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**VARIATION IN THE BLUE GROSBEAK  
(*GUIRACA CAERULEA*) WITH SPECIAL REFERENCE  
TO THE MEXICAN POPULATIONS**

BY ROBERT W. STORER AND DALE A. ZIMMERMAN

In preparing revisionary studies, systematists all too frequently emphasize the distinctness of subspecies, implying that all individual specimens, even those taken on migration or in the winter quarters, can be identified to subspecies. Although from the literature one gathers that the various subspecies of the Blue Grosbeak (*Guiraca caerulea*) are not difficult to distinguish from one another, we have encountered considerable trouble in identifying certain examples of this species taken in Mexico. We therefore assembled specimens from various parts of the range of this species, particularly birds taken in Mexico and Central America during the breeding season, to determine as closely as possible the range of variation in samples from various areas. A background of such information is necessary in order to make valid identifications of birds taken out of their breeding range.

In addition to the specimens in the University of Michigan Museum of Zoology (UMMZ), we have examined material from the following institutions: The American Museum of Natural History (AMNH), The Carnegie Museum (CM), The Chicago Natural History Museum (CNHM), Louisiana State University Museum of Zoology (LSU), Museum of Comparative Zoology (MCZ), United States National Museum (USNM), University of California Museum of Vertebrate Zoology (MVZ), University of California at Los Angeles (UCLA), and the collection of George M. Sutton (GMS). To Dr. Sutton and the curators of these museums we are much indebted for permission to study the specimens under their care.

Five subspecies of the Blue Grosbeak are currently recognized (cf. Hellmayr, 1938; Miller, 1957; and American Ornithologists' Union, 1957): *Guiraca caerulea caerulea*, breeding in the southeastern and south-central United States; *G. c. interfusa*, in the southwestern United

States and northern Mexico; *G. c. salicaria*, in the Central Valley and southwestern California and in northwestern Baja California; *G. c. eurhyncha*, in central and southern Mexico; and *G. c. lazula*, in Central America. Two other races have been described: *G. c. deltarhyncha* (van Rossem, 1938) from southwestern Mexico (type locality, Tepic, Nayarit) and *G. c. chiapensis* (Nelson, 1898) from Chiapas, Mexico (type locality, "Ocozocuautila," given as Ocozocoautla by Goldman, 1951: 106-107). We agree with Miller (1957) that *G. c. deltarhyncha* should be merged with *G. c. eurhyncha*. On the other hand, *G. c. chiapensis* appears to be a valid subspecies.

METHODS.—As pointed out by Dwight and Griscom in their revision of the species (1927), the brown color of females and yearling males is subject to extreme fading and is thus of little or no use in identifying specimens taken during the breeding season. Because of this and because relatively few specimens of breeding females were available, our analysis of variation is based primarily on adult males. In the Blue Grosbeak, adult males are larger than first-year males, which in turn are larger than females. We were not able to distinguish with certainty first-year females from older ones, but, as in males, the older birds probably average larger than the yearlings. This is borne out by the greater coefficient of variation for wing length in females (2.81) than in adult males (1.91) of the El Salvador population.

Color comparisons were made on clear days in north light. The "arc" of the wing was measured by flattening the wing on the measuring device. The standard tail measurement and the length of the bill from the anterior edge of the nostril were also taken. In the case of bill length only, measurements of one-year-old birds were included with those of adult males.

The following population samples were analyzed: (1) Eastern United States (Virginia, South Carolina, Georgia, and Florida); (2) Louisiana and Mississippi; (3) Southeastern Texas (Cameron County); (4) Arizona and New Mexico; (5) California (Central Valley and southwestern part); (6) Baja California (7 mi. E of Cerro Prieto); (7) Northeastern Sonora (Saric and Pilares); (8) Jalisco (Autlán and 20 mi. S of Guadalajara); (9) Michoacán (9 mi. W of Jacona, Huingo, and San José de Purua); (10) Valley of Mexico (Distrito Federal, Querétaro, Mexico); (11) Guerrero; (12) Oaxaca (9 and 20 mi. SE of Oaxaca); (13) Chiapas; and (14) El Salvador. Nine of the 14 samples consisted entirely of birds taken between May 8 and August 23. In three of the northern samples (Eastern United States, Louisiana and Mississippi, and California), birds taken as early as April 15 were

