

# American Museum Novitates

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PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY  
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, N. Y. 10024

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NUMBER 2453

FEBRUARY 26, 1971

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## *Peromyscus allophylus* Osgood: a Synonym of *Peromyscus gymnotis* Thomas (Rodentia, Muridae)

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Mice in the *mexicanus*-group of species in the genus *Peromyscus* occur in tropical and subtropical regions of Mexico and Central America. Emmet T. Hooper, the most recent classifier of species in *Peromyscus*, recorded (1968, p. 59) "That fourteen nominal species are included in this group acknowledges the facts that many of these forms are poorly known and their affinities are unclear. With further study some of them will prove to be geographic races or to rank in synonymy of other species. All are inhabitants of tropical or subtropical environments in Middle America and almost all of them exhibit external and cranial features which seem to be characteristic of tropical species of the genus."

Two scientific names that have been applied to members of the *mexicanus*-group have been especially perplexing to students who have tried to identify and classify members of the group. One is *Peromyscus allophylus*, named and described by Wilfred H. Osgood in 1904. The other is *P. gymnotis*, a taxon proposed by Oldfield Thomas in 1894 and eventually allocated as a subspecies of *P. mexicanus* by Osgood in 1909. The original descriptions of each taxon are similar to each other, both are known only by specimens from extreme southeastern Chiapas and south-

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ern Guatemala, and their identifications and allocations have been unclear since the names were first proposed.

In 1964 I collected specimens of deer mice from southeastern Chiapas that were referable to either *allophylus* or *gymnotis*, and I later studied additional material in an attempt to resolve relationships of the two taxa. In 1969 I studied the holotype of *P. gymnotis* in London and the holotype of *P. allophylus* in Washington, D.C., and was able to demonstrate that the name *allophylus* is a synonym of *gymnotis*. The present report documents that identity.

### ABBREVIATIONS AND METHODS

The specimens discussed herein are in the collections of the American Museum of Natural History (A.M.N.H.), the British Museum (Natural History) (B.M.), the United States National Museum of the Smithsonian Institution (U.S.N.M.), and the University of Michigan Museum of Zoology (U.M.M.Z.).

Unless otherwise stated all external measurements are those of the collectors and were taken from labels attached to study skins. Cranial measurements were taken with Anderson's craniometer (Anderson, 1968) and with dial calipers graduated to tenths of millimeters. The limits of these measurements are explained in Osgood, 1909 and Musser, 1970.

#### ASSOCIATION OF *Peromyscus gymnotis* AND *P. allophylus*

In 1894 (p. 365) Thomas named and described *Peromyscus gymnotis* as a mouse of medium size with dark brown upper parts and dirty buff underparts. Its tail was dark brown everywhere and slightly shorter than the head and body. The ears were sparsely haired and the soles of the hind feet had only a few hairs scattered over their surfaces. The description was based on a young adult male (B.M. No. 86.5.13.4) obtained from "Guatemala" by Bernoulli.

Fifteen years later, Osgood applied the name *gymnotis* as a subspecies of *Peromyscus mexicanus* in his taxonomic revision of the genus *Peromyscus* (1909). Osgood's decision was based on a study of three specimens from Huehuetán, Chiapas. Two of these mice (U.S.N.M. Nos. 77658, 77659) were compared with the holotype of *gymnotis* by Gerrit S. Miller, Jr. in 1905, and in his account of *P. m. gymnotis* Osgood noted that Miller thought the specimens closely resembled the holotype (1909, p. 205). Osgood also examined the holotype after he had written the account for *P. m. gymnotis* and he could only state that "Since the above was written I also have examined this type, but can form no more positive conclusions regarding it than those here stated" (1909, p. 205). At the time of

Osgood's revision, therefore, *P. m. gymnotis* was known only by three specimens from Chiapas and the holotype from Guatemala.

In 1934 Goodwin reported specimens of *P. m. gymnotis* from two localities in Guatemala—Hacienda California and Finca El Cipres. Goodwin had sent specimens from Hacienda California to Edward A. Goldman in Washington, D.C. asking him to compare them with the holotype of *P. allophylus*. Goldman, however, identified the individuals as *P. m. gymnotis* and Goodwin's allocation of the specimens is based on Goldman's identification. Based on the published records of Osgood and those of Goodwin, Hall and Kelson (1959, p. 651) indicated that the geographic range of *P. m. gymnotis* extended from southeastern Chiapas through the lowlands and coastal mountains of southern Guatemala.

