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GEOGRAPHICAL VARIATION IN THE RED-BELLIED
WOODPECKER IN THE SOUTHEASTERN
UNITED STATES

By THOMAS D. BURLEIGH AND GEORGE H. LOWERY, JR.

Thirty years ago Ridgway¹ called attention to the fact that there is a certain amount of geographical variation in the Red-bellied Woodpecker (*Centurus carolinus*), but he stated that the differences noted were not sufficiently correlated with definite geographical areas to justify subdivision of the species. More recently other taxonomists have attempted to discern some constancy in the noticeable variation exhibited by any adequate museum series. All of these attempts ended without the results of the studies being published, and without the taxonomy of the species and Ridgway's conclusions being altered. That we should now claim to have uncovered a solution to the interesting but difficult problem is doubtless contingent upon our good fortune in having access to new material from highly critical areas, particularly from the eastern Gulf coast region. With this excellent series of recently taken and unusually clean specimens before us, the whole pattern of geographical variation in the species became much clearer, especially so far as populations in the southeastern United States are concerned.

On the basis of specimens examined by us from throughout the greater part of the range of the species, three morphologically distinct and geographically delimited populations are recognizable. They are: (1) the birds of the Mississippi Valley and mid-western United States; (2) the eastern

¹ "Birds of North and Middle America," *Bull. U. S. Nat. Mus.*, 50, pt. 6, 1914:56.

and southeastern United States and eastern Gulfcoast; and (3) the lower Florida Peninsula and Florida Keys.

Surprising as it may seem, the Mississippi Valley and southern Florida populations have the greatest number of characters in common. For most purposes they might be considered the same if they were not completely separated by the totally different southeastern and eastern Gulf coast population. (See Figure 1). These two similar but widely separated populations differ in minor characters only, but because they are separated geographically, greater emphasis justifiably can be placed on the slight differences, especially since those differences are notably constant.

In brief, the three populations are distinguished as follows: the Mississippi Valley birds are comparatively white above and below (the "whiteness" of the upper parts resulting from the white interspaces being equal or nearly equal to the black cross-bars), and the under parts are consistently tinged with yellow. In size, the birds from this area average slightly larger than do the other populations, but this character is considered of little value in identifying specimens, as is also the greater amount of red on the sides of the head, throat, and upper breast. Occasional specimens from the other two populations are similarly marked with red on these parts.

The southeastern and eastern Gulf coast population, compared both with Mississippi Valley and with lower Florida Peninsula birds, is grayer below and decidedly blacker above (the "blackness" of the upper parts resulting from the black cross-bars being much broader than the white interspaces). Our series containing a number of well-washed specimens in fresh plumage, demonstrates clearly that the grayness of the under parts (which also attracted Ridgway) is the true color characteristic of the feathers themselves and is not attributable to a soiled condition of the feathers as other workers have incorrectly surmised. In addition to the color of the under parts, the color of the belly is a different shade of red (approaching Coral Red) that stands out in striking contrast to the color of these parts in other populations.

The lower Florida Peninsula birds and those taken on the Florida Keys differ in having "whiter" upper parts (i. e., black cross-bars narrower than the white interspaces); by the fact that the central tail feathers are blacker (often entirely black except for a few irregular spots on the inner webs, chiefly on the basal parts of the feathers); and by the paleness of

the frontal antiae and the whole postnasal region. An occasional specimen taken elsewhere shows a restriction of the red crown patch and a paleness of the frontal antiae and postnasal feathers, but in none of the 201 specimen examined by us is this character nearly so distinct as it is among Florida examples. Figure 2 shows the abruptness of the break between the color of the crown and the postnasal region in the southern Florida population. The amount of white in the central tail feathers of Mississippi Valley and southern United States birds is variable, but in no specimen examined by us was the white found to be restricted as in the southern Florida birds.

As previously noted, the Florida population is superficially similar to the Mississippi Valley population. Other workers, in analyzing this population, may have made comparisons with specimens from the latter region, whereas, if they had used material from the southeastern United States, the distinctness of the Florida birds would have been apparent immediately. As shown later in the nomenclatural discussion, the dark-backed, gray-bellied population of the southeastern United States is the nominate race of the species and hence primary comparisons should be made with that form. Since the Florida population is effectively isolated from its closest counterpart (the birds of the Mississippi Valley) by the intervention of a dissimilar population, and since the somewhat minor differences by means of which it is distinguished from the latter reflect the relative state of isolation experienced by the Florida birds, we feel that taxonomic recognition facilitates the handling of the facts. Accordingly, after careful examination of the material before us, we have agreed in the opinion that the Florida population should be named. Also, since the Mississippi Valley population is equally distinct from birds from the southeastern United States, we feel that it likewise should be given nomenclatural recognition. The three populations of Red-bellied Woodpeckers as outlined may be classified racially as follows:

CENTURUS CAROLINUS CAROLINUS (LINNAEUS)

Picus carolinus Linnaeus, Syst. Nat., ed. 10, 1758: p. 113 (based on the Red-bellied Woodpecker, *Picus ventre rubro* Catesby, Carolina, 1: 19).

