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## NOTES ON MAMMALS OF TAMAULIPAS, MÉXICO

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RECENT reports by Sutton and Pettingill (1942), Eaton and Edwards (1948), Dalquest (1950, 1951), Lowery and Newman (1951), and Baker (1951), to mention a few, have drawn attention to the importance of eastern San Luis Potosí and southern Tamaulipas for an understanding of the zoogeography of México and the southern United States. It is a region of differentiation. Some forms—mainly, if not exclusively, subspecies—are endemic there. From a zoogeographical standpoint it is perhaps more important as a region of transition, where tropical faunas, floras, and climates impinge on and give way to temperate environments. In the semiarid lowlands or in the humid, cloud-bathed belt on the eastern face of the Sierra Madre Oriental, distinctly tropical animals, such as the tepechichi (*Eira*), brocket, ant birds, and boat-billed herons, are found in juxtaposition with numerous temperate species that range into the region from the north. The region is not yet well worked by mammalogists, and collections of any size from the area may provide new information concerning the composition and distributional limits of the faunas. The collections of mammals that are the basis for the following notes extend the known ranges of some species and provide additional records of occurrence of other forms heretofore known from only one or two localities.

The collections are from southern Tamaulipas. Most of the specimens were obtained in the vicinity of Gómez Farías. Some were collected at other localities as far east as Zamorina and San Fernando. The specimens are now in the University of Michigan Museum of Zoology, but most of them comprise part of the private collection of George M. Sutton. A few of the harvest mice—those that I reported earlier (Hooper, 1952)—are the property of Bruce Hayward. The collections are the result of efforts of several people, as follows: W. F. Harrison, B. Hayward, W. B. Heed, R. P. Hurd, W. B. McIntosh, P. S. Martin, C. R. Robins, and G. M. Sutton. For each of these,

except Hayward and McIntosh, who spent only a few days in the state, mammal collecting was largely incidental to other interests. As a result, there are no large series of any species, and undoubtedly some species are not represented at all. The collections indicate that the region warrants detailed study. I am indebted to Sutton and Hayward for the use of their materials and to Martin for information about collecting stations.

The localities represented, together with a few remarks about each, are listed below. Unless otherwise indicated, all mileages are map (airline) distances determined from the millionth maps of the American Geographical Society.

Pano Ayuctle.—Pano Ayuctle, E. W. Storms's ranch, adjoins the Río Sabinas 45 miles south of Victoria and four miles north-northeast of Gómez Farías. It lies at an estimated altitude of 300 feet at the base of the Sierra Madre Oriental. This locality receives more rainfall than any of the other lowland collecting stations. For a map of the area and further information about it, see Eaton and Edwards (1948).

Rancho del Cielo.—This ranch, the property of Frank Harrison, is situated five miles northwest of Gómez Farías at an elevation of approximately 3500 feet on the eastern flanks of the Sierra Madre Oriental. It is frequently swathed in clouds formed by the cooling of warm air that rises from the adjoining lowlands. By retarding evaporation and keeping the area continually moist, this cloud banner exerts a strong influence on the biota. The vegetation there is luxuriant and tropical in aspect, standing in marked contrast to the drier, generally more open vegetation of both lower and higher elevations. Gigantic oaks of several species form the dominant element of the forest. The following species are other principal elements: *Liquidambar styraciflua*, *Clethra marcophylla*, *Magnolia schiedeana*, *Podocarpus Reichei*, *Acer Skutchii*, and species of *Carya* (Sharp *et al*, 1950).

La Joya de Salas.—This village is situated in a valley at an elevation of approximately 5000 feet, 40 miles south-southwest of Victoria and about 15 miles south-southeast of Jaumave. Scrub oak, oak-pine, and humid deciduous forests occur in the area (for details see Robins and Heed, 1951).

El Pachón.—El Pachón lies in tropical deciduous forests five miles northeast of Antiguo Morelos near Cuesta El Abra in the Sierra Cucharas.

