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GEOGRAPHIC VARIATION IN *EMPIDONAX TRAILLII*

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OF ALL the birds of North America, the Alder Flycatcher, with its willow-inhabiting races in the west, is perhaps as difficult as any to the taxonomist. Except for the lack of pronounced sexual differences, these birds present nearly every possible difficulty. Indeed, the very similarity of the sexes poses a problem; a large female of one race may be confused with a small male of another, leading to doubt as to whether the bird was breeding or on migration when taken. The species migrates both very late in spring and early in fall; only from June 25 to July 20 may the birds be presumed to be on their breeding grounds; and at this time most of them are in poor plumage.¹ In cases of this sort, the inadequacy of the usual museum label (which gives no data on sexual condition or on plant association) becomes painfully apparent. Besides these difficulties, size varies rather independently of color; immatures differ from adults; adults migrate before their post-nuptial molt; and it is no easy matter even to distinguish this from other species of *Empidonax*. Perhaps the worst features of all are the manner of intergrading, by wide individual variation in intermediate areas, and certain peculiarities in the distribution of the races, which does not always coincide with the distribution of races of most other species (which we think of as 'natural' ranges). This last situation might well be suspected from the proximity of the type localities of *brewsteri* and *adastus*, both of which lie in the western Great Basin region.

¹ Even as far south as Costa Rica (Agua Caliente, 4500 feet alt.), on May 24, 1920, Austin Paul Smith wrote on the label of a specimen of *brewsteri*: "No sign of breeding, and species rather common in old pastures—perhaps migrants!" But the extreme limits of the birds' stay in Central America are not clear; the June 4 specimen of *brewsteri* from Hacienda California, Guatemala, had sustained an injury to the right wing.

An attempt to determine which races occur in Arizona proved to require a review of the species. This review is based primarily on the specimens in the United States National Museum (including the Fish and Wildlife Service collection), American Museum of Natural History, Cornell University, University of Arizona (including the Arizona State Museum), University of Utah, Museum of Northern Arizona, and the collections of Lyndon L. Hargrave, Gale Monson, and the writer. Some birds were also examined from the collections of the Academy of Natural Sciences of Philadelphia, Cleveland Museum of Natural History, University of Michigan Museum of Zoology, University of California Museum of Vertebrate Zoology, and the Dickey collections, University of California at Los Angeles. I am greatly indebted to the authorities in charge of these collections.

From these studies, pursued intermittently over a period of six years, it appears that five races may be recognized, as follows:

***Empidonax traillii traillii* (Audubon)**

Muscicapa Traillii Audubon, Birds Amer. (folio), 1: plate 45, 1828 (Prairie lands of the [lower] Arkansas River).

Empidonax ridgwayi Sclater, Proc. Zool. Soc. London, 1887: 50 ("Bogota," Colombia). See van Rossem, 1934: 350.

Empidonax traillii alnorum Brewster, Auk, 12: 161, 1895 (Upton, Maine).

SUBSPECIFIC CHARACTERS: Entire head, neck and upper parts greenish and relatively uniform; wing-bars prominent, pale yellowish; under parts rather uniform, the grayish chest-band not conspicuously darker than throat and belly; wing rather pointed, with tenth (outer) primary usually equal to or longer than fifth.

MEASUREMENTS: In most populations, wing (chord) of males, 68.3 to 72.9 mm. (average 71.0); of females, 65.3 to 68.5 and (one specimen) 69.0 (average 66.95). Tail, males, 55.8 to 61.1 (58.6); females, 54.1 to 57.8 and 58.9 (55.8).

Occasional eastern colonies are somewhat larger (males, wing, 72.0 to 74.4 and even 75.2; tail, 58.3 to 61.6) and more brownish on the back and rump; some of them, at least, also differ in rather darker coloration, particularly on the crown and nape. But no broad geographic segregation of the two types is evident.

RANGE: Breeds across southern Canada and in the northeastern and central United States, west to British Columbia (Lac La Hache; Hazelton), Montana (Java, Blackfoot Agency, Fort Keogh, and northeast of Albion), and probably eastern Wyoming (Douglas, June 3 and July 29). Migrates through central United States (west to trans-

Pecos Texas) and Central America. Winters widely in South America, north rarely to Costa Rica (Dota, "Feb. 29, 1866") and even Nicaragua (San Carlos, Feb. 25, 1892).¹ Guatemala migrations are in May and from August (26, Panajachel) to September (11, Progreso).

REMARKS: From Audubon's account of the date and their notes and actions, the cotypes were evidently on their breeding grounds. This is fortunate, as the application of the name *traillii* might otherwise be difficult; the lectotype (U. S. Nat. Mus. no. 1865) is a bird of maximum size, measuring: wing, 73.6; tail, 58.2 mm. Measurements of the type (not sexed) of *ridgwayi*, furnished through the kindness of A. J. van Rossem, are: wing, 70 mm.; tail, 57.5; tarsus, 16.0; and exposed ("total") culmen, 11.8; these are quite normal for a male of this widespread race.

