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GEOGRAPHIC VARIATION IN *CONTOPUS SORDIDULUS* AND *C. VIRENS* NORTH OF MEXICO

M. Ralph Browning¹

ABSTRACT.—Geographic variation in plumage color between populations of *Contopus sordidulus* is minor. The differences in color between the races described by Burleigh (1960) is largely the result of postmortem color changes of museum skins. Variation in wing chord and length of tail between samples does not support recognizing additional races of *C. sordidulus*. *Contopus virens* is monotypic. The relationships between *sordidulus* and *virens* is unclear.

In a review of *Contopus sordidulus* (Western Wood Pewee) Burleigh (1960) proposed four nomenclatural subdivisions for the populations of the species north of Mexico. He recognized *saturatus* Bishop, 1900, and subdivided *veliei* Coues, 1866, into three races, *veliei* and two new races, *amplus* and *siccicola*. This subdivision was considered untenable by Mayr and Short (1970), who suggested that the only valid race north of Mexico is *veliei*. The AOU (1957) Check-list recognized both *veliei* and *saturatus* as races of the northern populations of *C. sordidulus*.

To determine the extent of geographic variation in the northern populations of *C. sordidulus* I compared Burleigh's type series of *amplus* and *siccicola* and other specimens for variation in color and size. Specimens used in this study include those collected in June. Although birds collected at this time and earlier could be migrants, those collected later are usually too badly worn to permit meaningful color comparisons (Phillips and Parkes 1955, Phillips et al. 1966: 169, pers. observ.). All measurements (Table 1) are in millimeters.

NOMENCLATURE HISTORY OF *CONTOPUS SORDIDULUS VELIEI* AND *C. S. SATURATUS*

Coues (1866) indicated that two color types were among his series from the southwestern United States and that Baird be-

lieved these to represent two species. Although Coues was not so convinced, he nevertheless introduced the name *Contopus veliei* for the southwestern form and gave a diagnosis to distinguish it from *C. richardsonii*, as *C. sordidulus* was then known (see Phillips and Parkes 1955). The name *veliei* as currently used is the equivalent of *C. r. richardsonii* of older usage. Parenthetically, Burleigh (1960) is incorrect in stating that Phillips and Parkes had overlooked Coues' lectotype of *veliei*. As pointed out by Phillips and Parkes (1955) and Parkes (*in litt.*, 1976), the only locality in Coues' original description is Colorado, from whence Velie sent the first example. The *ex post facto* selection of a lectotype has no bearing on the fact that Coues had already stated that the first example came from Colorado. Thus, the specimen from Fort Whipple, Arizona (chosen by Coues at Richmond's prompting), considered by Deignan (1961) as the lectotype of *veliei*, cannot be regarded as a primary type. The type locality of *veliei* is the mountains of Colorado as stated by Phillips and Parkes (1955). The change in the type locality of *veliei* has no nomenclatural effects.

Contopus sordidulus veliei was recognized by Phillips and Parkes (1955) and the AOU (1957) Checklist as the race breeding from central eastern Alaska south through southern Mackenzie, northeastern Alberta, northwestern and central Saskatchewan, and central Manitoba, the eastern parts of North

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and South Dakota to central and western Texas. The AOU Checklist gives the western boundary of *veliei* as from Alaska south through eastern British Columbia to northern Mexico. This agrees with Webster (1957), who considered *placens* van Rossem, 1940, type locality in Arizona, a synonym of *veliei*.

The second northern race, *Contopus sordidulus saturatus*, was described by Bishop (1900) as darker dorsally than the other forms of the species. Bishop considered *saturatus* to be the race breeding from the Yukon Valley in Alaska south along the coast ranges to British Columbia. Ridgway (1907) did not recognize *saturatus* because dark birds occurred outside the range ascribed to *saturatus*, that is, within the breeding range of what is currently known as *veliei*. Although recognized by van Rossem (1945), *saturatus* was not generally accepted as a distinct race until subsequent studies by Aldrich (in Jewett et al. 1953) and Phillips and Parkes (1955). The breeding range of *saturatus* in the AOU (1957) Checklist is given as southwestern Alaska south through western British Columbia and west from the Cascade Mountains in Washington and Oregon.