Acuña.—The village of Acuña is about 60 miles southeast of Victoria in the higher parts of the Sierra de Tamaulipas. Specimens were obtained three miles northwest of Acuña in dry, open, pine-oak parkland at elevations of 2500–3300 feet.

Zamorina.—Specimens are from a collecting station 10 miles north-east of Zamorina, or 35 miles north-northeast of Aldamá, at an estimated elevation of 300 feet. This is in tropical deciduous forests on the eastern side of the Sierra San José de las Rusias.

Soto la Marina.—Soto la Marina lies at an estimated altitude of 100 feet, about 60 miles east of Victoria, at the northeastern base of the Sierra de Tamaulipas. The vegetation there consists of mesquite and other thorny shrubs, which give way to cypress gallery forests along the rivers.

Mesa de Llera.—Mesa de Llera consists of flat-topped and rolling, brush-covered foothills north of the Río Guayalejo (Río Tamesi). Collections are from localities near the Pan-American Highway; elevation of Llera grade summit 2200 feet.

Matamoros.—Specimens are from mesquite-cactus lowlands 40 miles south of Matamoros by highway; estimated elevation 400 feet.

San Fernando.—San Fernando lies on the mesquite- and cactus-studded coastal plain halfway between Matamoros and Victoria. Specimens were obtained 11 miles by highway southwest of San Fernando at an estimated elevation of 600 feet.

*Didelphis marsupialis californica* Bennett.—Nine juveniles from Rancho del Cielo. The subspecific name *californica* probably applies to the populations of Tamaulipas (see Hershkovitz, 1951: 550).

*Nasua narica narica* Linnaeus.—A skin from Rancho del Cielo, a skin with skull from 3 mi. NW Acuña, and two skulls only from 10 mi. NE Zamorina. The specimen from Acuña was one of a group of six coatis observed on an open pine- and oak-studded hillside. The specimen from Rancho del Cielo was one of six young which with eight adults were found in dense oak-sweetgum forest.

The use of the subspecific name *narica* instead of *tamaulipensis* (Goldman, 1942: 80) requires comment. The characters ascribed to *tamaulipensis* are well seen in the coatis at hand from Tamaulipas, which are from localities, in addition to those above, as follows: Soto la Marina, 1; Sierra de Tamaulipas, 1; Sierra San Carlos, 3. The Tamaulipan specimens are darker on the average than five specimens of *pallida* from Chihuahua and Arizona. The browns and blackish browns are deeper in tone, both dorsally and ventrally. The dorsal profile of the skull is flatter and the frontal area is less inflated than in *pallida*. That the Tamaulipan populations are subspecifically separable from *pallida* seems reasonably clear. That they differ from *narica* is doubtful.

Heavier dentition and paler color are the two characters that Gold-

man (1942: 80) employed for distinguishing *tamaulipensis* from *narica*. I am unable to appreciate any significant difference in size of teeth or in other cranial parts between the sample from Tamaulipas and a sample of two specimens of *narica* from Cuatotolapam, Veracruz. Moreover, in *Nasua* size of teeth and, especially, color of pelage are known to be reliable racial traits only within broad limits, since each trait varies greatly among individuals from a single locality. This fact is intimated by Goldman and is made quite clear in the more than 50 specimens at hand from various parts of México and Central America. The characters of coloration that are ascribed to *tamaulipensis* and that distinguish it from *narica* are based on three skins. This is an exceedingly small sample for use in estimating racial traits in a species as wide-ranging and individually variable as *N. narica* is known to be. To judge from the information accumulated to date, therefore, it has yet to be demonstrated that *tamaulipensis* is distinct from *narica*.

*Eira barbara senex* Thomas.—An adult male obtained 18 January 1949 at Pano Ayuctle. For use of the name *Eira*, instead of *Tayra* or *Galera*, see Hershkovitz (1949: 295). To my knowledge this is the northernmost record of occurrence of this mustelid.