Agreeing with Anderson (1934) that English names for subspecies are undesirable, I do not propose any. Of the English names already used for one race or another of this species, Alder Flycatcher is the least objectionable; yet it is appropriate for only a part of the range, even of the race now so designated! Willows, and even rosaceous shrubs, are evidently more widely occupied by the species as a whole. What is common to, and diagnostic of, the entire species is a habitat of low, dense brush. A good specific name might be "Thicket Flycatcher."

***Empidonax traillii alascensis*, subsp. nov.**

TYPE: United States National Museum no. 187,242, Fish and Wildlife Service collection; adult male; Charlie Creek, Yukon River, Alaska, June 21, 1903; collected by W. H. Osgood (original no. 774).

SUBSPECIFIC CHARACTERS: Very similar to *E. t. traillii*, but wing longer and tail averaging longer. The more brownish-backed specimens differ from the largest, brownish *traillii* in their paler heads with the green feather-edgings paler, grayer, and perhaps broader; their backs, too, are paler, but color differences are minute.

MEASUREMENTS: Wing, males, 71.5 (one specimen from Mackenzie) and 73.3 to 77.4 mm. (average 75.1); females, 67.8 to 71.1 (average 69.5). Tail, males, 57.6 (same specimen) and 58.6 to 64.1 (61.4); females, 55.2 to 58.8 (57.1). Females seen only from Mackenzie and Yukon, none from northern Alaska.

RANGE: Breeds in northern Alaska (Nulato and eastern Yukon River), Yukon (Ft. Selkirk), and northwestern Mackenzie (Forts Norman, McPherson, and Good Hope). Migrates through Alberta (Edmonton, May 30, 1896), Montana (Fort Keogh and Terry, June

¹ Specimens recorded from Salvador in winter were not examined by me.

2 to 6; Summit, June 19), Wyoming (Douglas, May 29 and Aug. 10), North Dakota (Lisbon, May 28; Pembina, June 3), South Dakota (Pierre and Smithville, May 30 to 31), Colorado (Wray, May 21; northeast of Avalo, June 7), Oklahoma (Arnett, May 27), and Texas (Tivoli, Aug. 16; near Santa Rosa, Cameron Co., Sept. 20), and east to Louisiana (New Orleans, Sept. 9 and 16) and Mississippi (Bay St. Louis, Deer Island, and Gulfport, Sept. 6 to 14). Several specimens sexed as females indicate, if no mistake was made, that it migrates through Central America to Colombia (Honda, Magdalena River, Feb. 8, 1913). Casual in southern Baja California (San Bernardo Mt., May 15, 1911).

REMARKS: Birds from the Athabaska Delta, Great Slave Lake, Slave River at Smith Landing, and Mackenzie River at Nahanni River Mts. are intermediate toward *E. t. traillii*. A single female (wing 68 mm.) from the Kenai Mts., Alaska, may also prove to be an intermediate; no other specimens from southern Alaska were examined.

In size this race resembles *E. virescens*. The latter, however, has a broader and deeper bill, paler and more greenish head (which is less contrasted with the back), a more pointed wing with the tenth primary usually about equal to the sixth instead of decidedly shorter, and often brighter wing-bars; the juvenal plumage, too, is quite different.

***Empidonax traillii adastus* Oberholser**

Empidonax traillii adastus Oberholser, Sci. Publ. Cleveland Mus. Nat. Hist., 4: 3, 1932 (Hart Mt., 20 miles northeast of Adel, Oregon).

SUBSPECIFIC CHARACTERS: Head (especially sides of neck) grayish, more contrasted with the back than in *traillii* or *alascensis*; back duller and more grayish green, rarely with a brownish cast; wing-bars darker and duller, less prominent; grayish chest-band darker and more pronounced; wing more rounded, the tenth (outer) primary usually shorter than the fifth; wing-length as in *traillii*, but tail somewhat longer.

MEASUREMENTS: Practically identical with those of *extimus* (see below), with bill and tail averaging very slightly smaller, but not sufficiently so to be of any use in identifying individual specimens. Males, wing, 68.1 to 73.7 mm. (averaging 71.0); tail, 58 to 63.2 (60.5).