From 1959 to 1968 the name *gymnotis* was recognized as a subspecies of *P. mexicanus*, but mammalogists working with the *mexicanus*-group of *Peromyscus* were aware that populations known as *P. m. gymnotis* were the most morphologically distinctive of any subspecies of *P. mexicanus*. In his classification of *Peromyscus* (1968, p. 61), Hooper accurately summarized the status of *P. m. gymnotis* stating that "One moiety inhabits the coastal region of extreme southeastern Mexico and southern Guatemala. The populations are known by the name *P. m. gymnotis*. Since externally and cranially they contrast rather strongly with the more northern populations of *mexicanus*, the possibility that the southern coastal populations may not interbreed with those of *mexicanus* to the north needs to be explored."

In 1969 I examined the holotype of *P. gymnotis* and compared it with three individuals obtained from Hacienda California—an old adult (A.M.N.H. No. 75871), a young adult (A.M.N.H. No. 75875), and a very young adult (A.M.N.H. No. 75878)—that were part of the series identified as *P. m. gymnotis* by Goldman.

The holotype of *P. gymnotis* is preserved in fluid; the cranium and mandibles have been extracted and cleaned. Judged from external and cranial dimensions and wear of teeth it is a young adult and approximately the same age as A.M.N.H. No. 75875. Pelage of upper parts and underparts are blackish brown, probably an alteration of the original color. The tail is dark brown everywhere. I could not detect whether this was the original color or whether the underside was once mottled. Although pelage of the holotype cannot be compared with that of more recently collected specimens, the skull is intact, in good condition, and can be compared with other series. Compared with the three specimens from Hacienda California, the cranium of the holotype is similar in size and configuration to A.M.N.H. No. 75875, the young adult. The holo-

type of *P. gymnotis* and the series of mice from Hacienda California clearly represent the same taxon.

*Peromyscus gymnotis* is only one of two scientific names that have been applied to *mexicanus*-like mice of small size and dark coloration from southeastern Chiapas; the other name is *P. allophylus*.

*Peromyscus allophylus* was named and described by Osgood in 1904 (p. 71). He characterized it as "Size medium (hind foot 25); tail shorter than head and body; ears moderate, scantily haired; coloration dark; tail dusky blackish, unicolor, covered with small imbricate scales, much as in *Oryzomys*; proximal third of soles of hind feet finely haired; skull rather long and narrow; teeth very small." The name and description was based on a female (U.S.N.M. No. 77657) obtained from Huehuetán, Chiapas on February 21, 1896 by E. W. Nelson and Goldman.

The essence of Osgood's description of *P. allophylus* recalled the features described for *P. gymnotis* by Thomas. Osgood was aware of similarities between the two descriptions, but he thought the taxa were still distinct. The precise relationships of *P. allophylus*, however, were unknown to him and he expressed this uncertainty with the statement that "it is difficult to be certain what are the affinities of this peculiar species. But for the size of its ears and shortness of its tail, it might well pass for an *Oryzomys* of the *O. chapmani* group. Its dark, scaly tail immediately suggests *Oryzomys*, and the character and color of its pelage bear out the resemblance. Its skull, however, is that of an ordinary type of *Peromyscus* without any striking characters. It seems probable that its closest relationship is with the *mexicanus* group, though it might easily be a northern member of some Central American group not yet known. It agrees in some respects with the description of *P. gymnotis* Thomas, from Guatemala. Another species from southern Chiapas agrees with this description much more closely, however, and for present purposes has been assumed to be identical with true *gymnotis*."

The relationships of *P. allophylus* have remained obscure to mammalogists from the time the taxon was proposed by Osgood. Furthermore, additional specimens have been reported in the literature only by Hooper (1947, p. 52) and Villa R. (1948, p. 514) and these were all obtained from southeastern Chiapas. In his report of 1947 Hooper indicated that *P. allophylus* was closely related to *P. gymnotis* if not identical with it, although he had not examined the holotype of either taxon. Later, in his classification of *Peromyscus* (1968, p. 60), Hooper summarized present information about affinities of *P. allophylus* by stating that "Knowledge of *allophylus* remains as incomplete as when the form was described by Osgood in