included because it was felt that there was virtually no chance of including birds from significantly different populations. The Guerrero sample included birds taken between April 2 and July 2. According to the labels, the April-taken birds had testes one-half or fully enlarged. There appears to be no significant difference between these birds and those taken later in the season, and the low coefficients of variation for the three measurements (Tables I, II, and III) are indicative of a homogeneous sample. Because of the ease of distinguishing the breeding birds of Central America from all the northern populations, and because the examples of *lazula* taken in El Salvador during the time of migration did not differ significantly in size from the birds taken during the breeding season, all were included in the El Salvador sample.

COLOR OF ADULT MALES.—The blue body plumage of males from the eastern United States west through Louisiana and Mississippi is the darkest and the most purplish in all the northern populations, although birds from central and southern Mexico (north of the Isthmus of Tehuantepec) are as dark. California birds average paler than those from either the eastern United States or Mexico, although individuals from many parts of the western United States and northern Mexico cannot be distinguished from California birds on this character alone. Blue Grosbeaks from south of the Isthmus of Tehuantepec (Chiapas and Central America) are strikingly pale and bright blue in series, individuals from Costa Rica being the brightest of all. Occasional individuals from central Mexico or California are as bright as the southern birds, but most of these exceptional birds are readily separable on the basis of measurements.

Contrary to the statements of Dwight and Griscom (1927), color differences between the two wing bars are found in individuals of all populations. The narrow band formed by the edgings of the secondary coverts is nearly always paler than the patch on the median coverts. In occasional birds from the eastern United States, California, and south of the Isthmus of Tehuantepec, the bars are nearly alike in tone, but there is considerable variation. Fading appears to accentuate the difference between the colors of the two wing bars.

The anterior wing bar varies in intensity of color within populations. In birds from the eastern United States, however, it tends to be a darker, richer chestnut than in birds of other populations, although breeding birds from south of the Isthmus of Tehuantepec also have dark anterior wing bars.

The bar formed by the edgings of the secondary coverts is narrowest and darkest in birds from the eastern United States and but slightly broader in birds from south of the Isthmus of Tehuantepec. In other populations it is still broader.

The amount of black on the back is highly variable in all races and is of virtually no use in identifying individual specimens. Within any population from north of the Isthmus of Tehuantepec, the range of variation is from blue with a few broad blue-black streaks to solid black. In southwestern Mexico (western Michoacán to Nayarit) a higher proportion of the adult males is black backed than in populations from elsewhere. The birds from the United States and northern Mexico, although highly variable in this character, have on the average less black on the back than birds from central Mexico to the Isthmus of Tehuantepec. As a group, the birds from south of the Isthmus of Tehuantepec are the lightest backed, one bird from Costa Rica having almost no black on the back.

MEASUREMENTS OF ADULT MALES.—Two clines of increasing wing length are evident from the figures in Table I: the first from east to west across the southern United States, and the second from Arizona and New Mexico south to Guerrero and Oaxaca. South of the Isthmus of Tehuantepec, the variation may also be clinal in nature; but from the limited material available, it appears that all breeding birds from Honduras to Costa Rica are smaller than birds from Chiapas. A series of breeding birds from Guatemala is needed to clarify this situation.

Tail length is more variable than wing length (the coefficients of variation ranging from 2.08 to 3.73, as against 1.75 to 2.26 for wing length). Geographic variation in tail length (Table II) follows the general pattern shown by variation in wing length with a few minor differences. The birds from the range of the nominate race are relatively shorter tailed than birds of other subspecies.

The cline of increasing bill length from Arizona and New Mexico to Guerrero and Oaxaca follows the similar clines in wing and tail lengths (Table III). Across the southern United States, bill length runs from a mean of nearly 12 mm. on the Atlantic seaboard to 12.9 in Louisiana and Mississippi, 12.2 in Arizona and New Mexico, and 11.2 in California. South of the Isthmus of Tehuantepec, the northern sample (Chiapas) has longer bills than the southern one (El Salvador), but there is much more overlap in this character than in wing or tail lengths.