RANGE: Breeds in the northern Great Basin region from southern British Columbia (Ashcroft, Okanagan) south to northern Modoc County, California (Sugar Hill, Goose Lake near Davis Creek), northern Nevada (Glenbrook, May 30), probably northern Utah (Clear Creek, Aug. 9), and along the east base of the Rocky Mts. south to southern Colorado (Pueblo, Colorado Springs) and possibly

northwestern Oklahoma (Kenton, May 20 to June 4). Migrates principally east of the Rocky Mts.; common in Brewster County, Texas, and ranges east to San Angelo (Aug. 4) and Ingram (May 21) and west rarely to eastern Arizona (northern Navajo County, as reported by Woodbury and Russell, 1945: 75; near Patagonia, Aug. 8, 1940). Winters from Michoacan (La Salada, March 18), Guatemala (Hacienda California, Nov. 1), probably Nicaragua (Tipitapa, Dept. Managua, Apr. 27 and 29), and Costa Rica to Colombia (Calamar, Magdalena River).

REMARKS: A large part of southwestern Oregon is inhabited by intermediates between *brewsteri* and *adastus*. These birds vary individually; birds much like *adastus* occur west at least to Salem, while darker and browner birds approaching *brewsteri* occur east to Fort Klamath and even to the head of Drew's Creek, Lake County, not far from the type locality of *adastus*. This area of intergradation extends south into California and north through a good part of western Oregon.

Empidonax traillii brewsteri Oberholser

Empidonax traillii brewsteri Oberholser, Ohio Jour. Sci., 18: 93, 1918 (Cloverdale, Nye County, Nevada).

Empidonax traillii zopholegus Oberholser, Proc. Biol. Soc. Wash., 60: 77, 1947 (South Vancouver, British Columbia).

SUBSPECIFIC CHARACTERS: Similar to *E. t. adastus*, but adults (especially males) with back and head darker and more suffused with brownish. Females average paler than males, and immatures do not appear to be safely separable from *adastus*.

MEASUREMENTS: Birds from east of the Sierra Nevada are of the same size as *adastus*. Those from the Pacific Coast region are smaller: males, wing usually 66 to 69.6 mm. (averaging 68.1); tail, 56.4 to 60.2 (58.0); tarsus, 15.7 to 16.7 (16.1); exposed culmen, 11.2 to 12.6 (11.9); extreme length in flesh, 148 to 151 (149.2); weight (one male, June), 11.6 grams; females, wing, 60.7 (one specimen from San Gabriel, Calif.) and 61.8 to 66 (64.2); tail, 52.3 (same specimen) and 54 to 58.4 (55.8); tarsus, 15.2 to 16.4 (15.8); culmen, 10.5 to 12.0 (11.3); length, 138 to 149 (144.9); weight (one female, August, fat), 12.3 grams.

RANGE: Breeds along the Pacific Coast from southwestern British Columbia to southwestern California (except, as noted above, in southern and central Oregon); also in a narrow east-to-west belt in the interior, from northern Nevada (Mountain City) and northern Utah (Great Salt Lake region) south to Owens Valley, California, and apparently northeastern Arizona (Tuba City), and east probably to central southern Colorado (Salida, May 23). Migrates from eastern

New Mexico (Santa Rosa, May 26), western Texas (Tascosa, May 21 and June 6; Brewster County, May 14 to 24 and June 17), and Tamaulipas (Jaumave, June 2) west to southeastern California (Brawley) and northernmost Baja California (Mt. Mayor, Colorado Delta, May 24; Nachoguero Valley at U. S. border, June 1),¹ but apparently not on the peninsula farther south. Winters from the Pacific Coast of Guatemala (San José) to eastern Panamá (Chepigana).

REMARKS: Supposed specimens of *brewsteri* from east of the range outlined above prove to be erroneously determined immature or faded specimens, mostly of *E. t. traillii*; such birds are from eastern Nebraska, central Oklahoma, and northern, central, and eastern Texas.

Birds from east of the Sierra Nevada appear darkest on the back, as well as slightly larger than coastal birds. Badly worn and faded birds from Tuba City, Arizona, and northward seem to be of this type. Those from northwestern Oregon northward incline very slightly toward *E. t. traillii* in averaging a trifle more olivaceous above, but are decidedly closest to *brewsteri* and are identical in coloration with birds from various scattered localities where *brewsteri* intergrades with other races. All these color differences are trivial.

In size, it is perfectly true that coastal birds are smaller, but overlapping is great when large series are compared. The smallest male *brewsteri* from east of the Sierra Nevada measure: wing, 68.3 to 69.0 mm.; tail, 58.5 to 59.4. Conversely, some coastal birds are large: males, wing, 69.6 to 70.2 (and even 71.4 and 72.3); tail, 58.4 to 61.2 (and even 62.3); females, wing, 66.0 to 66.4; tail, 56.7 to 57.6 (one female 59.1). Thus the extremes of one population are about equal to the average of the other. This means, of course, that somewhat less than half of the birds can be identified by size alone, and nomenclatural recognition of the difference is impractical.