Type locality.—South Carolina.

Distribution.—Eastern United States, east of the Alleghanies (northern limits of range still to be fully worked out), and the southeastern United

States in southern Mississippi, Alabama, Georgia, eastern Tennessee, northern Florida, and North and South Carolina.

Diagnosis.—Dorsum very dark (i.e., black bars wider than the white) ; crown and occiput slightly darker than in other races; frontal antiae and postnasal region usually the same color as the crown and occiput, only rarely a shade paler thereby seldom showing differentiation in color from the crown; color of the under parts dark gray; red of the under parts, notably the belly, approaching Coral Red and thereby distinct from the color of these parts in other races; central tail feathers barred and mottled with white, the white usually extending far distally to the very edge of the terminal acumination of the feather web.

Remarks.—This race apparently reaches its maximum development in the eastern Gulf coast region. Specimens from this region are both well marked and strikingly uniform. The most striking characteristics of the race are the very dark upper parts, the dark gray under parts, and the particular shade of red of the belly.

Specimens from South Carolina, the general area from which Catesby probably secured his specimens or his impressions of the Red-bellied Woodpecker and upon which he drew the picture that later served as the basis for Linnaeus' name, are not as uniform in every character as are eastern Gulf coast examples of the race. Certain female specimens from South Carolina are aberrant in that they show traces of yellow in the under parts, a feature wholly absent from the Gulf coast series. However, in the aggregate of characters, the South Carolina birds fall definitely within the broader limits of individual variation within the population, as do also specimens from North Carolina and Virginia. The exact status of populations in the eastern and northeastern part of the range of the species demands further study.

Specimens examined.—Total number, 61, as follows: *South Carolina* (Charleston, 2; Mt. Pleasant, 3; Daufuskie Island, 1; Wadmalaw River, 1). *Georgia* (Grady County near Sherwood Plantation, 2; Athens, 1). *Alabama* (Auburn, 1; Woodbine, 1). *Mississippi* (Gulfport, 9; Deer Island, 1; Saucier, 5; Brooklyn, 1; Biloxi, 1; Pearlinton, 2). *North Carolina* (Asheville, 1). *Virginia* (Mt. Vernon, 1). *Florida* (Sopchoppy, 5; Port St. Joe, 1; Lake City, 1; Starke, 1; Anclote, 6; Mary Ester, 2; Amelia Island, 1; Rosewood, 2; Santa Rosa County, 4; Tallahassee, 1; 3 mi. N. Sewannee River, 3; Demory, 1).

CENTURUS CAROLINUS ZEBRA (BODDAERT)

Picus zebra Boddaert, Tabl. Pl. Enl., 1783: 43 (based on *Epeiche ou Pic rayé de la Louisiane* D'Aubenton, Pl. Enl., pl. 692).

Type locality.—Louisiana (herein restricted to Baton Rouge, Louisiana).

Distribution.—The whole of the Mississippi River Valley and the region covered by most of the tributaries of the Mississippi River. Eastern distribution in the northern states not definitely known, but occurring as far east as Ohio.

Diagnosis.—Compared with *carolinus*: upper parts averaging decidedly whiter (i.e., white interspaces equal to or wider than black cross-bars); under parts lighter (less grayish) and with a slight suffusion of yellow in fresh specimens; red of belly approaching Peach Red; red of crown and occiput slightly paler; postnasal region and frontal antiae generally undifferentiated from crown, but sometimes slightly paler; amount of white in central tail feathers about as in *carolinus*. Compared with *perplexus* (as described beyond): differs only slightly in that the upper parts are less whitish, the frontal antiae and the postnasal region is seldom differentiated from the crown in fresh specimens, and the central tail feathers are extensively marked with white.

Remarks.—Specimens from Louisiana and eastern Texas are more extensively tinged with red on the sides of the head and upper breast than are specimens from the upper Mississippi Valley. However, as noted above, this character is often highly developed in populations representing other races. The character, therefore, cannot be correlated with any one race.

Specimens from several parts of Tennessee appear to be intermediate between *zebra* and *carolinus*. Those from the Memphis area are typical, whereas those from Clarksville and Springfield are intermediate between *zebra* and *carolinus*, but closer to the former in that they show a tendency toward possessing the normal suffusion of yellow on the under parts. Specimens from Nashville and Murfreesboro, Tennessee, are also intermediate, but apparently closer to *carolinus*. A large population sample from this area is needed in order to determine adequately the exact degree of intergradation present.