*Felis concolor stanleyana* Goldman.—A skin and skull of an adult obtained in the vicinity of Zamorina by a native. The specimen is assigned the name *stanleyana*, rather than *azteca*, principally for geographic reasons. The data at hand do not permit recognition of distinctions between those two forms. *Felis c. mayensis*, which might range into Tamaulipas (Goldman, 1946), is ruled out on the basis of coloration and size. The specimen at hand is paler, much less reddish, and smaller than examples of *mayensis* from the Yucatán Peninsula.

*Felis pardalis pardalis* Linnaeus.—Three skulls only from 10 mi. NE Zamorina. These were obtained from a native.

*Sciurus deppei negligens* Nelson.—Nineteen specimens from situations as follows: An oak-sweetgum forest at Rancho del Cielo, 9; a rocky hillside at Pano Ayuctle, 1; oak woods and dry subtropical woods 3 mi. NW Acuña, 2; Mesa de Llera, 1; dense tropical growth 10 mi. NE Zamorina, 6.

The four adult females from Rancho del Cielo contained no embryos, but all apparently had been lactating recently. They were collected in the period March 18–22. The specimens from Rancho del Cielo, Pano Ayuctle, and Mesa de Llera average darker dorsally than those from Zamorina and the Sierra de Tamaulipas. They approach *S. d. deppei* in coloration.

*Sciurus aureogaster aureogaster* F. Cuvier.—Six specimens, one mela-

nistic, from pine-oak woods 3 mi. NW Acuña, 3500 ft., and one melanistic individual from dense shrubby growth northeast of Zamorina near the Gulf of Mexico.

*Sciurus alleni* Nelson.—Two examples from open pine woods at La Joya de Salas.

*Heterogeomys hispidus concavus* Nelson and Goldman.—A young male, skin with broken skull, killed by a native in a cane field at Pano Ayuctle. Lacking comparative material, I have merely followed Baker (1951: 211) in the use of the name *concavus* for the populations of the area. El Carrizo, whence came Baker's specimens, is about 15 miles north of Pano Ayuctle.

*Liomys irroratus texensis* Merriam.—Three specimens from Mesa de Llera, 14 from Pano Ayuctle, and two from a collecting station 3 mi. W Soto la Marina. Few habitat notes are available. Two specimens from Pano Ayuctle were trapped in a fallow field overgrown with dense stands of herbaceous vegetation. The two examples from Soto la Marina were collected among mesquite and shrubs.

As was pointed out earlier (Hooper and Handley, 1948: 20), *texensis* grades into *pretiosus* in southern Tamaulipas, and it becomes largely a matter of opinion to which of the two races some samples should be referred. The examples from Mesa de Llera are "good" *texensis*, evidencing no diagnostic features of *pretiosus*. Those from Pano Ayuctle and Soto la Marina resemble *texensis* in breadth of frontals and in size of interparietal. They, like a sample of seven specimens from the Sierra de Tamaulipas, grade toward *pretiosus* in coloration, breadth of rostrum, and dilation of the nasal bones. All characters considered, these series fit better with *texensis* from the Sierra San Carlos than with *pretiosus* from Pahuatlán, Puebla, and Nautla, Veracruz. The samples suggest that *texensis* grades gradually into *pretiosus*. If those character gradients steepen in the lowlands of Tamaulipas and Veracruz, they must do so south of the Sierra de Tamaulipas.

*Perognathus merriami merriami* Allen.—Four subadults and one adult from the highway shoulders 40 mi. S Matamoros. All were obtained at night by means of flashlight and lantern; four were collected by hand; one was shot.

*Perognathus hispidus hispidus* Baird.—One adult trapped among mesquite trees 3 mi. W Soto la Marina.

*Onychomys leucogaster longipes* Merriam.—One specimen caught in dry mesquite-cactus association 40 mi. S Matamoros.