In every way in which *adastus* differs from *brewsteri*, coastal birds agree with the latter. Furthermore, nobody has ever claimed that the coastal birds were *adastus*. It seems clear, therefore, that *adastus* is not the closest relative of the coastal birds; yet it is the only race with which "*zopholegus*" is compared.

***Empidonax traillii extimus*, subsp. nov.**

TYPE: Collection of Allan R. Phillips, no. 707; breeding male; Feldman, lower San Pedro River, Arizona, May 30, 1940; collected by Gale Monson (original no. 89).

¹ Other records in the literature for extreme northern Baja California probably also pertain to this race.

SUBSPECIFIC CHARACTERS: The palest race of *E. traillii*. Adults most closely resemble *adastus*, but are even paler above (decidedly paler and less brownish than *brewsteri*); this is most noticeable on the head. Cheeks paler than in *adastus*, and more gradually merging into the more grayish areas below and behind; chest-band less pronounced, and belly and crissum paler yellow. Crown distinctly paler, and succeeded by a more distinct gray collar. Rectrices less blackish. The wing-bars (especially the posterior one) tend to be paler, the edgings of the tertials broader and paler, and the outer web of outer rectrix slightly paler, but these are less constant differences. Size (particularly of bill and tail) is rather large, but not diagnostic. The few fresh-plumaged females studied average more gray and brown (less olive) than males, but unlike *brewsteri* are not noticeably paler than males. Some rather strikingly pale immatures occur in the range of this race, but as yet the range of variation in locally raised immatures is uncertain, and the identification of these pale immatures is by inference.

MEASUREMENTS: Males, wing, 68.9 to 73.0 mm. (averaging 70.7); tail, 59.3 to 64.7 (61.9); tarsus, 15.2 to 16.6 (15.9); exposed culmen, 11.4 to 13.0 (12.2); extreme length in flesh, 155 to 158.5 and even (one specimen) "167"; weight (May), 12.1 to 13.2 and (one specimen) 14.0 grams. Females, wing, 64.5 to 69.5 (66.4); tail, 55.2 to 60.6 (57.7); tarsus, 14.4 to 16.4 (15.6); culmen, 10.9 to 12.4 (11.8); length 146 to 152 (148.4); weight (Sept. 1 and late July), 11.1 and 11.95 grams, probably somewhat heavier in May.

The above, like all measurements given in this paper, are for adults. The few data available suggest that immatures have wings about 1.5 mm. shorter than adults and tails 2 to 3 mm. shorter.

RANGE: Breeds in willows and other swamp bushes along the main rivers and streams of southern and western Arizona, from the Lower Sonoran Zone up (very locally) into the Transition Zone. Ranges north and east to southern Nevada (Indian Springs, Clark County), southwestern Utah (St. George and Springdale), central and central-eastern Arizona (Camp Verde and Alpine), and, in surprisingly atypical form, to southwestern New Mexico (near Redrock); also probably on the Rio Grande in western Texas (Fort Hancock, June 18). Breeds, or formerly bred, south to Yuma, Tucson, and Charleston (upper San Pedro River), Arizona, and probably to the Arizona-Sonora border at Nogales ("June, 1855") and San Bernardino Ranch (several, mostly immatures, late August). Winters from Salvador (Rio San Miguel, 13° 25' N., Dept. San Miguel; also Lake Olomega, Aug. 14 to Sept. 3) and Nicaragua (Greytown) to Costa Rica (Bebedero,

Sept. 13) and rarely Colombia (Turbaco, Chocó, Aug. 15, 1911; Honda, Magdalena River, Feb. 7, 1913).

REMARKS: Breeding birds from northeastern Arizona, southwestern Colorado, and much of New Mexico (particularly from Springerville, Arizona, east to the Rio Grande) show great individual variation, and are thus intermediate between *extimus* and *brewsteri*. A male in peculiar, retarded plumage from the Gallinas River at Las Vegas, New Mexico, May 23, seems to be typical *extimus*. Further collecting may extend the range of *extimus* somewhat to the northeast.

This is not the common race in general collections of southern Arizona birds; even among June birds, somewhat more than half the specimens examined proved to be transient *brewsteri*. *Extimus* is now greatly reduced in numbers, and no breeding colonies are known to survive south of Feldman. Since the territory is generally unfavorable, colonies are few and far between, especially in recent years, and the total population is relatively small. This is doubtless the reason that few migrants, in extensive series examined, have been identified as *extimus*.

The pale wing-bars, under parts, and outer webs of rectrices of extreme individuals of this race at one time led me to think they might be hybrids with *E. t. traillii* or other species of *Empidonax*.

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Museum of Northern Arizona

Flagstaff

Arizona