Boddaert described *Picus zebra* on the basis of a plate drawn by D'Aubenton depicting a bird from "Louisiana." The term "Louisiana" in the

eighteenth century might have referred to the area incorporated in the then existing "Louisiana Territory." However, the population of the Red-bellied Woodpecker to which we now apply Boddaert's name, *zebra*, occurs throughout the old Louisiana Territory and hence no difficulty regarding type locality is encountered by its use. James L. Peters has kindly examined D'Aubenton's plate for us and has informed us that it is a drawing of a female in which the white cross-bars of the dorsum are broad, giving the bird the appearance of being light-colored above. Although little credence can be placed in the accuracy of drawings made during that period, a comparatively white-backed bird is exactly what one would expect since D'Aubenton apparently based his drawing on a Red-bellied Woodpecker from a region inhabited by a population characterized by light-colored upper parts.

To further definitize taxonomic studies of this group of woodpeckers, we restrict the type locality of *C. c. zebra* to Baton Rouge, East Baton Rouge Parish, Louisiana. This is a locality well within the range of the race, and one from which additional specimens can be procured easily as needed. The series already available from this region demonstrates adequately the variation in the population which it represents and is in no way intermediate toward the adjacent race of the Gulf coast and southeastern United States.

Specimens examined.—Total number, 98, as follows: *Louisiana* (Baton Rouge, 9; Avery Island, 28; Baines, 1; Jackson, 1; St. Francisville, 1; Slidell, 1; Mandeville, 1; New Orleans, 3; Creole, 8 mi. N, 1; Egan, 1). *Tennessee* (Memphis, 12 mi S, 1; Germantown, 3; Clarksville, 2; Springfield, 2). *Mississippi* (Jackson, 4; Rosedale, 1; Vicksburg, 2). *Texas* (Gainesville, 1; Marshall, 1; Dallas, 1). *Illinois* (Monticello, 8; Havana, 1; Olive Branch, 5; Meredosia, 2; Carlinville, 1; Evanston, 1; Cairo, 1; Morgan County, 1; unspecified, 1). *Iowa* (Iowa City, 6; Johnson County, 3). *Wisconsin* (Racine, 1). *Ohio* (Windham, 1). *Michigan* (Ann Arbor, 1).

CENTURUS CAROLINUS PERPLEXUS new subspecies

Type.—Male, adult; no. 3846, Louisiana State University Museum of Zoology; Cape Sable, near Flamingo, Monroe County, Florida; April 1, 1940; George H. Lowery, Jr.; original number 1837.

Distribution.—Lower Florida Peninsula and the Florida Keys.

Diagnosis.—Compared to *carolinus*: dorsum decidedly whiter (resulting

from the narrowness of the black cross-bars); under parts much paler (less grayish); frontal antiae and postnasal region clearly differentiated from crown and occiput by much paler coloration, sometimes being almost devoid of any trace of the red tinge of these parts evident throughout populations representing other races; red of crown and occiput very slightly paler; central tail feathers averaging decidedly more blackish (less white spotting and barring) sometimes being entirely black except for the basal half or a few irregular spots on the inner web; rump slightly more whitish (i.e., more white feathers and with fewer feathers showing black along the inner margin of the webs). Compared with *zebra*: dorsum slightly whiter; frontal antiae and postnasal region decidedly paler and thus clearly differentiated from the crown; central tail feathers much blacker; rump whiter.

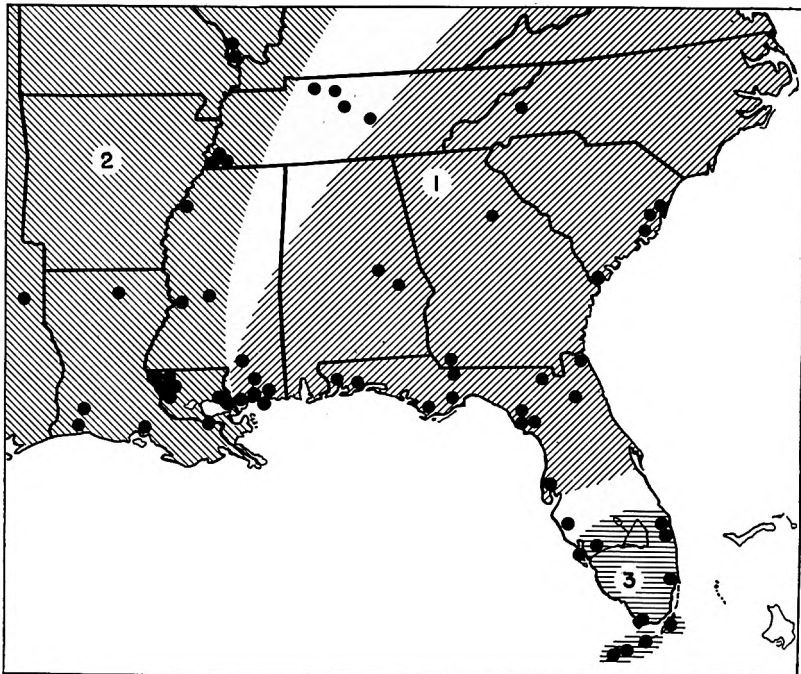


FIGURE 1. Map showing the distribution of the races of *Centurus carolinus* in the southeastern United States, as follows: (1) *C. c. carolinus*; (2) *C. c. zebra*; and (3) *C. c. perplexus*. Dots represent localities within the area covered by the map whence specimens were examined. Blank areas are regions of intergradation or areas from which no specimens were studied.