VARIATION IN COLOR

Burleigh (1960) subdivided *veliei* into three races on the basis of size (see below) and color. In so doing he restricted the range of *veliei* to northern California, Nevada, Utah, and Colorado south through Arizona, New Mexico, western Texas, northern Baja California, eastern Sonora, and northern Chihuahua. He claimed that the two new races breed north of this region. *Contopus s. siccicola* was said to breed from southern British Columbia east of the coast ranges, and east of the Cascades in Washington and Oregon to western Montana west of the Rocky Mountains. The second new race, *amplus*, was said to breed from central Alaska, southern Mackenzie, Saskatchewan, and southern Manitoba south through British Columbia, northeastern and eastern Montana to Wyoming, and in western North and South Dakota. *Contopus s. siccicola* was described by Burleigh as the palest of the four northern forms. The upper parts in *siccicola* were said to be washed with gray, whereas Burleigh considered *amplus* to be browner, and his *veliei* to be fuscous-olive. The underparts of *siccicola* were also said to be more gray and the bel-

TABLE 1. Measurements of adult males of *Contopus sordidulus* and *C. virens*.

	n	range	Wing Chord			Tail			
			mean	S.D.	C.V.	range	mean	S.D.	C.V.
<i>saturatus</i>	11	83.4-88.1	86.11	1.53	1.78	62.4-67.8	64.89	1.71	2.64
California ¹	20	82.4-89.6	85.63	1.87	2.18	61.6-69.7	64.77	2.18	3.37
<i>siccicola</i>	12	83.3-89.0	86.97	1.65	1.90	64.6-69.7	66.28	1.58	2.38
Nevada	8	85.0-88.7	86.60	1.51	1.74	65.0-70.0	66.70	1.59	2.38
Arizona	18	85.2-88.8	86.82	1.21	1.39	63.4-68.9	65.92	1.52	2.31
<i>amplus</i> ²	14	83.6-90.6	87.69	2.22	2.53	62.6-71.1	67.09	2.82	4.20
northwestern									
<i>C. virens</i> ³	15	82.0-88.3	85.17	2.28	2.68	63.5-71.8	68.20	2.39	3.50
eastern									
<i>C. virens</i> ⁴	14	82.0-88.5	84.59	1.76	2.08	63.9-70.6	66.95	2.16	3.23

¹Specimens from south of latitude 40 degrees

²Montana and Wyoming

³North and South Dakota, Minnesota, Wisconsin

⁴East of Appalachian Mountains

ly more white (less yellow) than in *veliei* and *amplus*. Burleigh described *amplus* as differing from both *siccicola* and *veliei* by being darker and "distinctly" more brown and less olivaceous dorsally, and differing from his *veliei* by being paler and less yellow ventrally.

Burleigh probably believed *siccicola* to be paler and grayer than the other forms of *C. sordidulus* for the reasons mentioned in Mayr and Short (1970)—the museum ages of the type series of *amplus* and *siccicola* and the comparative series of his *veliei* are not similar (cf. Burleigh 1960:143–146). The two dark races, *amplus* and *veliei*, were collected, on the average, 25 years earlier than birds assigned by Burleigh to the paler series of *siccicola*. The most recently collected specimens in Burleigh's series were collected in the 1950s with only 7 percent of these specimens assigned to *veliei* and 11 percent assigned to *amplus*, whereas 44 percent of the specimens assigned to *siccicola* were collected after 1950. As would be expected, because of the nature of post-mortem color changes, the darker and browner specimens were collected much earlier than the cleaner and paler specimens.

