitney & Kaufman (1986b). No other subspecies of *E. difficilis* occur, and one other subspecies of *E. occidentalis* occurs in Mex.

Pacific-slope Flycatcher

E. d. difficilis (br coastal se.AK-s.CA): Medium in size; bill small (exp culmen 9.5-12.2, bill width at tip of nares 4.7-5.7); exp culmen \pm wg small (0.14-0.19 mm); plumage medium pale, dull, olive and yellow; wing bars dark ochre-buff (juv-HY) to pale lemon (basic). ♀ wg(n100) 59-68, tl(n74) 51-58; ♂ wg(n100) 61-70, tl(n100) 54-61.

E. d. insulicola (br Channel Is, CA): Wg medium in length but tl and bill long (exp culmen 10.7-11.3; exp culmen \pm wg small (0.15-0.18 mm)); wing bars buffy (juv-HY) to white (basic). ♀ wg(n9) 54-61; ♂ wg(n10) 64-70, tl(n10) 57-63.

E. d. cineritius (br s.Baja CA; vag to AZ): Small but bill long (exp culmen 10.6-13.2); exp culmen \pm wg large (0.18-0.24 mm); wing bars dingy buff (juv-HY) or dingy whitish with a lemon tinge (basic). ♀ wg(n11) 59-67, tl(n11) 52-57; ♂ wg(n16) 62-69, tl(n16) 55-61.

Cordilleran Flycatcher

E. o. helmayri (br s.BC-s.Alb to ne.CA-w.TX): Large; bill large (exp culmen 11.2-13.5, bill width at tip of nares 5.4-6.2); plumage medium dark, brightish olive and yellow; wing bars dark buffy (juv-HY) to buffy-lemon (basic); ♀ wg(n60) 62-71, tl(n20) 54-62; ♂ wg(n62) 65-75, tl(n32) 57-65.

Molt—PB: HY partial (Sep-Dec), AHY complete (Aug-Nov); PA: SY partial-incomplete (Mar-May), ASY partial (Feb-Apr). Most molting occurs on the winter grounds. The 1st PB varies in extent between Pacific-slope and Cordilleran flycatchers. In Pacific-slope it often (in ~60% of

birds) includes 1-5 inner gr covs and sometimes (in ~28% of birds) includes 1-3 terts (rarely s6 as well), but no rects. In Cordilleran it usually (in ~93% of birds) includes 1-6 inner gr covs and includes 1-3 terts (sometimes s6 and rarely s5), but no rects. The 1st PAs include 0 (~40%) to 3 inner gr covs, often (in ~70% of birds) 1-3 terts, and rarely (in ~5% of birds) 1-2 central rects (r1). The adult PAs include 0 (~70%) to 3 inner gr covs, sometimes (in ~29% of birds) 1-3 terts, and occasionally (in ~6% of birds) 1-2 central rects (r1). The PAs also average more extensive in Cordilleran than in Pacific-slope Flycatcher.

Skull—Pneumatization completes in HY/SY from 15 Oct (as early as 15 Sep in birds of s.CA). Some SYs (and ASYs?) can retain windows (> 2 mm; see Figs. 11D & 204) through spring.

Age—Juv (May-Oct) has dull, brownish-washed upperparts and underparts, and buffy wing bars; juv ♀ = ♂.

Juv-HY/SY (Aug-2nd Oct): Wing bars and edging washed buff; molt limits occur among the wing covs and terts (Fig. 133A-D in Pacific-slope, Fig. 133B-D in Cordilleran; see Molt), with three generations of feathers often present in Mar-2nd Oct (see Fig. 135); retained outer covs brown with buff to whitish tips, contrasting with the dusker and olive-tipped to lemon-tipped, replaced inner covs; 1-3 terts sometimes (Pacific-slope) or usually (Cordilleran) contrastingly fresh in Nov-Mar (Fig. 133D-E) or very worn and abraded (see Molt); outer pp covs narrow, relatively abraded, and brownish with reduced or no olive edging (Fig. 138); pp and rects relatively fresh in Aug-Oct, not molting in Sep-Nov, and relatively worn in Nov-2nd Oct; rects narrow and tapered (Fig. 139A). **Note: HYs are separated from SYs in Aug-Oct by incompletely pneumatized skulls (see Skull), uniformly buff wing bars, and much fresher flight feathers, which are very abraded on SYs at this time.**

AHY/ASY (Nov-Oct): Wing bars and edging lemon to whitish (Oct-May), or whitish to worn off (Jun-Sep); wing covs and terts uniformly adult (Fig. 133F) or with some replaced, adult feathers in Mar-Oct (see Molt; at most only two generations of feathers are present); outer pp covs broad, relatively fresh, and dusky with broader olive edging (Fig. 138); pp and rects relatively worn in Aug-Sep, molting in Sep-Oct, and relatively fresh in Nov-Aug; rects broad and truncate (Fig. 139A).

Sex—♀ = ♂ by plumage. CP/BP (Mar-Aug); the CP is poorly developed. Pacific-slope ♀ wg(n100) 59-68, tl(n100) 51-61; ♂ wg(n100) 61-70, tl(n100) 54-63; see Geographic variation. Cordilleran ♀ wg(n60) 62-71, tl(n20) 54-62; ♂ wg(n62) 65-75, tl(n32) 57-65. Wing-morphology formulas for each species probably can be used to sex some birds, as in other *Empidonax* flycatchers; more study is needed.

References—Ridgway (1907), Bent (1942), Miller (1955a), Phillips & Lanyon (1970), Johnson (1974, 1980), Oberholser (1974), DeSante *et al.* (1985), Whitney & Kaufman (1985a, 1987), Kaufman (1990a), Pyle (1997a, 1997c); I. Hamay, A.R. Phillips (pers. comm.); IBP (MAPS) data, PRBO data.

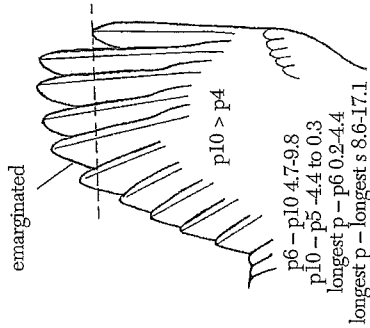
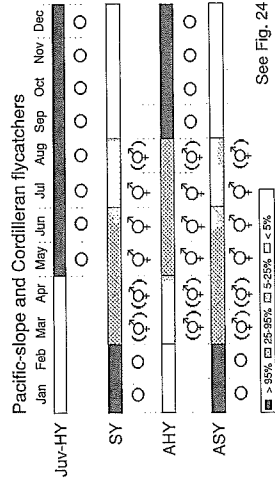


FIGURE 155. The wing morphology of "Western" Flycatcher. See Figure 10 for measurement techniques. See text for formulas useful in separating Pacific-slope and Cordilleran flycatchers.



See Fig. 24