TABLE 1  
EXTERNAL MEASUREMENTS (IN MILLIMETERS) FROM SAMPLES OF  
*Peromyscus gymnotis* and *Peromyscus allophylus*

Taxon, Locality, and Specimen	Sex	Head and Body Length	Tail Length	Hind Foot Length	Ear Length
<i>P. gymnotis</i> , Guatemala					
B.M. No. 86.5.13.4 <sup>a</sup>	M	98	95	23	18
<i>P. gymnotis</i> , Hacienda California, Guatemala					
A.M.N.H. No.					
74164	F	112	113	25	20
74162	M	120	108	25	22
74157	F	110	110	24	20
75871	M	115	110	25	17
75879A	M	109	91	24	20
75879B	F	113	97	25	17
75873	F	115	97	24	18
75872	F	124	96	25	20
74163	M	113	95	22	20
75878	F	110	90	24	16
<i>P. gymnotis</i> , Huixtla, Chiapas					
U.M.M.Z. No.					
117310	F	120	121	26	19
117313	M	118	121	26	20
117315	M	109	117	25	19
117312	M	115	118	27	20
117311	M	111	119	26	18
117309	M	113	110	26	19
117314	M	107	107	24	19
117308	F	107	95	24	17
<i>P. gymnotis</i> , Huehuetán, Chiapas					
U.S.N.M. No.					
77659	F	113	104	25	—
77660	M	119	124	27	—
77658	M	110	110	24	—
<i>P. allophylus</i> , Huehuetán, Chiapas					
U.S.N.M. No. 77657 <sup>b</sup>	F	107	95	25	—

<sup>a</sup> Holotype. Measurements were taken by me from the fluid-preserved specimen.

<sup>b</sup> Holotype.

1904; no new information indicating any relationship of it has been published, to my knowledge.”

The holotype of *P. allophylus* was one of five specimens of *Peromyscus* collected near Huehuetán by Nelson and Goldman. The other four (U.S.N.M. Nos. 77658–77660 and 77699) were obtained on February 23, 29, and March 2. Osgood identified three of these as *P. m. gymnotis*, and the fourth, represented by only a skull, can also be identified as *gymnotis*. I compared the holotype of *P. allophylus* and the specimens from Huehuetán that Osgood allocated to *P. m. gymnotis* with the three individuals from Hacienda California that I had taken to London and compared with the holotype of *P. gymnotis*.

Osgood accurately described the holotype of *P. allophylus*. The specimen differs from the other four mice collected at Huehuetán in being slightly smaller, darker, and having a monocolored tail. The other specimens are larger, their pelages are brighter, and the undersurfaces of each tail is mottled on its basal half; the distal half of each tail is monocolored like the tail of the holotype.

The holotype of *P. allophylus* and the four specimens of *P. m. gymnotis* from Huehuetán form a graded series in which the observed morphological differences between the individuals is a reflection of individual and age variation (tables 1 and 2). The oldest of the five specimens, U.S.N.M. Nos. 77659 and 77699, are old adults. Cusps of their teeth are worn down almost to the roots. Number 77659 is in bright, adult pelage; the other specimen is represented only by cranium and mandibles. Next in age is U.S.N.M. No. 77660. It is an adult in worn, dark, and discolored pelage. All teeth are worn but the patterns of the cusps are not obliterated. The fourth specimen originally allocated to *P. m. gymnotis*, U.S.N.M. No. 77658, is the next in age. Its teeth are moderately worn and the pelage is dark and discolored. The holotype of *P. allophylus* is next in age; judged by wear of teeth and dimensions of skin and skull, it is the youngest of the five specimens.

The variation seen in the series from Huehuetán is of the same kind and degree as that seen in larger series of *P. gymnotis* at hand, namely those from Hacienda California, Guatemala and a series obtained from near Huixtla, Chiapas. In tables 1 and 2 external and cranial measurements of these two series are compared with measurements from the holotypes of *P. gymnotis* and *P. allophylus* and the series from Huehuetán. The specimens from Hacienda California are listed according to age as approximated by condition of pelage, size of skin and skull, and wear of teeth. The oldest individual is A.M.N.H. No. 74164, an old adult; the youngest is A.M.N.H. No. 75878, which is either a young adult or a

TABLE 2  
CRANIAL MEASUREMENTS (IN MILLIMETERS) FROM SAMPLES OF *Peromyscus gymnotis* AND *Peromyscus atlophytus*

