

VARIATION IN THE GREAT HORNED OWLS OF MIDDLE AMERICA

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THE Middle American Great Horned Owls (*Bubo virginianus*) were revised by Oberholser (1904), who recognized four races in México (exclusive of Baja California), and Griscom (1935), who recognized but two. Ridgway (1914) followed Oberholser's treatment; Peters (1940) and Friedmann, Griscom and Moore (1950) followed Griscom's arrangement. Oberholser had about 16 specimens available to him from México (exclusive of Baja California); Griscom did not state how many he studied.

Our work involved the comparison of 86 adult Great Horned Owls from México, together with additional material from southwestern United States, Baja California, and Central America. Briefly, we concluded: (1) the range of *B. v. pallescens* should be extended southward to include most of México; (2) *B. v. mayensis* is confined to the Yucatán Peninsula, rather than being widespread; (3) Oberholser's races *B. v. melancerus* and *B. v. mesembrinus* should be merged in one race, but should not be treated as synonyms of *B. v. mayensis*, as done by Griscom (1935); (4) large size coupled with dark color is a strong tendency in the Mexican highlands, but, as Griscom stated, it is not on the order of a valid subspecies. Our material was insufficient to justify review of the Baja California populations.

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DISTRIBUTIONAL AND TAXONOMIC PROBLEMS

The Great Horned Owl is found in almost every terrestrial habitat in Mexico except tropical rain forest (Humid Lower Tropical). However, in our experience, which checks with accounts in the literature and

specimen labels seen, it is commoner in temperate habitats (desert, grassland, oak woodland, etc.) than in tropical areas (deciduous forest, thorn scrub, etc.). Curiously, the species has not been recorded from the Atlantic coastal plain between central Tamaulipas and Yucatán. We found no evidence of migration in the Mexican and Central American populations.

The species *Bubo virginianus* is a difficult but interesting one for the taxonomist. Complicating factors are: (1) the availability of relatively few specimens; (2) the existence of two and even three color phases in some areas; (3) considerable indifference to ecological conditions by the species as a whole, yet ecological constraint exhibited by local populations; (4) a network pattern of distribution of morphological characters, with some localized populations distinct, but surrounded by much larger areas where the populations are intermediate or different.

Taxonomically, the crucial problem in the racial distribution of *Bubo virginianus* in México concerns the southern boundary of the range of the subspecies *pallescens*. Oberholser (1904) drew this line approximately at the International Boundary, but bending south to include a few localities in northeastern Coahuila and northern Nuevo León. Van Rossem (1945) used similar definitions in western México. Friedmann, Griscom and Moore (1950) drew this line in Nayarit, Durango and Nuevo León. Of these arbitrary lines, the former (Oberholser and van Rossem) is not too clear, but it can be used. It could more precisely be drawn, according to our observations, south to include northwestern and north central Sonora, extreme northern Chihuahua, northeastern Coahuila, extreme northern Nuevo León, and the Tamaulipas coast to Soto La Marina. The trouble with such a boundary is that it leaves two extremely variable subspecies, instead of one, and we cannot consistently differentiate them. The boundary used by Friedmann, Griscom, and Moore is in our opinion contrary to the facts. While very pale specimens occur in Jalisco, they do not occur on the Pacific coastal plain south of central Sonora, nor in the highlands south of Guzman, extreme northern Chihuahua, and Sabinas, northeastern Coahuila, in the material we have examined.

VARIATION IN MIDDLE AMERICA

In an attempt to analyze quantitatively the geographic variation in *Bubo virginianus* within the area under study, five characters were studied separately. They will be considered one by one. For an index to the population groups as used in the tables, see Fig. 1.