TABLE I  
WING LENGTH (ARC) OF ADULT MALE BLUE GROSBEAKS

Sample	Number	Range	Mean $\pm$ $\sigma_m$	$\sigma$	V
<i>G. c. caerulea</i>					
Eastern United States	11	85.0-91.0	87.59 $\pm$ 0.46	1.53	1.75
Louisiana and Mississippi	5	88.0-89.5	88.9		
Southeastern Texas	11	86.0-93.0	88.59 $\pm$ 0.59	1.95	2.20
<i>G. c. salicaria</i>					
California	13	88.0-94.0	90.35 $\pm$ 0.53	1.91	2.11
<i>G. c. interfusa</i>					
Arizona and New Mexico	16	87.0-93.0	89.78 $\pm$ 0.44	1.74	1.94
Baja California	12	86.5-92.0	89.17 $\pm$ 0.50	1.75	1.96
Northeastern Sonora	15	87.5-94.0	90.17 $\pm$ 0.51	1.98	2.20
<i>G. c. eurhyncha</i>					
Jalisco	2	91.0-92.0	91.5		
Michoacán	5	92.0-96.0	94.1		
Valley of Mexico	11	90.0-96.0	93.59 $\pm$ 0.67	2.12	2.26
Guerrero	11	93.5-99.0	96.18 $\pm$ 0.53	1.75	1.82
Oaxaca	2	95.0-96.0	95.5		
<i>G. c. chiapensis</i>					
Chiapas	7	93.5-98.5	95.9		
<i>G. c. lazula</i>					
El Salvador	19	87.5-93.0	91.11 $\pm$ 0.40	1.74	1.91

*Guiraca caerulea caerulea* (Linnaeus)

*Loxia caerulea* Linnaeus, Syst. Nat., 10th ed., 1, p. 175, 1758, type locality, "Carolina" = South Carolina.

COLOR OF ADULT MALES.—The underparts are dark purplish blue as in *G. c. eurhyncha*, the palest individuals falling within the range of variation of *G. c. interfusa* and *G. c. salicaria*, but not of *G. c. chiapensis* or *G. c. lazula*. The blue of the crown and nape is dark as in *eurhyncha*, but overlapping considerably with *interfusa* and *salicaria*; one specimen of *caerulea* from South Carolina (MVZ 51287) is as pale-headed as some examples of *chiapensis* and *lazula*, but otherwise there is no overlap between *caerulea* and these subspecies. As in all other races except *chiapensis* and *lazula*, the black on the

TABLE II  
TAIL LENGTH OF ADULT MALE BLUE GROSBEAKS

Sample	Number	Range	Mean $\pm \sigma_m$	$\sigma$	V
<i>G. c. caerulea</i>					
Eastern United States	11	63.0-68.0	65.77 $\pm$ 0.52	1.74	2.65
Louisiana and Mississippi	5	64.0-67.0	65.4		
Southeastern Texas	11	66.5-73.5	69.09 $\pm$ 0.58	1.94	2.81
<i>G. c. salicaria</i>					
California	13	68.0-74.5	71.00 $\pm$ 0.58	2.10	2.96
<i>G. c. interfusa</i>					
Arizona and New Mexico	15	67.0-75.0	70.10 $\pm$ 0.50	1.95	2.78
Baja California	12	67.0-72.5	68.96 $\pm$ 0.54	1.88	2.73
Northeastern Sonora	15	66.0-75.0	69.70 $\pm$ 0.67	2.60	3.73
<i>G. c. eurhyncha</i>					
Jalisco	2	71.0-73.0	72.0		
Michoacán	5	70.0-77.0	74.6		
Valley of Mexico	10	70.0-78.0	74.20 $\pm$ 0.82	2.61	3.51
Guerrero	11	73.0-80.0	76.05 $\pm$ 0.57	1.88	2.47
Oaxaca	2	74.0-76.0	75.0		
<i>G. c. chiapensis</i>					
Chiapas	7	73.0-81.0	76.6		
<i>G. c. lazula</i>					
El Salvador	18	68.5-77.0	73.33 $\pm$ 0.51	2.18	2.97

