

GEOGRAPHIC VARIATION IN THE YELLOW-BILLED CUCKOO¹

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Abstract. Populations of the Yellow-billed Cuckoo, *Coccyzus americanus*, west of the Rocky Mountains have average wing lengths slightly greater than those of eastern North America, but the difference is not sufficient for taxonomic recognition. There is no geographically oriented variation in bill size or color, and the species is best considered monotypic.

Key words: Yellow-billed Cuckoo; geographic variation; North America; *Coccyzus americanus*.

INTRODUCTION

The breeding range of the Yellow-billed Cuckoo, *Coccyzus americanus*, includes most of North America from southern Canada to the Greater Antilles and northern Mexico (AOU 1983). Despite this extensive range, little systematic attention has been given to the species and no comprehensive analysis of its morphological characteristics, which might reveal geographic variation, has been published.

Ridgway (1887:273) separated western populations from eastern ones under the subspecific name *C. a. occidentalis*. Western birds were said to be "larger, with proportionally larger and stouter bill." The differences in mean measurements were 0.23 in (6 mm) for wing length, 0.52 in (13 mm) for tail length, and 0.06 in (1.5 mm) for both culmen length and bill depth. The division into two subspecies has been generally recognized through the past century (e.g., Peters 1940, AOU 1957, Oberholser 1974). Wetmore (1968:112) added as a separating character that "the western subspecies is faintly grayer above, the eastern one browner. . . ." On the other hand, several authors (Todd and Carriker 1922, Van Tyne and Sutton 1937, Mees 1970) have suggested that the subspecific separation is not worthy of recognition, although none presented data to support that position.

MATERIALS AND METHODS

I measured wing (chord) length, length of the culmen from the anterior edge of the nostril, and depth of the upper mandible at the nostril on nearly 700 adult specimens of *C. americanus* for

this study. Tail length was also measured until it became obvious that abrasion and extreme individual variation rendered that measurement useless for taxonomic purposes; tail length ranged from 1 cm longer than wing length of the same individual to 1 cm shorter. Visual color comparisons were made under museum "examolites."

Yellow-billed Cuckoos are erratic in their time of breeding, with egg dates ranging from mid-April to late August (Bent 1940:66). In the southern portions of the range, some birds may be breeding while others are still migrating through. I arbitrarily set June, July, and August as the breeding season, but specimens marked as being breeding birds were included in this portion of the samples even if taken earlier. Spring (May) and fall (September) nonbreeding specimens were also measured when available; I examined few such birds from the western populations.

Many migrating and wintering birds were examined in less detail. Birds of the year, distinguished from adult birds by lack of the conspicuous black and white tail pattern, the relatively narrow tail feathers instead being gray and grayish white (Bent 1940:59, Parkes 1984), were not studied in detail nor measured. Fully grown young appeared in the specimen samples as early as July. Molt of the body feathers began, in both adults and young of the year, in midsummer and continued into the winter, with no notable difference in the aspect of the birds. There was a complete replacement of remiges and retrices of both adult and young birds on the South American wintering grounds, mainly in January and February. I could find no way to separate birds in the first breeding season from older birds.

Specimens of breeding birds were divided into 19 geographic samples (Fig. 1). Sexes were treat-

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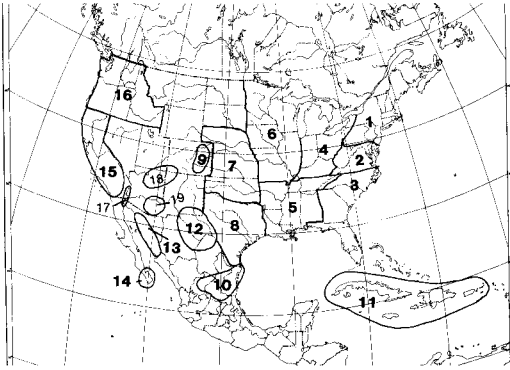


FIGURE 1. Approximate boundaries of breeding populations of Yellow-billed Cuckoos.

ed separately. Simple statistics (\bar{x} , SD, SE) were calculated for each sample and compared by Student's *t*-test. The preliminary analysis was of geographically adjacent samples from the breeding season. Neither spring nor fall birds differed significantly ($P < 0.05$) from breeding birds in any measured character, so seasonal and similar geographic samples were combined as the analysis progressed, until all eastern birds were compared with all western birds. The population sample from western Texas, eastern New Mexico, and adjacent Mexico (no. 12) was excluded from both the merged eastern and western populations because of the probability of intermediacy if the populations proved to be separable; Oberholser (1974) believed that the boundary

between the two forms occurred in western Texas.

