VARIATION IN THE NORTH AMERICAN FORMS OF WESTERN FLYCATCHER

By PIERCE BRODKORB

Three subspecies of the Western Flycatcher are currently recognized in western North America, *Empidonax difficilis cineritius* from the mountains of northern and southern Baja California, *E. d. hellmayri* from the mountains of western Texas, and *E. d. difficilis* from the rest of western North America. Other races, not to be treated here, occur in Mexico and Central America. In addition Oberholser separated the birds of the Santa Barbara Islands, but this race has not been recognized by recent authors other than van Rossem (Trans. San Diego Soc. Nat. Hist., 6, 1931:264). Recently Moore (Proc. Biol. Soc. Wash., 53, 1940:24) described *Empidonax difficilis immodulatus* from Chihuahua and included the Santa Rita Mountains of Arizona within its range. Still later Woodbury and Russell (Bull. Univ. Utah, 35, 1945:77) and Behle (Condor, 50, 1948:72) extended the range of *hellmayri* to northern Arizona and Utah.

Specimens used in the present study are included in the collections of O. Dowell, Jr., Randolph Jenks, H. M. Laing, Dr. Max M. Peet, Carnegie Museum, Chicago Academy of Science, Chicago Natural History Museum, Cornell University, Museum of Comparative Zoology (including type and allotype of *cineritius*), Museum of Vertebrate Zoology, Royal Ontario Museum of Zoology, State College of Washington, Texas Agricultural and Mechanical College, United States National Museum (including types or cotypes of *difficilis, perplexus,* and *insulicola*), University of Michigan Museum of Zoology (including type of *hellmayri*), and University of Utah Museum of Zoology.

Along the Pacific coast there is little geographic variation from Alaska to southern California. Birds from this region are rather small (see table 1). The bill is short, and its lateral outlines are somewhat convex. The upper parts are brownish olive or citrine-drab. The wing bars and edgings of the remiges are olive-buff. The orbital ring is colonial buff. The chin and throat are olive-buff, more or less yellowish. The breast and sides are between deep olive-buff and dark olive-buff. The posterior under parts are primrose or barium yellow. The axillars are cream-buff, and the under wing coverts are chamois. As in other races of this species, the maxilla is blackish brown, the mandible ivory yellow, the iris dark brown, and the legs and feet fuscous.

Breeding specimens from the Sierra San Pedro Mártir, northern Baja California, show a slight decrease in wing length and a very slight increase in bill length. Birds from this area have been referred by Grinnell (Univ. Calif. Publ. Zool., 32, 1928:140) and others to *E. d. cineritius,* which was described from the Cape region of Baja California. The variation in bill size is in the direction of *cineritius,* but the wing variation is not. There is too much overlap to separate these birds taxonomically from *E. d. difficilis* of the Pacific coast region.

The Sierra de la Laguna, southern Baja California, is inhabited by *Empidonax difficilis cineritius.* This subspecies is characterized by very pale coloration and long, straight-sided bill. Above it is brownish with a yellowish green tinge. The wing bars are whitish. The throat is gray. The breast band is scarcely darker than the rest of the lower parts, being pale dull buffy. The belly and crissum are dull whitish yellow, with a slight buffy tinge.

The population breeding on the islands off the coast of California differs from *difficilis* of the mainland in having a slightly larger bill, longer tail, white wing bars, grayer back, average paler breast, and paler yellow belly. This appears to be a recognizable race, *Empidonax difficilis insulicola* Oberholser. In color it resembles *cineritius* more