back varies from a few broad blackish-blue streaks to a nearly solid patch. The anterior wing bar averages deep chestnut as in *eurhyncha*, *chiapensis*, and *lazula*; it averages darker than in *interfusa* and *salicaria*, although there is considerable overlap. The posterior wing bar is light buff to chestnut as in all forms, but averages darker in *caerulea*, *chiapensis*, and *lazula* than in *eurhyncha*, *interfusa*, and *salicaria*.

MEASUREMENTS OF ADULT MALES.—The population of the Atlantic seaboard is the smallest of the species; wing, 85.0-91.0 (87.59), tail, 63.0-68.0 (65.77). The bill is larger than in *salicaria* and smaller than in *eurhyncha*, *chiapensis*, and *lazula*.

COMMENTS.—Birds from Louisiana, Mississippi, and Cameron County, Texas, are larger, near the size of *interfusa* (Table I) from

TABLE III  
BILL LENGTH (FROM NOSTRIL) OF ADULT MALE BLUE GROSBEEKS

Sample	Number	Range	Mean $\pm$ $\sigma_m$	$\sigma$	V
<i>G. c. caerulea</i>					
Eastern United States	18	11.3–12.8	11.98 $\pm$ 0.12	0.52	4.34
Louisiana and Mississippi	5	12.4–13.7	12.9		
Southeastern Texas	11	11.8–13.0	12.45 $\pm$ 0.13	0.44	3.57
<i>G. c. salicaria</i>					
California	14	10.0–11.8	11.16 $\pm$ 0.14	0.51	4.57
<i>G. c. interfusa</i>					
Arizona and New Mexico	23	11.5–13.2	12.24 $\pm$ 0.09	0.44	3.59
Baja California	14	11.1–12.8	11.89 $\pm$ 0.11	0.42	3.53
Northeastern Sonora	14	11.6–14.0	12.59 $\pm$ 0.18	0.67	5.32
<i>G. c. eurhyncha</i>					
Jalisco	2	12.5–12.5	12.5		
Michoacán	5	13.0–13.5	13.3		
Valley of Mexico	10	12.1–13.5	12.79 $\pm$ 0.16	0.50	3.92
Guerrero	11	12.2–13.5	12.85 $\pm$ 0.15	0.49	3.81
Oaxaca	2	12.9–13.7	13.3		
<i>G. c. chiapensis</i>					
Chiapas	7	14.5–15.1	14.8		
<i>G. c. lazula</i>					
El Salvador	19	12.7–15.1	14.09 $\pm$ 0.15	0.67	4.76

Arizona and New Mexico, but as they agree with *caerulea* in color, we have assigned them to that race.

SPECIMENS EXAMINED.—VIRGINIA: Prince William Co., 2 males, 2 females (UMMZ). SOUTH CAROLINA: Chester Co., Chester, 1 male (MVZ). GEORGIA: Baker Co., 12 mi. SW of Newton, 1 male (MVZ); Chatham Co., 2 males (UMMZ); Clarke Co., Athens, 1 male, 1 female (UMMZ); Clay Co., ¼ mi. S of Ft. Gaines, 1 female (MVZ); Cobb Co., Roswell, 1 male (MVZ), 3 males, 1 female (UMMZ); Fulton Co., 2 to 6 mi. N of Roswell, 2 males, 1 female (UMMZ); Tift Co., Tifton, 1 female (MVZ). FLORIDA: Pinellas Co., Madeira Beach, 2 males (UMMZ), Pass-A-Grille, 1 male (UMMZ). MISSISSIPPI: Harrison Co., Biloxi, 1 male (UMMZ), Deer Id., 1 male (LSU), Saucier, 1 male (UMMZ); Warren Co., 7 mi. N of Vicksburg, 1 male (LSU). LOUISIANA: Bienville Par., 2 mi. SE of Acadia, 1 male (LSU); Cameron Par., Cameron, 1 male (LSU); E Baton Rouge Par., 6 mi. S of Univ., 1 male (LSU); Orleans Par., New Orleans, 1 female (UMMZ). TEXAS: Cameron Co., Brownsville, 12 males, 4 females, 1 sex? (UMMZ), Los Fresnos, 12 males, 10 females, 1 female? (UMMZ), locality unspecified, 1 male, 2 females (UMMZ).