RESULTS

COLOR

I found no consistent variation in color. Some birds were grayer or browner dorsally than others, but this variation was apparently individual and was not correlated with geographic origin of the specimens. There also was variability in the intensity of rufous on the wings, but this also appeared to be individual and not geographically oriented. In short, contra Wetmore (1968), I could not separate eastern and western birds on the basis of any difference in color.

BILL SIZE

The depth of the upper mandible was measured, along with bill length, in an attempt to evaluate the supposedly "larger and stouter" bill mentioned by Ridgway (1887) for the western birds. The bills of some Yellow-billed Cuckoos did appear, on visual examination, to be larger and heavier than those of others, but large-billed birds were found in samples from all parts of the range of the species. There was essentially no sexual dimorphism in bill size. In both males and females, western birds averaged very slightly larger in both depth of the upper mandible and length of the culmen (Table 1), but none of the differences were statistically significant ($P < 0.05$).

TABLE 1. Measurements (mm) of populations of Yellow-billed Cuckoos from eastern and western North America.

Region ¹	Sex	n	Range	\bar{x}	SD	SE
Wing length						
East	M	219	128.7-155.6	140.81	3.98	0.27
East	F	196	134.5-154.9	144.51	3.72	0.27
West	M	119	133.8-158.1	135.01	4.38	0.40
West	F	103	138.2-163.5	150.33	4.67	0.46
Bill length						
East	M	206	17.0-21.2	19.11	0.83	0.05
East	F	170	17.0-21.4	19.27	0.87	0.07
West	M	124	17.4-22.9	20.17	1.00	0.08
West	F	96	18.0-23.0	20.58	1.00	0.10
Upper mandible depth						
East	M	215	5.4-7.5	6.49	0.36	0.02
East	F	192	5.5-7.4	6.48	0.38	0.04
West	M	130	5.8-7.5	6.74	0.39	0.03
West	F	99	5.4-7.8	6.84	0.38	0.04

¹ Eastern populations include nos. 1-10 of Figure 1; western populations are nos. 13-19. Populations 11 and 12 were excluded from either group.