*Reithrodontomys megalotis saturatus* Allen and Chapman.—Fifteen

examples from a humid oak-sweetgum forest at Rancho del Cielo. Only one of these is new to the series already reported (Hooper, 1952: 58-60). That specimen, obtained by a different collector and at another time, also has cinnamon underparts, a relatively long tail, and small teeth with short mesolophs in  $M^{1,2}$ . This specimen lends further support to the earlier inference (Hooper, 1952: 58-60) that the populations here represented are recognizably different from *saturatus*. If, as it now appears, the populations warrant another subspecific name, should a new name be proposed or is another current one applicable? Those are questions that I could not answer to my satisfaction when I reviewed the genus, and they cannot be satisfactorily answered until an abundance of material from central and northern México, particularly from the Sierra Madre (Oriental and Occidental) and Pinal de Amoles, has been collected and studied.

The material seen to date indicates that in the mountains of central and northern México there is a series of populations characterized by small body size, dark dorsal coloration, cinnamon underparts, and long tail. These features have been observed in samples from southeastern Arizona, from the Sierra Madre Occidental as far south as southern Jalisco, and from the mountains of eastern México south to Querétaro. To those populations the names *arizonensis*, *zacatecae*, *amoles*, and, for those in Nuevo León and Tamaulipas, *saturatus* have been applied. I treated all of these forms as races of *R. megalotis* because their characters merged with those of other races of the species and because distributionally as well as morphologically the array of forms has the aspect of one polytypic species. At the same time I pointed out (Hooper, 1952: 65) that the precise interrelationships of *arizonensis*, *zacatecae*, *amoles*, *saturatus*, and *megalotis* are still not completely clear. In at least one area, two of these occur together and apparently do not interbreed (Hooper, 1952: 44). Other evidence (Hooper, 1952: 55, 58, 63) suggests, however, that all of these forms constitute an intergrading series of geographic races. The populations from southern Tamaulipas belong to this small, red-bellied group. They appear to be morphologically distinguishable from *saturatus* and *megalotis*. They may or may not be distinguishable from *zacatecae* or *amoles*. The range of variation and the geographic limits of those two forms must be better known before this point can be satisfactorily settled.

*Reithrodontomys fulvescens tropicalis* Davis.—Seven specimens from Pano Ayuctle. Four of these were trapped in dense herbaceous cover in a fallow field.

*Reithrodontomys mexicanus mexicanus* de Saussure.—One specimen

from undergrowth at the edge of an oak-sweetgum forest at Rancho del Cielo.

*Baiomys taylori taylori* Thomas.—Sixteen from Pano Ayuctle and one from Mesa de Llera. Twelve specimens from Pano Ayuctle were trapped in a cultivated field which was overgrown with herbaceous vegetation.

*Peromyscus leucopus texanus* Woodhouse.—Twenty-two specimens from Pano Ayuctle, one from cactus-mesquite scrub on the Matamoros-Victoria highway, and two from dense tropical growth 10 mi. NE Zamorina. Four specimens from Pano Ayuctle were trapped in a weed-covered, fallow field.

All of these are referable to *texanus*. The specimens from Pano Ayuctle average slightly darker dorsally than those from the other two localities. The Pano Ayuctle series is no darker, however, than one from General Terán or than another from the Sierra San Carlos. All of these slight color differences appear to be well within the range of variation of *texanus*. If *mesomelas* or *incensus* (if *incensus* is a tenable form) ranges into Tamaulipas, evidence of it is not seen in the series at hand. Before me are 156 skins, in addition to those listed above, representing localities from north to south as follows: Brownsville, Texas; General Terán, Sierra San Carlos, Jaumave, Tula, Sierra de Tamaulipas, and Antiguo Morelos, Tamaulipas; El Salto, Pujal, and Tamazunchale, San Luis Potosí; Pahuatlán and Huauchinango, Puebla; and Nautla, Veracruz. The specimens from El Salto and Pujal can justifiably be referred to *mesomelas* or *incensus*, but only in the samples from Tamazunchale and thence southward are the characters of those races well developed. None of the Tamaulipan samples is referable to *mesomelas* or *incensus*.

*Peromyscus boylei levipes* Merriam.—Twenty specimens from an oak-sweetgum forest at Rancho del Cielo and five from open pine-oak forests 3 mi NW Acuña. The specimens were collected in late March and early April. One of four adult females evidenced breeding activity; it contained two embryos, each 3 mm. long.