Comparison of the type series of *amplus* with similarly old specimens of *veliei* used by Burleigh does not reveal sufficient differences in coloration to justify subspecific separation. Comparison of the more recently collected specimens making up the type series of *siccicola* with the series of *amplus* and *veliei* used by Burleigh reveals *amplus* to be, on the average, slightly paler. Using specimens of *C. sordidulus* of similar museum age from the ranges of the three named races, however, reveals that the differences in palor between *siccicola* and *veliei* and *amplus* is the result of post-mortem color changes. Specimens representing the three forms cannot be separated on the basis of dorsal coloration.

I found that the underparts of *siccicola* are not noticeably paler than the other forms of *Contopus sordidulus* (*contra* Burleigh 1960). Variation in ventral coloration in *C. sordidulus* appears to be clinal from

west to east, with the coastal form, *saturatus*, being slightly darker and more yellow. The paleness increases gradually eastward toward the Rocky Mountains. Specimens from the northwestern slope of the northern Rocky Mountains, however, are slightly darker. Nonetheless, ventral coloration has not proven to be useful for distinguishing between the northern forms of *C. sordidulus*.

In a recent study of the races of migrant *C. sordidulus* in Utah Behle (1967) considered *siccicola* and *amplus* as valid races. Behle followed Burleigh's suggestion that some individuals of southern populations begin nesting while other populations are still en route to more northern localities. This was a reasonable assumption based on his limited sample and is a convenient means of disposing of the considerable amount of individual variation in dorsal coloration. For example, I found that slightly pale gray birds and darker examples occur in adjacent areas in June. Although some individuals of *C. sordidulus* may be migrating north as late as June, the lack of consistent geographic variation in color among Burleigh's forms of the species argues against recognition of additional races.

The relationships of *Contopus sordidulus* populations to those of *Contopus virens* (Eastern Wood Pewee), a monotypic species of eastern North America, not mentioned by Burleigh (1960), were also examined. These two species are morphologically similar. Phillips et al. (1966) have pointed out that adult *virens* are typically olivaceous and that *sordidulus* is slightly darker and browner in plumage coloration and usually has a darker lower mandible. I compared specimens of *sordidulus* collected in eastern Montana and Wyoming with a series of *virens* from eastern North Dakota and Wisconsin. The two series may be readily separated by the browner upper parts of *sordidulus*. However, both series are consistently olivaceous above. Specimens of *C. sordidulus* from west and south of Montana and Wyoming are not as olivaceous as specimens of *C. virens* and *C. sordidulus* from eastern Montana and Wyoming.

VARIATION IN MENSURAL CHARACTERS

Measurements of wing chord and length of tail of adult male *Contopus sordidulus* and *C. virens* (Table 1) show considerable overlap in these characters with nearly identical means for the geographical samples. Burleigh's (1960) characterization of *amplus* as longer-tailed than other forms of *C. sordidulus* is not upheld.

CONCLUSIONS

Geographic variation in *Contopus sordidulus* north of Mexico is slight. The amount of variation in color and size is shown to be insufficient for recognizing *amplus* and *siccicola*. These names, along with *placens*, should be considered synonyms of *C. sordidulus veliei*. The form *saturatus* should be recognized, although it is a weakly marked race. There is no pronounced geographic variation in *C. virens*.

Overlap in coloration between the northwestern samples of *C. virens* and representatives of *C. sordidulus* from eastern Montana and Wyoming suggest a close relationship between the two species. The breeding ranges of these species overlap in western Manitoba, Nebraska (Phillips et al. 1966), and in Kansas (Barlow and Rising 1965). Van Rossem (1940, 1945), Rand (1948), Aldrich (in Jewett et al. 1953), and Meyer de Schauensee (1966) have considered *virens* and *sordidulus* conspecific. Evidence of interbreeding is inconclusive, but hybridization is mentioned by Mayr and Short (1970) as occurring in the Great Plains. It is premature at this time to consider *virens* and *sordidulus* as conspecific. Field studies, urged by Phillips and Parkes (1955), where the two species come in contact, are still needed. Such studies should be conducted on territorial individuals in late May and June, during which time birds are retaining plumage suitable for color comparisons (A. R. Phillips, *in litt.*).

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