The length of the wing (chord) is extremely variable individually, but

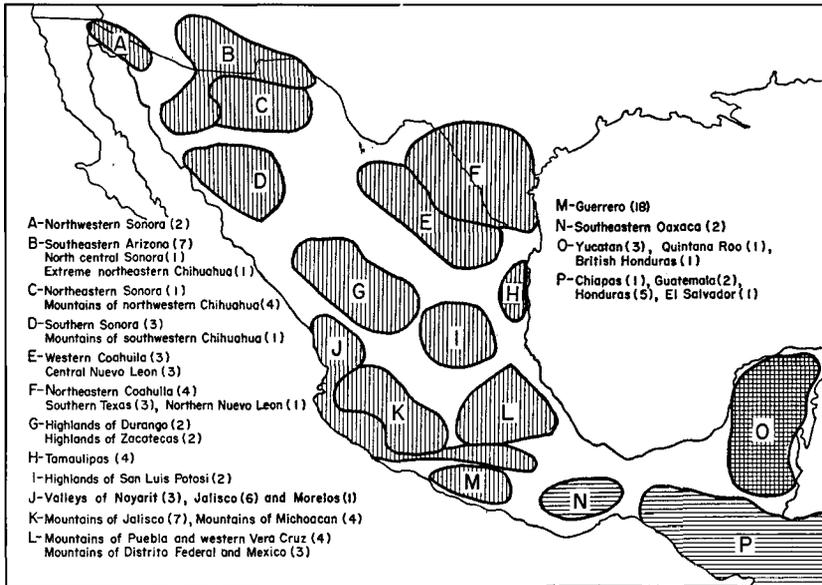


FIGURE 1. Regions in southwestern United States, México and extreme northern Central America from which specimens of *Bubo virginianus* were examined. Letters A to P indicate population groups referred to in Tables I to IV. Figures in parenthesis after each region refer to the number of specimens examined. Vertical lines = *Bubo virginianus pallescens*; cross lines = *B. v. mayensis*; horizontal lines = *B. v. mesembrinus*

TABLE I

LENGTH OF WING IN MILLIMETERS IN *Bubo virginianus* IN MIDDLE AMERICA

Groups	No. specimens	Extreme measurements	Average	Groups	No. specimens	Extreme measurements	Average
<i>pallescens</i>							
<i>males</i>				<i>females</i>			
A, B	3	321-340	328	B	8	331-381	351
F	3	320-339	331	F	5	352-373	363
H	3	327-330	327	H	1	331	
E	4	325-340	335	E	2	335-352	344
C,G,K,I,L	20	323-368	337	C,G,K,L	9	351-377	359
D,J	9	323-346	339	D,J	5	333-363	348
M	12	312-347	332	M	6	342-359	349
<i>mayensis</i>							
<i>males</i>				<i>females</i>			
O	2	297-304	301	O	2	303-315	309
<i>mesembrinus</i>							
P	5	324-340	335	N,P	6	334-357	348

geographic variability is slight except for the Yucatán Peninsula (see Table I). Rather short wings seem to be definite on the Tamaulipas coast, but the sample is very small. More certain is the tendency to long wing in the pine-oak association in the mountains of the Sierra Madre Occidental, Sierra Madre Oriental, transvolcanic range, and scattered mountains of Jalisco.

Length of the bill (culmen from cere in millimeters) was measured on 38 specimens. No geographical variation is apparent, as these results show: 12 males of *pallascens*, 24.5–29 (av. 27.1); 2 males of *mayensis* 26–29 (av. 27.5); 4 males of *mesembrinus* 27–29 (av. 27.8); 13 females of *pallascens* 26–32 (av. 29.0); 2 females of *mayensis* 29–32 (av. 30.5); 5 females of *mesembrinus* 28–30 (av. 29.2).

The color of the dorsum varies strikingly in degree of pigmentation

TABLE II
DORSAL COLORATION IN *Bubo virginianus* IN MIDDLE AMERICA

<i>Very pale</i>		<i>Pale</i>		<i>Moderately dark</i>		<i>Dark</i>		<i>Very dark</i>	
<i>Group</i>	<i>No. specimens</i>	<i>Group</i>	<i>No. specimens</i>	<i>Group</i>	<i>No. specimens</i>	<i>Group</i>	<i>No. specimens</i>	<i>Group</i>	<i>No. specimens</i>
<i>pallascens</i>									
A	2								
B	3	B	4	B	2	C	2		
				C	3				
				D	4				
				E	6				
F	1	F	5	F	2				
				G	2	G	2		
		H	2	H	2				
						I	2		
J	2	J	7	J	1				
				K	5	K	4	K	2
				L	4	L	2	L	1
		M	2	M	15	M	1		
<i>mayensis</i>									
				O	4				
<i>mesembrinus</i>									
								N	2
						P	7	P	2

or blackness. We classified our series into five categories, using five average specimens for comparison when geometry of these large specimens became difficult, and in order to standardize observations of a second loan series with an earlier study. As can be seen in Table II, *pallescens* varies from very dark in groups K (2 specimens from the mountains of Michoacan) and L (1 specimen from the mountains of western Veracruz) to very pale in groups A, B, (3 specimens from southeastern Arizona), F (1 specimen from northeastern Coahuila) and J (2 specimens from the valleys of central Jalisco). The extremes of local variation are to be noted in groups B, F, J, K and L. Within the state of Jalisco, where most of the specimens represented in groups J and K were collected, four of the five dorsal color groups are represented. While