Table 1

Average and Extreme Measurements of *Empidonax difficilis* in Millimeters

		Males					
		Wing	Tail	Culmen	Width of bill	Tarsus	Middle toe
E. d. difficilis							
3	Alaska	67.2 (67-67.5)	56.0 (54-59)	14.2 (14-14.5)	5.0	16.7 (16.5-17)	8.7 (8.5-9)
11	British Columbia	67.6 (63-70)	57.3 (54-59.5)	14.3 (13.5-15)	5.3 (5-5.5)	16.7 (16.5-17)	9.1 (8.5-9.5)
5	Washington	67.1 (65-68.5)	56.0 (52-60.5)	14.4 (13.5-15)	5.3 (5-5.8)	17.2 (16.5-18)	8.6 (8.5-9)
7	Oregon	67.8 (64-70)	56.1 (53.5-57.5)	14.3 (14-15)	5.2 (5-5.5)	16.3 (15.5-17)	8.7 (8.5-9)
11	Northern California	66.2 (63-68)	56.1 (51.5-60)	14.2 (14-14.5)	5.1 (5-5.5)	16.5 (16-17)	8.8 (8-9.5)
10	Southern California	67.0 (63-69.5)	57.4 (54.5-59.5)	14.3 (13.5-15)	5.1 (4.5-5.5)	16.7 (16-17.5)	8.8 (8.5-9.5)
47	Pacific coast	67.1 (63-70)	56.6 (57.5-60.5)	14.3 (13.5-15)	5.2 (4.5-5.8)	16.6 (15.5-18)	8.8 (8-9.5)
4	San Pedro Mártir (breeding)	64.9 (62.5-67)	57.5 (54.5-61)	14.5 (14-15)	5.2 (5-5.5)	16.6 (16-17)	8.6 (8-9.5)
5	Sonora	65.0 (62.5-67.5)	55.5 (53.5-58)	14.1 (13.5-14.5)	5.6 (5.5-5.8)	16.5 (16-17)	8.6 (8.5-9)
1	Eastern California	69.5	56.5	15.0	5.5	17.0	
19	Southern Arizona	67.7 (64-71)	56.4 (53-60)	14.2 (13.5-15)	5.5 (5-6)	16.7 (16-17.5)	8.9 (8.5-9.5)
E. d. insulicola							
9	California islands	68.0 (64-69.5)	60.0 (58-62.5)	14.6 (14-15)	5.6 (5.2-6)	17.8 (17.5-18)	8.9 (8.5-9.5)
E. d. cineritius							
12	Sierra Laguna	67.6 (63-69)	57.8 (55-60.5)	15.3 (14.5-16.2)	5.3 (5-5.5)	16.8 (16.5-17.5)	8.7 (8.5-9.2)
E. d. hellmayri							
13	Texas	73.6 (69-75.5)	61.3 (60-65)	15.5 (15-16)	6.4 (6-6.5)	17.3 (16.5-18)	9.4 (8.5-10)
4	Northern Arizona	73.6 (71-76)	61.4 (58-63.5)	15.6 (15-16.5)	6.1 (5.8-6.5)	17.4 (17-17.5)	9.5 (9-10)
6	Northern Rockies	71.4 (69-73.5)	60.3 (57-62.5)	15.2 (14-15.5)	5.8 (5.5-6)	17.7 (17.5-18)	9.2 (9-9.5)
4	Black Hills	70.3 (68-72)	59.5 (57.5-62.5)	14.5 (14-15)	5.9 (5.8-6)	17.3 (17-17.5)	9.3 (9-10)

Females

E. d. difficilis							
4	Alaska	62.9 (62-64)	53.6 (52.5-55)	13.0 (12-14)	4.9 (4.5-5)	16.1 (15-16.5)	8.5
2	British Columbia	62.8 (61-64.5)	53.5 (51.5-55.5)	14.3 (14-14.5)	5.3 (5-5.5)	16.0	8.5
1	Washington	65.0	57.5	14.5	5.0	17.0	8.5
1	Oregon	61.5	53.0	14.5	5.0	16.5	8.5
6	Northern California	61.8 (59-64)	54.4 (53-56.5)	13.9 (13-14.5)	5.1 (5-5.5)	15.5 (14.5-16.5)	8.1 (7.5-8.5)
8	Southern California	62.2 (59-65.5)	54.8 (53.5-57.5)	13.9 (13-14.5)	5.1 (5-5.5)	16.3 (16-16.5)	8.3 (8-8.5)
22	Pacific coast	62.3 (59-65.5)	54.5 (51.5-57.5)	13.8 (13-14.5)	5.1 (4.5-5.5)	16.0 (14.5-17)	8.3 (7.5-8.5)
6	San Pedro Mártir (breeding)	60.8 (59-63)	54.4 (52-57)	14.3 (13.5-15)	5.1 (4.5-5.5)	16.3 (15.5-17)	8.6 (8.2-9)
5	Sonora	62.0 (60-65)	52.7 (51-54.5)	14.1 (13.5-15.5)	5.4 (5.2-5.5)	16.5 (16-17)	8.6 (8.2-9)
11	Southern Arizona	64.4 (60.5-66.5)	54.6 (51-56.5)	14.0 (13.5-15)	5.4 (5-5.5)	16.5 (16-16.5)	8.9 (8.5-9.5)
1	Central Arizona	67.0	56.5	14.0	5.5	17.5	9.5
E. d. insulicola							
2	California islands	66.0 (64-68)	59.0 (57.5-60.5)	14.0	5.7 (5.5-5.8)	16.8 (16.5-17)	8.5
E. d. cineritius							
5	Sierra Laguna	64.7 (63-66.5)	56.2 (56-57)	15.0 (14.5-15.5)	5.0 (4.5-5.5)	16.7 (16.2-17.5)	8.6 (8-9)
E. d. hellmayri							
9	Texas	66.8 (64-69.5)	57.5 (55-62)	14.6 (14-15)	6.1 (6-6.5)	16.8 (16-18)	8.9 (8.5-9.5)
3	Northern Arizona	67.5 (67-68)	58.3 (57.5-59)	14.5	6.1 (6-6.2)	16.8 (16.5-17.5)	9.3 (9-9.5)
2	Northern Rockies	66.5 (66-67)	55.5 (55-56)	14.3 (14-14.5)	5.5	17.0	8.5
1	Black Hills	63.0	53.5	14.0	5.2	16.0	9.0