Taxon, Locality, Specimen	Zygomatic	Breadth		Skull (Greatest Length)	Nasals	Rostrum	Diasterna	Length		Palatal Bridge	M <sup>1-3</sup> (Alveolar)
		Interorbital	Braincase					Palatal	Postpalatal		
<i>P. gymnotis</i> , Guatemala B.M. No. 86.5.13.4	15.3	4.8	12.9	30.1	11.7	10.2	7.6	13.7	—	4.3	4.4
<i>P. gymnotis</i> , Hacienda California, Guatemala A.M.N.H. No.	—	5.0	—	—	12.3	10.6	7.8	12.6	—	4.8	4.3
74162	14.6	4.9	12.2	31.8	12.6	11.3	8.6	13.0	11.0	4.6	4.3
74157	—	4.7	12.8	30.5	12.1	10.4	7.4	11.7	—	4.1	4.4
75871	15.0	4.9	12.2	31.1	12.1	10.9	7.9	12.3	11.0	4.7	4.6
75879A	14.1	4.7	12.2	30.0	12.1	10.3	7.7	11.9	10.6	4.2	4.2
75875	14.5	4.8	12.9	29.8	11.8	10.2	7.6	11.7	10.4	4.2	4.5
75879B	14.7	4.7	12.8	29.3	11.7	9.4	7.5	11.8	9.6	4.7	4.1
75873	15.0	4.7	12.6	29.7	12.0	9.7	7.4	11.9	10.0	4.5	4.4
75872	14.6	4.7	12.4	30.0	12.0	10.5	7.4	11.9	10.0	4.6	4.4
74163	13.3	4.5	12.1	28.5	11.4	10.0	7.3	11.2	—	4.4	3.7
75878	14.0	4.8	12.4	28.5	11.2	9.3	7.0	11.3	9.7	4.5	4.4
<i>P. gymnotis</i> , Huixtla, Chiapas U.M.M.Z. No.	—	5.2	13.4	31.7	13.0	11.5	8.4	14.9	10.8	4.5	4.5
17310	16.1	4.9	13.0	32.3	12.3	11.0	7.9	14.5	11.3	4.6	4.6
17313	15.7	5.2	13.6	32.7	13.0	11.3	8.3	15.2	11.6	4.6	4.8
17315	15.9	4.9	12.8	31.8	12.9	11.2	8.2	14.8	10.9	4.7	4.7
17312	15.6	5.2	13.5	31.5	12.8	11.0	7.7	14.9	10.4	4.5	4.9
17311	15.2	4.9	12.9	31.3	12.3	10.6	8.1	14.8	10.7	5.1	4.5
17309	14.5	4.8	12.9	31.2	12.1	10.6	8.0	14.5	10.6	4.2	4.5
17314	14.8	4.6	12.1	29.3	11.8	9.6	7.3	13.2	10.2	4.4	4.3
14.2	—	—	—	—	—	—	—	—	—	—	—
<i>P. gymnotis</i> , Huehuetán, Chiapas U.S.N.M. No.	—	5.0	13.0	31.3	13.4	10.8	8.4	14.3	10.8	4.3	4.3
77659	15.1	4.6	13.3	31.5	12.7	10.5	7.9	14.4	11.5	4.1	4.6
77699	—	4.8	12.9	30.5	12.6	—	8.0	14.8	10.5	4.7	4.9
77660	15.3	5.1	—	—	11.9	9.9	7.5	13.6	—	4.2	4.4
77658	—	—	—	—	—	—	—	—	—	—	—
<i>P. atlophytus</i> , Huehuetán, Chiapas U.S.N.M. No. 77657	14.5	5.0	13.2	29.8	11.5	9.7	7.8	13.6	10.5	4.1	4.2

subadult. The holotype of *P. allophylus* is most like A.M.N.H. No. 75875 in size but slightly younger as judged by wear of teeth.

The series from Huixtla consists of 13 specimens that were obtained from 13 kilometers north of Huixtla. This locality is about 24 airline kilometers north of Huehuetán, the type locality of *P. allophylus*. Five of the mice are preserved in fluid and were collected by me in July, 1964. The others are skins and skulls and were obtained by David G. Huckaby in August, 1969.