TABLE III

VARIATION IN VENTRAL BARRING IN *Bubo virginianus* IN MIDDLE AMERICA

<i>Very finely barred, almost vermiculated. General effect almost white</i>		<i>Fine, paler barring close together</i>		<i>Blacker, coarser, sparser barring</i>		<i>Very black, wide barring. General effect almost black</i>	
Group	No. specimens	Group	No. specimens	Group	No. specimens	Group	No. specimens
<i>pallescens</i>							
A	2			B	5		
B	2	B	2	C	5		
		D	2	D	2		
		E	4	E	2		
		F	6	F	2		
				G	4		
		H	4				
				I	2		
		J	10				
				K	11		
				L	7		
		M	13	M	5		
<i>mayensis</i>							
		O	4				
<i>mesembrinus</i>							
				N	2		
				P	1	P	4
				P	4*		

* Bars closer together, not sparser. General effect very dark.

there is a definite tendency to darkness in the owls of the high mountains, and it is coupled with large size in many individuals, recognition of a separate race is not justified by the material we have studied. This incipient ecological race is distinguishable from all other populations of *pallascens* to the extent of about 50% from 100%. Not noted in Table II is a variation within the Central American race *mesembrinus*: the five Honduras specimens (collected 1933-1937) are browner, less purely black and white, than the three comparable specimens (1926-1941) from Chiapas, Guatemala, and El Salvador.

Ventral dark barring varies a great deal, both individually and geographically. It is correlated only to a moderate extent with dorsal color, as comparison of Table III with Table II shows. The extreme of pale, fine barring is found only in Arizona and northwestern Sonora. While black, coarse barring is consistent in the central Mexican high-

TABLE IV
VARIATION IN OCHRACEOUS SUFFUSION OF UNDERPARTS IN *Bubo virginianus* IN MIDDLE AMERICA

<i>Black and white; almost no ochraceous</i>		<i>Intermediate</i>		<i>Strong ochraceous suffusion</i>	
<i>Group</i>	<i>No. specimens</i>	<i>Group</i>	<i>No. specimens</i>	<i>Group</i>	<i>No. specimens</i>
<i>pallascens</i>					
A	2				
B	2	B	5	B	2
		C	5		
		D	3	D	1
E	1	E	5		
F	1	F	6	F	1
		G	4		
H	1	H	2	H	1
		I	2		
J	1	J	8	J	1
		K	11		
		L	5	L	2
		M	17	M	1
<i>mayensis</i>					
		O	4		
<i>mesembrinus</i>					
		N	2		
		P	8	P	1

lands, it is also found in Arizona, northeastern Coahuila, the lowlands of southern Sonora, and in Guerrero.

Ochraceous suffusion of the underparts is a common phase or individual variation in the Great Horned Owl in the United States, and Oberholser (1904) characterized *mesembrinus* on the basis of a single extremely ochraceous specimen. In our study, we found little correlation with geography. However, as shown in Table IV, the extreme black and white phase, with almost no ochraceous tinge on the underparts, is restricted to Arizona, northwestern Sonora, Texas, Tamaulipas, northwestern Coahuila, and central Jalisco.

REVIEW OF THE MIDDLE AMERICAN RACES

Bubo virginianus pallescens Stone

Bubo virginianus pallescens Stone, Amer. Nat., 31: 237, 1897. (Watson Ranch, 18 miles southwest of San Antonio, Texas.)

Subspecific characters: As compared with the other Middle American races, *pallescens* is much more variable. It is longer-winged than *mayensis* and averages slightly longer-winged than *mesembrinus*. As compared with *mayensis*, some specimens and populations are indistinguishable in color, others are darker, and others are paler. As compared with *mesembrinus*, most specimens are paler all over and more finely barred ventrally, but some dark phase specimens from the mountains of central México are distinguished with difficulty. These last have the dark bars of the ventral surface more widely spaced than in *mesembrinus*, and, usually, these dark bars are less blackish.

Range: South Texas, southern New Mexico, southern Arizona, southeastern California, northeastern Baja California, and México south to Guerrero, Morelos, and western Veracruz. This statement is based on specimens we have examined. We have not seen material from western Texas, southern Utah, or southern Nevada, which are included in the range of *pallescens* in the A. O. U. Check-list (1957). A wide variety of temperate and tropical habitats is occupied.