The examples from Rancho del Cielo resemble specimens of *levipes* from Hidalgo and Puebla. They average slightly larger and distinctly more somber dorsally than nine specimens from the Sierra de Tamaulipas or than seven specimens from the Sierra San Carlos. In view of the broad span of individual variation that is known for *levipes*, it is doubtful whether these differences are racial characteristics.

*Peromyscus ochraventer* Baker.—Seven examples from Rancho del Cielo. Two were trapped on deep leaf litter in an oak-sweetgum forest.

No embryos were found in the two adult females, obtained in April and May.

Rancho del Cielo apparently constitutes the second locality of occurrence of *P. ochraventer*, the first being the type locality, which lies about 15 miles to the north of Rancho del Cielo. Most of the characters ascribed to *ochraventer* by its authority (Baker, 1951: 213) are seen in the specimens at hand. I fail to appreciate any unique features of the rostrum of *ochraventer*, however, in contrast to *boylei*, *banderanus*, or *mexicanus*.

*Oryzomys couesi aquaticus* Allen.—A juvenile male from Pano Ayuctle. It is referred to *aquaticus* for distributional reasons only.

*Oryzomys melanotis rostratus* Merriam.—Three males from Pano Ayuctle. One was trapped in a sugar cane field, another at the edge of dense, brushy growth. Two are old; the third is of medium age.

Like specimens at hand from Pujal and El Salto, San Luis Potosí, these three examples are paler dorsally and are slightly larger than examples of *rostratus* from Presidio (southeast of Córdoba), Veracruz. Topotypes of *rostratus* are not at hand for comparison.

*Oryzomys melanotis* and *O. rostratus* apparently are conspecific. As pointed out by Goldman (1918), they occur in similar ecological situations, they complement one another geographically, and they are similar morphologically. The two are distinguishable in a number of characters (Goldman, 1918: 49), most of which pertain to the skull. These are average differences; they do not identify all individuals. They are best appreciated in contrasting *melanotis* with *rostratus* from northern México. The distinctions between *melanotis* and *rostratus* from southern México are trivial, the sort often observed between races of one species. Evidence that the two forms interbreed is still lacking, but so, too, are specimens from areas where interbreeding might be expected. The two forms do intergrade by individual variation, and other evidence suggests that they are conspecific. The specimens on which these observations are based are from areas as follows: Southwestern Tamaulipas, 3; eastern San Luis Potosí, 2; southern Veracruz, 4; northern Quintana Roo, 7; western Guerrero, 2; and southern Jalisco, 22.

*Oryzomys alfaroi huastecae* Dalquest.—Three specimens from Rancho del Cielo. Two were trapped in a clearing, planted to fruit trees, in an oak-sweetgum forest. The third was caught in the forest proper.

In both subadult and adult pelages these specimens average paler dorsally than do eight specimens of *O. a. dilutior* from Huauchinango, Puebla, and Zacualtipán, Hidalgo. It is on the basis of paler coloration

that they are referred to *huastecae*. I fail to see the distinctions in size of body and skull that are accredited to *dilutior* and *huastecae* (Dalquest, 1951: 363). This record of occurrence is the northernmost known for the species *Oryzomys alfaroi*. Platanito, the type locality of *huastecae* and the northern limit as heretofore known, lies about 45 miles south-southwest of Rancho del Cielo.

*Oryzomys fulvescens engraciae* Osgood.—Five specimens from Pano Ayuctle. Three were trapped in a weed-covered, fallow field.

*Sigmodon hispidus*.—Specimens are as follows: Pano Ayuctle, 15; Rancho del Cielo, 4; Mesa de Llera, 5. The examples from Rancho del Cielo are adult females, collected April 6; none contained embryos. The only other adult female about which breeding condition is known contained two embryos, each 8 mm. long; it was taken April 8.