*Guiraca caerulea interfusa* Dwight and Griscom

*Guiraca caerulea interfusa* Dwight and Griscom, Amer. Mus. Novit., 257, p. 4, 1927, type locality, Fort Lowell, Arizona.

COLOR OF ADULT MALES.—In series, the blue of the underparts of specimens of this race is paler and less purplish than in series of *caerulea* or *eurhyncha*. The four lightest of 19 *eurhyncha* fall into the middle of our series of 26 *interfusa* from Arizona, New Mexico, and Baja California (Cerro Prieto); and the three darkest *interfusa* (which are somewhat worn) approach the darkest examples of *eurhyncha*. In this character, *interfusa* and *salicaria* are indistinguishable. However, *interfusa* in series is darker, less intense blue than either *chiapensis* or *lazula*, although there is some overlap with each. The blue of the crown and nape in *interfusa* is light, resembling that in *salicaria* and overlapping the lightest examples of *caerulea* and *eurhyncha* and the darkest specimens of *chiapensis* and *lazula*. The range of variation in the amount of black in the back is similar to that in *caerulea*, but individuals of *interfusa* tend to retain the light rufous or dark buff edgings to the back feathers later into the summer than do individuals of other races. These edgings, superimposed upon the black-and-blue ground color, impart a somewhat greenish-blue cast to the back which is absent in specimens of the other races taken at the same season. The anterior wing bar is, on the average, lighter than that of *caerulea* or *eurhyncha* and is similar to that of *salicaria*. The posterior wing bar averages lighter than that of any of the other races except *salicaria*, which it resembles.

MEASUREMENTS OF ADULT MALES.—The Arizona-New Mexico population is larger than that of the eastern United States; wing, 87.0–93.0 (89.78), and is relatively longer tailed, 67.0–75.0 (70.10). *G. c. interfusa* does not differ significantly in bill length from *caerulea*; 11.5–13.2 (12.24).

COMMENTS.—Breeding birds from northwestern Baja California (Cerro Prieto) average very slightly smaller and are smaller billed than birds from Arizona and New Mexico, in the latter character showing an approach to *salicaria*. The sample from northeastern Sonora is not significantly different in measurements from that from Arizona and New Mexico. Fifteen adult males taken between April 15 and May 21 at Sabinas, Coahuila, measure as follows: wing, 87.0–92.5 (89.80); tail, 66.0–71.0 (69.10); bill from nostril, 11.4–13.3 (12.31). Except for their short tails, these birds are indistinguishable from the Arizona-New Mexico sample, and, indeed, they may represent, at



least in part, migrants from farther north. An adult male from Guirocoba, southern Sonora, taken May 24 (UCLA), has dark wing bars as in *eurhyncha*, but resembles *interfusa* in the blue of the crown and underparts and in measurements (wing, 89.5; tail, 67.0; bill, 12.5). A. J. van Rossem (1938: 133) first assigned birds from Guirocoba to his race *deltarhyncha* (here included in *eurhyncha*), but later (1945: 255) he referred all breeding Blue Grosbeaks of Sonora to *interfusa*. We believe the latter determination to be the correct one. Six adult males from Rancho Baillón, Durango, are intermediate between *interfusa* and *eurhyncha* in both color and measurements; wing, 92.0–95.0 (93.5); tail, 71.5–72.5 (71.9); bill, 11.7–12.9 (12.2).