Remarks.—The superficial resemblance of this isolated race to the wide-ranging population occupying the Mississippi Valley is doubtless the reason for its remaining undescribed to date. As previously noted, this race differs from *zebra* in somewhat minor characters only, but is strikingly distinct from the race with which it comes into geographical contact in northern Florida (*carolinus*). However, southern Florida birds can always be distinguished from examples of *zebra* either by the extensive black on the central tail feathers, or by the sharp differentiation in color between the crown and the postnasal region (see Figure 2). From *carolinus*, southern Florida examples are distinguishable at a glance by the characteristics noted above in detail.

Specimens examined.—Total number, 42, as follows: *Florida* (Cape Sable near Flamingo, 8; Miami, 8; Pine Island, 1; Stuart, 6; Jupiter, 3; Venice, 3; Fort Myers, 6; Big Pine Key, 2; Islamorada Key, 1; Key Largo, 1; Florida Keys, unspecified, 1; Key West, 2).

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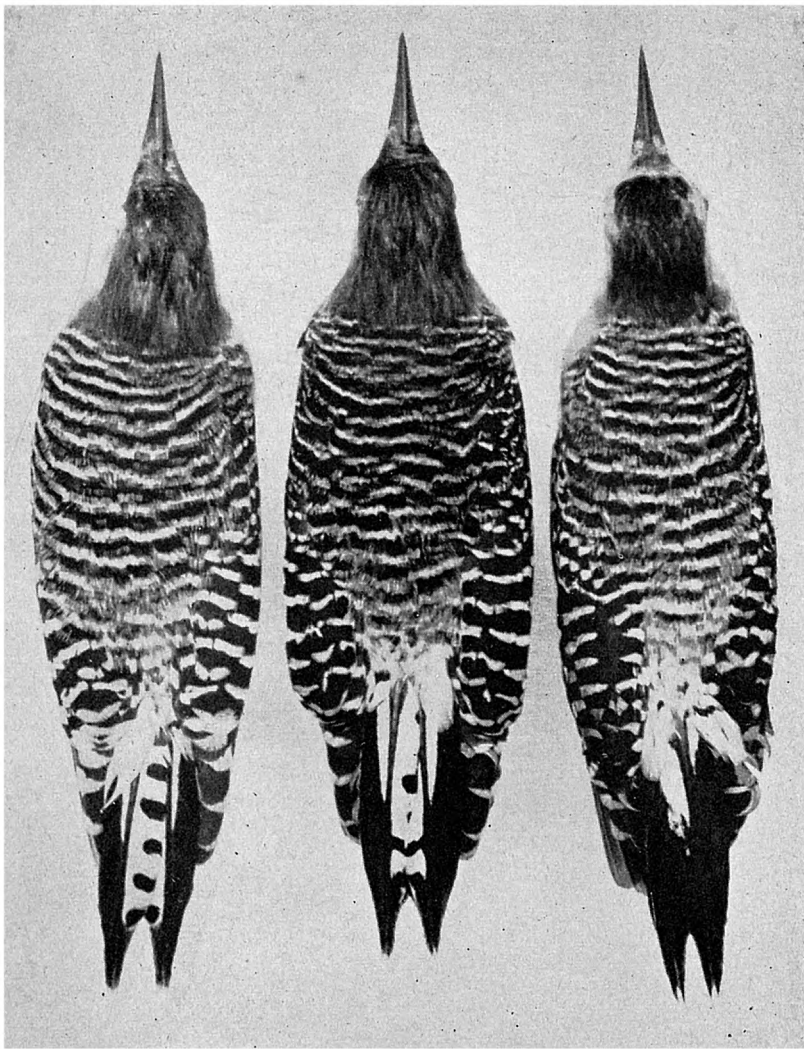


FIGURE 2. Photograph showing some of the outstanding features by means of which the three races of *Centurus carolinus* are distinguished. From left to right—*C. c. zebra*, LSU 9382, Baton Rouge, La., Nov. 24, 1943; *C. c. carolinus*, LSU 8977, Charleston, S.C., Nov. 15, 1943; *C. c. perplexus*, MCZ 243844, Fort Myers, Fla., Dec. 31, 1891.