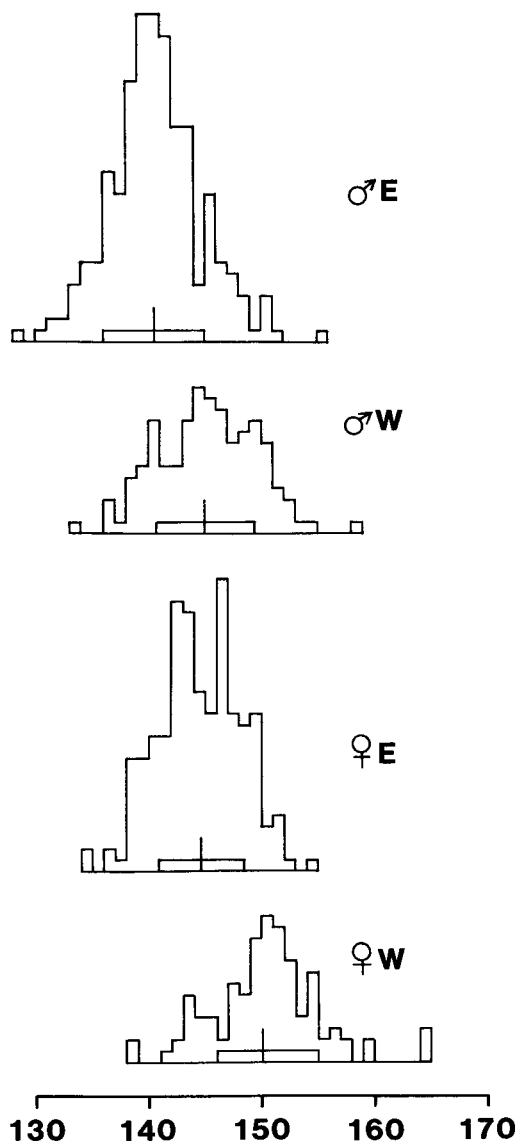


FIGURE 2. Frequency distribution, by mm, of wing lengths of male and female Yellow-billed Cuckoos in eastern (E; populations 1-11) and western (W; populations 13-19) North America. The mean and 1 SD are shown at the bottom of each histogram.

The supposed difference in bill size could not be substantiated.

WING LENGTH

Throughout the range of the species, female Yellow-billed Cuckoos had slightly longer wings than males (Table 1). As Ridgway (1887) suggested, western birds had slightly longer wings than those

of the same sex in eastern North America. However, there were no statistically significant differences ($P < 0.05$) in this character between eastern and western birds. The variability within many populations was great, and there was much overlap when populations were compared (Table 2, Fig. 2). In wing length, 48% of eastern males and 45% of western males fell within the 5-mm interval between the means of the eastern and western populations, that interval being very near 1 SD from either mean. For females, 51% of the eastern birds and 46% of the western ones were in the 7-mm range that encompassed both population means. This degree of overlap precluded the possibility of determining whether a correctly sexed individual bird represented either of the combined populations. Western males and eastern females had virtually identical ranges of wing measurements, and it would be impossible to designate as eastern or western an unsexed bird from outside the breeding range. No division of the species on the basis of wing length is warranted.

PATTERNS OF VARIATION

Yellow-billed Cuckoo populations from east of the Rocky Mountains were remarkably uniform in average size. Females from the Greater Antilles may be slightly smaller than others, but even the minor differences between populations would probably disappear if sample sizes were increased. The situation is similar for birds from the western populations. Samples from the Pacific Northwest and from Baja California tend to be slightly longer-winged than those from California, but overall differences are minor and no clines are evident in any character.

The only notable pattern in the variation in the Yellow-billed Cuckoo was the slight step of increasing size to the west that occurs south of the main mass of the Rocky Mountains. This can hardly be called a step cline, because there is no regular variation on either side of the step. Oberholser (1974:434) recognized two subspecies and placed their border in extreme western Texas. I established a potentially intermediate population (no. 12) that extended several counties farther east in Texas and westward to the southeastern counties of New Mexico. Birds from that area measured well within the range of both the eastern and western samples, but averaged nearer the eastern populations. The actual step to having more large birds and fewer small ones

TABLE 2. Measurements (mm) of wing length in populations of Yellow-billed Cuckoos.

Population ¹	n	\bar{x}	SD	Range	n	\bar{x}	SD	Range
Males				Females				
1	11	140.60	4.28	131.9–146.7	13	144.31	3.34	138.9–149.1
2	21	141.34	3.90	135.4–150.0	19	144.73	3.28	137.0–149.7
3	10	140.34	4.39	134.1–149.1	7	145.46	3.10	141.7–150.5
4	12	138.80	4.10	134.5–148.1	20	143.96	4.41	138.5–154.9
5	13	140.95	3.91	133.8–150.9	14	145.11	3.45	138.5–150.4
6	8	142.25	2.23	138.2–145.0	11	144.17	4.76	136.5–151.0
7	50	140.20	4.28	128.7–150.2	35	144.50	3.76	138.5–152.8
8	7	139.59	3.92	135.2–145.5	5	144.34	4.01	140.4–149.6
9	12	142.56	4.84	136.4–155.6	9	144.20	4.36	136.3–149.9
10	1	131.00			15	145.13	3.40	139.5–149.8
11	20	139.20	4.86	130.0–151.0	7	141.74	3.94	134.8–146.8
12	15	140.86	4.22	132.3–147.8	13	146.78	4.53	133.7–151.9
13	9	144.74	3.70	139.1–149.5	11	149.91	3.98	144.9–153.3
14	20	147.72	4.07	140.1–154.0	14	153.34	4.47	149.1–163.3
15	18	144.85	3.75	138.2–150.7	19	148.65	4.59	141.1–159.7
16	9	147.01	5.32	136.0–152.0	10	154.36	4.94	147.8–163.5
17	10	142.78	4.22	136.5–147.5	6	149.25	3.76	145.1–155.9
18	13	144.19	4.29	138.0–150.7	8	147.39	5.58	138.5–156.5
19	40	144.51	3.60	137.4–151.8	29	149.91	3.98	138.2–156.0
1–9 S	58	141.03	3.67	132.2–150.6	48	144.36	3.80	134.5–151.8
1–9 F	18	141.47	3.57	137.7–148.7	—			