SPECIMENS EXAMINED.—TEXAS: Jeff Davis Co., Fort Davis, 1 female (UMMZ), 1 mi. N of Fort Davis, 1 male (UMMZ), 6 mi. E of Mt. Livermore, 1 male (UMMZ); El Paso Co., El Paso, 1 male? (UMMZ). NEW MEXICO: Catron Co., Reserve, 4 males, 1 female (UMMZ); Mora Co., La Cueva Ranch, 3 males, 2 females (UMMZ); San Miguel Co., Las Vegas, 1 male (UMMZ). ARIZONA: Cochise Co., Chiricahua Mts., near Paradise, 1 male, 1 female (UMMZ), Portal, 1 female (UMMZ); Mojave Co., Fort Mojave, 1 male (MVZ); Pima Co., Tucson, 11 males, 1 female (UMMZ); Santa Cruz Co., Patagonia, 1 male, 1 female (UMMZ), Sonoita, 1 male, 1 male? (UMMZ), Tumacacori Mts., Peña Blanca, 1 male (UMMZ); Yavapai Co., Williamson Valley, 1 female (UMMZ). BAJA CALIFORNIA: 7 mi. E of Cerro Prieto, 13 males, 9 females (MVZ). SONORA: Guirocoba, 3 males, 2 females (UCLA), 1 male (CNHM), Pilares, 2 males (UMMZ), Saric, 13 males, 4 females (UCLA). CHIHUAHUA: Pacheco, 1 male (CNHM), N Chihuahua, 1 male (AMNH). COAHUILA: Del Carmen Mts., 1 male (USNM), Sabinas, 2 males, 1 female (USNM), 5 males, 3 females (CNHM), 5 males (UCLA), 3 males (AMNH), 1 male (MVZ). NUEVO LEÓN: Allende, 1 male (AMNH), Boquillo, 2 males (AMNH), Boque Negro, 1 male (AMNH), Montemorelos, 1 male (AMNH), Monterrey, 1 female (AMNH), Villa Santiago, 15 mi. S of Los Adjuntas, 1 male, 2 females (CNHM). TAMAULIPAS: Cañón Cavilleros, 2 males (AMNH), La Joya de Salas, 1 female (GMS), Mesa de la Angostura, 1 male (CNHM), 1 female (GMS), Mesa de Llera, 1 male (GMS), 11 mi. SE of Norias, 1 male (GMS), Río Sabinas, near Gómez Farías, 1 male (CNHM), Victoria, 1 male (USNM). DURANGO: Rancho Baillón, 6 males (AMNH), intermediate between *interfusa* and *eurhyncha*.

### *Guiraca caerulea salicaria* Grinnell

*Guiraca caerulea salicarius* Grinnell, Proc. Biol. Soc. Wash., 24, p. 163, 1911, type locality, Santa Ana River bottom, near Colton, San Bernardino County, California.

COLOR OF ADULT MALES.—The blue of the underparts and of the crown and nape are pale as in *interfusa*, but the color of the crown and nape averages slightly darker. The black on the back is extremely variable as in *caerulea*. The anterior wing bar averages pale as in *interfusa*; the posterior one averages the palest of any race, but its range of variation is similar to that of both *interfusa* and *eurhyncha*.

MEASUREMENTS OF ADULT MALES.—The California race averages slightly, but not significantly, larger and longer tailed than *interfusa*. It is, however, the smallest billed of all the races: 10.0–11.8 (11.16).

COMMENTS.—The bills of three females from Kern County, California, measure 10.2, 11.9, and 12.2, suggesting intergradation with *interfusa* in this area.

SPECIMENS EXAMINED.—CALIFORNIA: Kern Co., Isabella, 1 female (MVZ), Onyx, 1 female (MVZ), Weldon, 1 male (MVZ); Los Angeles Co., El Monte, 1 male (MVZ), Los Angeles, 1 male (MVZ), Pasadena, 5 males (MVZ); Merced Co., Snelling, 4 males, 1 female (MVZ); San Diego Co., Lake Hodges, 2 males (UMMZ), San Onofre, 1 female (MVZ), Sorrento Valley, 1 male (UMMZ); San Joaquin Co., Lodi, 1 male (UMMZ); Ventura Co., Ventura, 2 males, 2 females (MVZ).