closely than *difficilis*. From the former it is differentiated by its shorter, broader, more convex bill, longer tail, somewhat darker coloration, and paler under wing coverts.

Sonoran specimens reflect the short wing length of the San Pedro Mártir birds. In addition they have somewhat wider bills. This latter variation is in the direction of *E. d. hellmayri*.

In eastern California (Nevada County) and southern Arizona (Cochise, Santa Cruz, and Pima counties) a trend toward *hellmayri* is apparent in increased wing length, broader bill, darker wing bars and breast, and brighter yellow posterior under parts. One specimen from central Arizona (Yavapai County) is about half way between *difficilis* and *hellmayri*. Similar intergrades from Chihuahua have been named *E. d. immodulatus*. The Santa Rita Mountains of Arizona were included within the range of *immodulatus* by Moore, but five breeding specimens from there do not differ from the remaining series from southern Arizona. I believe that birds from all these localities should be considered atypical *difficilis*, since the differences between that race and *hellmayri* are not great enough to allow recognition of an intermediate subspecies. Furthermore, the situation in *hellmayri* in the northern Rockies, to be discussed presently, also lessens the advisability of recognizing an intermediate race to the south.

In northern Arizona (Navajo, Apache, and Greenlee counties) breeding birds agree well with topotypical *hellmayri* from Texas in large general size, broad bill with lateral outlines convex, yellowish olive upper parts, dark olive-buff wing bands, cream-buff edgings of the remiges, whitish or pale yellowish white orbital ring, dark olive-buff breast and sides, and bright yellow posterior under parts.

In the northern Rockies (Colorado, western Wyoming, eastern Idaho, and Montana) agreement with Texas birds is fairly good in color, but there is a slight reduction of wing, tail, and bill size. In the Black Hills of western South Dakota and eastern Wyoming the reduction in size, particularly of the bill, is carried even farther.

In summary I propose the recognition of the following subspecies in the area under consideration.

Empidonax difficilis difficilis Baird

Empidonax difficilis Baird, Rep. Expl. Surv. R. R. Pac., 9, 1858:xxx, 193, 198 (west coast: Fort Steilacoom, Washington Territory; Shoalwater Bay; Fort Tejon, California).

Empidonax bairdi perplexus Nelson, Auk, 17, July, 1900:263 (Puerto Angel, Oaxaca).

Empidonax difficilis immodulatus Moore, Proc. Biol. Soc. Wash., 53, April 19, 1940:24 (Mount Mohinora, Chihuahua).

Range.—Coniferous forests and mesic, broad-leaved woodland areas of Pacific coastal area from southern Alaska to the Sierra San Pedro Mártir, northern Baja California, eastward in the mountains of Sonora and southern and central Arizona, where intergrading with *E. d. hellmayri*. Intergradation also apparently occurs across the Great Basin to the Raft River Mountains in northwestern Utah (Behle, *loc. cit.*).

In winter occurs in southern Baja California (Todos Santos, October 28–November 9) and Oaxaca (Puerto Angel, March 13).