Two races appear to be represented here. I see no significant differences between the specimens from the humid mountains at Rancho del Cielo and those from the drier lowlands at Pano Ayuctle. The individuals in both of these samples are small and dark; they agree closely with specimens of *S. h. toltecus* de Saussure from Veracruz and Puebla. Those from Mesa de Llera are distinctly paler dorsally, resembling specimens of *S. h. berlandieri* Baird from New Mexico and western Texas. A review of the specimens at hand from Tamaulipas indicates that, in some areas at least, the gradient between *berlandieri* and *toltecus* may be a rather sharp one. The samples at hand, in addition to those listed above, are as follows: Sierra San Carlos, 13; Jaumave, 19; Sierra de Tamaulipas, 9. Those from the Sierra San Carlos, Mesa de Llera, and Jaumave are pale and large; they are referable to *berlandieri*. Those from Pano Ayuctle and Rancho del Cielo, 15 to 20 miles south of Mesa de Llera and Jaumave, are referable to *toltecus*, as are also the examples from the Sierra de Tamaulipas. To judge from the data at hand, the assignment of the name *toltecus* to a specimen from El Barretal (Baker, 1951: 216) should be reviewed.

*Neotoma micropus micropus* Baird.—A male from a collecting station 40 mi. S Matamoros.

*Neotoma angustapalata* Baker.—An adult female and a subadult male, both taken in limestone caves in an oak-sweetgum forest at Rancho del Cielo, and an adult female and her two nursing young, shot May 19 in a limestone cave located near El Pachón. There was no evidence of breeding in the female from Rancho del Cielo; the specimen was obtained May 8.

The two samples do not agree in all details. The observed morphological differences between them are exemplified by the two adult

females, which are of approximately identical age and date of collection. The specimen from El Pachón is predominantly gray dorsally, but the tips of the hairs are toned slightly with cinnamon-buff. The hairs in the right axilla are completely white; those elsewhere on the underparts are plumbeous basally and white or (on the belly) pale buff distally. The feet are white, and the tail is fuscous, scarcely paler ventrally than dorsally. The specimen from Rancho del Cielo is much darker. The upper parts are dark gray, suffused with pinkish cinnamon. The hairs of the underparts are everywhere deep plumbeous basally and, as in the Pachón specimen, with a narrow band of white or buff distally. The feet are white and the tail is blackish dorsally and whitish ventrally. The two specimens are similar in size (basilar length 40.5 and 39.0 mm., tooth row 4.8 and 4.6 mm., respectively), in tail length (79 and 80 per cent of head and body length), in breadth of mesopterygoid fossa (greatest breadth 4.8, 4.6 mm.), and in most other cranial details. In  $M_3$  of the adult from Rancho del Cielo there is an anteroexternal enamel fold. This fold is less well developed in the subadult from the same locality and is absent in the other specimens.

Whether these differences signify population differences or, instead, are variations within a single, morphologically similar breeding population cannot be reasonably estimated from the few specimens at hand. Neither can the problem be solved by recourse to the literature. The woodrats of México are badly in need of systematic review, and the addition of new names, based on highly inadequate material, only confounds an already muddled situation. The specimens fit the description of *N. angustapalata* Baker (1951: 217) reasonably well. They are tentatively known by that name. It should be pointed out that all characters considered, however, the specimens appear to be large, deeply pigmented examples of the species *N. micropus*, notwithstanding the deep anterior fold in  $M^1$ . The presence of that deep fold is far from an absolute character in the *mexicanus* group.

*Sylvilagus floridanus chapmani* Allen.—Three specimens, collected January 8 at localities on the Matamoros-Victoria highway: 40 mi. S Matamoros, 1; 11 mi. SW San Fernando, 2. All are females; two were lactating.

*Pecari tajacu* subsp.—A right ramus and part of the cranium were found in oak-sweetgum forest at Rancho del Cielo.

*Mazama satoriusi satoriusi* de Saussure.—Crania or parts thereof of five individuals from Rancho del Cielo. The brocket is reported to be fairly common and the only deer in the oak-sweetgum forest.

*Dasyops novemcinctus mexicanus* Peters.—An incomplete skeleton found in humid, oak-sweetgum forest at Rancho del Cielo. The occurrence of the armadillo in dense, humid forest may be noteworthy.

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