¹ Numbers of populations correspond to Figure 1. 1–19 are breeding (June to August) samples; S = spring (May), F = fall (September).

in a population sample must take place abruptly in extreme western New Mexico or extreme eastern Arizona.

The demonstrated lack of any pattern of geographic variation in *Coccyzus americanus* indicates that it should be treated as a monotypic species.

DISCUSSION

The statement (AOU 1983) that the Yellow-billed Cuckoo breeds "from interior California . . . south to southern Baja California" is somewhat misleading, as it implies breeding throughout the peninsula. There are breeding specimens from the Colorado delta in northeastern Baja California and suggestions of breeding in the northern mountains (Grinnell 1928, Wilbur 1987), but elsewhere the species apparently breeds only in the Cape Region. Birds in that isolated population have longer wings than other western birds (except those of the Pacific Northwest) but are otherwise indistinguishable.

The population of northeastern Mexico, in Nuevo Leon, Tamalulipas, San Luis Potosí, and Zacatecas, is a southern extension along the coast of the Gulf of Mexico from eastern Texas, and apparently is isolated from birds of Chihuahua and Coahuila. It is peculiar that this population

was represented among the birds that I studied by 15 females but only three males; in most samples, males slightly outnumbered females.

The suggestion that this species breeds on the Yucatan Peninsula (Paynter 1955) was based on birds taken in mid-June, without information on their reproductive condition. A female taken at Piste, Yucatan (KU 40491) on 22 July 1962 had an ovary measuring 12 × 9 mm. This specimen adds support to the possibility that there is an isolated breeding population on the peninsula, but definitive evidence is still lacking.

Several specimens from Colombia with minimal gonadal data give a tantalizing suggestion that an isolated breeding population could become (or might be) established there. Males taken on 27 April 1950 in Antioquia (USNM 425561) and on 7 June 1952 in Caqueta (USNM 446017) are marked as having the testes enlarged. Females taken on 27 and 31 May 1960 in Magdalena (LACM 37601, 37602) are labeled as having enlarged ovaries. Nesting is well under way at the northern limits of the range by early June. Without additional evidence the late May and June specimens from Colombia must be considered very late migrants, but the speculation that such birds might breed locally rather than migrate is difficult to suppress. Similar cir-

cumstances might explain the origin of the South American *Coccyzus euleri*, a probable allospecies of *C. americanus*.

A cause for similar speculation is provided by a small series of specimens from Lichtenau, Chaco, Paraguay (AMNH 803179-803181). Two apparently young birds, judged by characteristics of the tails, were taken on 12 August and 12 September 1970. This seems extremely early for migrants from North America to have reached such a southern location. Even more intriguing is an apparent bird of the year taken 1 May 1971. The molt of remiges and retrices that normally takes place in January and February should have eliminated all trace of birds hatched the previous summer, replacing the feathers by which the apparent age of this individual can be determined. Its feathers are not sufficiently worn to suggest that it merely failed to molt. The alternative is that it hatched only a few months before it was taken. Clearly we know less about Yellow-billed Cuckoos on their "wintering" grounds than we should.

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