Bubo virginianus mayensis Nelson

Bubo virginianus mayensis Nelson, Proc. Biol. Soc. Wash., 14:170, 1901. (Chichen Itza, Yucatan, Mexico.)

Subspecific characters: This race is distinguished chiefly by small size, as indicated by the short wing. The bill is as long as in other Mexican races, thus being relatively large in proportion to other measurements. It is uniform in color, considerably paler than *mesembrinus* both dorsally and ventrally, and similar to the median of *pallescens* in dorsal darkness and in darkness and coarseness of the ventral barring.

Range: Yucatán Peninsula, in Yucatán, Quintana Roo, and British Honduras. Inhabits tropical arid scrub and coastal scrub.

Bubo virginianus mesembrinus Oberholser

Asio magellanicus mesembrinus Oberholser, Proc. U. S. Nat. Mus., 27:179, 1904. (San Jose, Costa Rica).

Asio magellanicus melancerus Oberholser, Proc. U. S. Nat. Mus., 27:180, 1904. (Tehuantepec City, Oaxaca, Mexico.)

Subspecific characters: Larger and darker than *mayensis*. It averages slightly shorter-winged than *pallascens*, and this distinction is marked when comparison is made with the blacker individuals of that race. As compared with *pallascens*, blacker dorsally and with the ventral dark bars blacker, coarser, broader, and more closely spaced.

Range: Central America from the Isthmus of Tehuantepec to western Panama, exclusive of the Yucatán Peninsula. Occurs in thorn scrub, cloud forest, temperate pine forest, and probably other habitats.

We note that the name *mesembrinus* Oberholser, 1904, has page priority over *melanercus* Oberholser, 1904, if one observes the main descriptions, or line priority if one observes the preceding key. As to a prior reviser, no one seems to have combined *mesembrinus* and *melanercus*, as we have here, without at the same time combining the still-prior *mayensis*, also.

SPECIMENS EXAMINED

B. v. pallascens: Arizona 7 (Tucson 2, Cochise County 2, Santa Cruz County 3); Sonora 7 (El Doctor 2, Magdalena 1, San Diego 1, Tesia 1, Obregon 1, Alamos 1); Chihuahua 6 (Guzman 1, Pacheco 2, Ramos 1, Garcia 1, Arroyo Hondo 1); Texas 3 (Atascosa County 2, Brownsville 1); Tamaulipas 4 (La Carbonera 1, Norias 1, 40 miles south of Matamoros 1, Soto La Marina 1); Nuevo León 4 (Rodriguez 1, Monterey 3); Coahuila 7 (Sierra del Carmen 1, Las Delicias 1, Sabinas 3, Nava 1, Las Margaritas 1); San Luis Potosí 2 (Alvarez 1, San Luis Potosí 1); Durango 2 (35 miles south of El Entronque 1, 30 miles southwest of Durango 1); Zacatecas 2 (Rio Florido 1, Laguna Valderama 1); Nayarit 3 (Ixtlan 1, Amatlan de Cañas 2); Jalisco 13 (Guadalajara 1, La Cañas 1, La Venta del Astillero 4, Rebo El Sapote 1, Sierra del Rosario 1, La Barca 4, Etzatlan 1); Michoacán 4 (Querendaro 1, Zamora 1, Mt. Tancitaro 2); Estado de México 2 (Villa Victoria 1, Mt. Popocatepetl 1); Distrito Federal 1 (Tlalpan); Puebla 1 (Chalchicomula); Veracruz 3 (Orizaba 2, Perote 1); Morelos 1 (Puente de Ixtla); Guerrero 18 (Omiteme 4, Chilpancingo 14).

B. v. mayensis: Yucatán 3 (Chichen Itza 2, one of them the type of *mayensis*, Santa Clara 1); Quintana Roo 1 juv. (Juan Ascension Bay); British Honduras 1 (Manatee District).

B. v. mesembrinus: Oaxaca 2 (Tehuantepec 2, one of them the type of *melanercus*); Chiapas 1 (Nuevo Amatenago); El Salvador 1 (Mt. Cacagatique); Honduras 5 (Caliche La Paz 1, Tegucigalpa 2, La Cueva Archaga 1, Monte Redondo Archaga 1); Guatemala 2 (Anajachel 1, not specified 1).

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