### *Guiraca caerulea eurhyncha* Coues

*Guiraca caerulea* var. *eurhyncha* Coues, Amer. Natur., 8, No. 9, p. 563, Sept., 1874, type locality, "Mexico."

*Guiraca caerulea deltarhyncha* van Rossem, Bull. Brit. Ornith. Club, 58, p. 133, 1938, type locality, Tepic, Nayarit, Mexico.

COLOR OF ADULT MALES.—The blue of the upperparts, crown, and nape resembles that in *caerulea*. The range of variation in the amount of black on the back is similar to that of the other northern races, but more individuals of *eurhyncha* possess nearly black backs than do individuals of *caerulea*. The anterior wing bar is similar to that in *caerulea*, but the posterior wing bar, although having nearly the same range of variation as in *caerulea*, is on the average lighter, resembling that of individuals of *interfusa* and *salicaria*.

MEASUREMENTS OF ADULT MALES.—As a group, the birds of central and southern Mexico are large and large billed. Wing and tail lengths increase from northwest to southeast (Tables I and II), but parallel differences in bill length are less marked (Table III).

SPECIMENS EXAMINED.—JALISCO: Autlán, 1 male (AMNH), 20 mi. S of Guadalajara, 1 male (UMMZ), La Laja, 1 male (AMNH), Ocotlán, 1 female (USNM). QUERÉTARO: Toliman, 1 male (MVZ). VERA CRUZ: Perote, 1 male (USNM). MICHOACAN: Huingo, 1 male (USNM), 9 mi. W of Jacona, 1 female (UMMZ), 20 mi. W of Jacona, 1 male (UMMZ), 3 mi. NE of Patzcuaro, 3 males (GMS), Tuxpan, 1 female (MVZ), 11 mi. NW of Zitacuaro, 1 male (UMMZ). MEXICO: Temescaltepec, 1 female (MVZ), Valley of Mexico, 2 males (UMMZ), 21 mi. E of Zitacuaro, 1 female (GMS). DISTRITO FEDERAL: Ixtapalapa, 2 males, 1 female (UMMZ), Sacatepec, 1 female (MVZ), San Nicolás, 3 males, 1 sex? (USNM), Tlalpam, 3 males (MVZ), 1 male (AMNH). GUERRERO: Amojileca, 2 males, 1 female (MVZ), Chilpancingo, 7 males, 2 females (MVZ), 2 males (UMMZ), 1 female (MCZ), 2 males, 1 female (CM), Cuapongo, 1 male (MVZ), Omilteme, 1 male (MCZ), Zumpango, 1 male (MVZ). OAXACA: near Oaxaca, 1 female (USNM), 9 and 20 mi. SE of Oaxaca, 2 males (UMMZ).

*Guiraca caerulea chiapensis* Nelson

*Guiraca chiapensis* Nelson, Proc. Biol. Soc. Wash., 12, p. 61, 1898, type locality, Ocozocuautila (= Ocozocoautla), Chiapas, Mexico.

COLOR OF ADULT MALES.—The underparts are bright, light blue, slightly darker in series than in *lazula*, and as in *lazula*, the darkest individuals match the lightest examples of *interfusa*. The blue of the crown and nape resembles that of *lazula* in being lighter than in *caerulea* and *eurhyncha* and on the average, lighter than in *interfusa* and *salicaria*, although there is considerable overlap with the last two races. The back color is variable, but, as in *lazula*, the range of variation does not include the extreme amount of black present in some individuals of all the northern races. The wing bars are dark as in *caerulea* and *lazula*.

MEASUREMENTS OF ADULT MALES.—The resident birds of Chiapas and Guerrero are not significantly different from each other in wing or tail length (Tables I and II) and in these characters are the largest of all populations examined. *G. c. chiapensis* is also the largest-billed population; we have found no overlap in this character with any population from north of the Isthmus of Tehuantepec. On the other hand, our sample from El Salvador completely overlaps our sample of *chiapensis* in bill length, although the mean bill length of the southern birds appears significantly smaller than that of *chiapensis*.