The name *difficilis* occurs at three separate places in the original reference. In the "List of Species," Baird (p. xxx) says of *Empidonax flaviventris* "perhaps replaced on the Pacific by a closely allied species, *E. difficilis*." The species is not characterized at this point, and it is not included in his key to the species of *Empidonax*. To his general introductory account of the genus, Baird (p. 193) appends a table of comparative measurements of the various species. Measurements of *Empidonax difficilis* are included, based on no. 5920, U. S. Nat. Mus., from Fort Steilacoom, Washington. Finally in the discussion of *Empidonax flaviventris* (p. 198) there is a paragraph calling attention to differences between *flaviventris* from the eastern states and birds from the west coast. The paragraph concludes with the statement "In view of all these circumstances, there-

fore, it may be well to give it provisionally a new name, and none would be more appropriate than that of *Empidonax difficilis*." At the end of the discussion of *Empidonax flaviventris* three birds from Pacific localities are included in the list of specimens, although none, at this point, is associated with the name *difficilis*. These three birds are listed in the following order: no. 5920, from Fort Steilacoom, already included in the table of measurements; no. 7243, from Shoalwater Bay [Washington]; and an unnumbered specimen, later catalogued as no. 137201, from Fort Tejon, California.

On the assumption, probably correct, that Baird considered all three specimens to represent his *E. difficilis*, they should all be considered cotypes. Nos. 7243 and 137201 are still in the National Museum, but I could not find no. 5920.

Although all three localities are at present understood to be inhabited by the same race, it is nevertheless desirable to fix the type locality to one of them. The Fort Tejon skin has been given a type label, and it bears the notation "Species was based on 3 skins, of which this is the only adult one." The latter part of this statement is incorrect, however, for the Shoalwater Bay specimen at least is also adult. Fort Tejon was accepted as the type locality in the third (1910) and fourth (1931) editions of the A.O.U. Check-list. Earlier, however, Ridgway (Bull. U. S. Nat. Mus., No. 50, pt. 4, 1907:578) included only Fort Steilacoom and Shoalwater Bay as localities after his citation of the original description. This may be taken as excluding Fort Tejon from later selection.

In restricting the type locality one is almost forced to choose Fort Steilacoom. It is the only definite locality actually coupled by Baird with the name *difficilis*. It is the only specimen included in the table of measurements, where the name was first validated. It is the first of the three western specimens included in the list of specimens examined. I, therefore, formally designate Fort Steilacoom, Washington, as restricted type locality of *Empidonax difficilis*.

The type of *Empidonax bairdi perplexus* Nelson, no. 154569, U. S. Nat. Mus., is a female taken on March 13, 1895, at Puerto Angel, Oaxaca, by Nelson and Goldman. It agrees with fresh-plumaged *E. d. difficilis* and is undoubtedly a migrant of that race. It has the following measurements: wing 63.5, tail 54.5, culmen from base 14.2, width of bill 5, tarsus 15.5, middle toe 8.5 mm. The tenth primary is shorter than the fourth.

Empidonax difficilis insulicola Oberholser

Empidonax insulicola Oberholser, Auk, 14, July, 1897:300 (Santa Rosa Island, California).

Range.—Resident on Santa Rosa, Santa Cruz, Santa Catalina and San Clemente islands off the coast of southern California.

Empidonax difficilis cineritius Brewster

Empidonax cineritius Brewster, Auk, 5, January, 1888:90 (La Laguna, Baja California).

Range.—Resident in the Sierra de la Laguna, southern Baja California.

Empidonax difficilis hellmayri Brodkorb

Empidonax difficilis hellmayri Brodkorb, Occas. Papers Mus. Zool. Univ. Mich., No. 306, January 30, 1935:1 (Boot Spring, Chisos Mountains, Brewster County, Texas).

Range.—Breeds in coniferous belt of the Chisos and Guadalupe mountains of western Texas, northeastern Arizona, and thence through the Rocky Mountains to Montana; Black Hills of western South Dakota and eastern Wyoming.

Occurs on migration in Baja California (San Pedro Mártir, May 11; Santiago, November 15), Durango (Chacala, February 27), Jalisco (Zapotlan, April 29), and the Tres Marías Islands (María Madre, May 15; María Magdalena, May 27).

Department of Biology, University of Florida, Gainesville, Florida, April 29, 1948.