COMMENTS.—Although most authors (e.g., Dwight and Griscom, 1927; Hellmayr, 1938; Miller, 1957) have regarded *chiapensis* as a synonym of *eurhyncha*, Dickey and van Rossem (1938: 587) were more nearly correct in synonymizing it with *lazula*. Both in color and in size of bill, *chiapensis* most closely resembles the latter subspecies and differs markedly from the former. It is readily distinguishable from *lazula*, however, by its larger size. An adult male (CNHM 212961) from Laguna de Atescatempa, Dept. Jutiapa, Guatemala, measures: wing, 92.5; tail, 76.5; bill, 14.5; and probably represents a population intermediate between *chiapensis* and *lazula*.

SPECIMENS EXAMINED.—CHIAPAS: 40 mi. NW of Arriaga, 1 juv. male, 1 female (CNHM), La Razón, 1 male (USNM), 6 mi. SW of Las Cruces, 1 male (UMMZ), Ocozocuautila, 1 female = type (USNM), Tuxtla Gutiérrez, 5 males, 1 female (USNM). OAXACA: Tehuantepec, 1 female (UMMZ).

*Guiraca caerulea lazula* (Lesson)

*Pitylus lazulus* Lesson, Rev. Zool., 5, p. 174, 1842, type locality, "San Carlos (Centre Amerique)" = La Unión, El Salvador.

COLOR OF ADULT MALES.—The underparts are the brightest blue of any population, but they are only slightly brighter in series than those

of *chiapensis*. In other color characters, adult males of *lazula* resemble those of *chiapensis*.

MEASUREMENTS OF ADULT MALES.—The wing is shorter than in *chiapensis* (no overlap in the series from Chiapas and El Salvador). The mean wing length is intermediate between those for *interfusa* and *eurhyncha*, and some individuals of *lazula* overlap each population from north of Guerrero in wing length. *G. c. lazula* is relatively long-tailed, some individuals overlapping all populations except those of the short-tailed *caerulea*. Excepting *chiapensis*, *lazula* has the greatest mean bill length of any race, and extremely large-billed examples match the largest-billed individuals of *chiapensis*. The smallest-billed examples of *lazula* can be matched by some individuals of all the northern populations except *salicaria*. The few adult males available from Honduras, Nicaragua, and Costa Rica agree in size with the birds from El Salvador.

SPECIMENS EXAMINED.—HONDURAS: La Flor, Archaga, 2 males (MCZ), Dept. Morazan, 1 male (MCZ). EL SALVADOR: Chilata, 1 male, 2 females (MVZ), Colinas de Jucuaran, 1 male (CNHM), 1 female (UCLA), Divisadero, 11 males, 2 females (UCLA), 1 male, 2 females, 1 sex? (CNHM), Hacienda Miraflores, 1 male (UCLA), Hacienda Zapotitan, 1 male (CNHM), 1 female (UCLA), Lago Coatepeque, 2 males, 1 sex? (CNHM), Lake Olomega, 1 female (MCZ), 1 male (MVZ), 4 males, 4 females (UCLA), 1 female (CNHM), San Salvador, 1 male, 1 female (CNHM), 1 female (UCLA), Sonsonate, 1 male (MCZ), 1 female (CNHM), Volcán San Miguel, 1 male (UCLA), 1 male (CNHM). NICARAGUA: Managua, 1 male? (USNM). COSTA RICA: Barranca de Puntarenas, 1 female (UMMZ), Orosi, 1 male (CNHM), Punta Piedra, 2 males (CNHM), Tenorio, Las Flores, 1 male (GMS).

SUMMARY.—Variation within populations of the Blue Grosbeak (*Guiraca caerulea*) is greater than has hitherto been described. This is particularly true in such color characters of the adult males as the amount of black on the back, the color of the wing bars, and the blue of the head and body.

In addition to the subspecies currently recognized (i.e. *caerulea*, *interfusa*, *salicaria*, *eurhyncha*, and *lazula*), the race from Chiapas (*chiapensis*) should be maintained. Birds of this subspecies resemble those of the Central American race (*lazula*) in color, but are much larger.

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