The magnitude of variation in age and dimensions of the series from near Huixtla is similar to that in the series from Huehuetán and Hacienda California. The oldest individual in the series from Huixtla is U.M.M.Z. No. 117310 and the youngest is U.M.M.Z. No. 117308. Color of upper parts ranges from brown in the older specimens to blackish brown in the younger ones. Underparts of all are dark gray. The three youngest specimens—U.M.M.Z. Nos. 117309, 117314, and 117308—may actually be in subadult pelage, but I cannot discriminate between adult and subadult pelages in this or any other series available for study. Length and coloration of tail is variable. The five oldest mice each has a tail longer than head and body; of the three youngest, one has a tail that equals length of head and body, and each of the other two has a tail shorter than head and body. The tail is short, black, and monocolored in U.M.M.Z. No. 117314. Tails of the other seven have mottled undersurfaces, but that mottling varies from extensive to small blotches near the base of the tail. There is no correlation between extent of mottling and age.

The youngest specimen from Huixtla, U.M.M.Z. No. 117308, closely resembles the holotype of *P. allophylus* in external and cranial dimensions and in color of pelage. The only conspicuous difference is the mottling of the tail; the specimen from Huixtla has a mottled undersurface, whereas the holotype is monocolored.

I cannot detect any significant taxonomic differences between external and cranial features of the holotypes of *P. allophylus* and *P. gymnotis* and specimens from Hacienda California, Huehuetán, or those from near Huixtla. The dark upper parts of head and body of the holotype of *P. allophylus* and its short, blackish and monocolored tail are matched by specimens in the other three series. Dark pelage and a tail that is shorter than head and body appear to be characteristics of young adults and probably subadults. In my opinion, *Peromyscus allophylus* Osgood, 1904, is a subjective synonym of *P. gymnotis* Thomas, 1894.

#### SPECIMENS AND HABITAT

Geographic and altitudinal distributions of *P. gymnotis* are incom-



pletely known. Specimens have been obtained only from extreme southeastern Chiapas and southwestern Guatemala and their altitudinal limits range from above 1700 meters (Cerro Ovando) to below 100 meters (Hacienda California). Specimens I studied from Chiapas are from: Cerro Ovando, 11 kilometers north of Escuintla, 1775 meters (U.M.M.Z. No. 79532); Finca Esperanza, 6 kilometers northeast of Escuintla, 150 meters (U.M.M.Z. No. 83322); approximately 13 kilometers (on the road between Huixtla and Motozintla de Mendoza) north of Huixtla, 250 meters (U.M.M.Z. Nos. 113752–113756 and 117308–117315); Huehuetán (U.S.N.M. No. 77657, holotype of *P. allophylus*; U.S.N.M. Nos. 77658–77660, and 77699); Talisman (A.M.N.H. Nos. 176851–176856); Tapachula (A.M.N.H. Nos. 176857, 177998); and 25 kilometers south of Tapachula (A.M.N.H. No. 176858). I have not seen the 16 specimens of "*Peromyscus allophylus*" that Villa R. (1948, p. 514) recorded from Cerro Ovando, Finca Liquidámbar, Finca Prussia, Paval, and 20 kilometers northeast of Mapastepec.

Specimens I examined from Guatemala are from: "Guatemala" (B.M. No. 86.5.13.4), holotype of *P. gymnotis*; *Departamento San Marcos*: Hacienda California (A.M.N.H. Nos. 74157, 74162–74165, 75871–75873, 75875, 75878, 75879A, 75879B); 10 miles west of San Marcos (A.M.N.H. No. 178084). *Departamento Retalhuleu*: Finca Santa Sofia (A.M.N.H. No. 215259). *Departamento Suchitepequez*: Finca El Cipres, 2000 feet (A.M.N.H. No. 68550). *Departamento Solola*: Olas de Moka (A.M.N.H. No. 171491).

Information on habitat of *P. gymnotis* is also scanty. Mice have been taken from cloud forest (Cerro Ovando); from under piles of leaves, brush, and rocks on the floor of coffee groves shaded by tropical rain forest (Finca El Cipres; near Huixtla); and from edges of a pasture where grass was growing next to underbrush (Hacienda California).

## CONCLUSIONS AND SUMMARY

Known information on morphology and habitat of *P. gymnotis* supports Osgood's allocation of that taxon to the *mexicanus*-group of species in *Peromyscus*, but his use of *gymnotis* as a subspecies of *P. mexicanus* is questionable. Osgood really did not present evidence indicating that populations of *gymnotis* were reproductively continuous with those of *P. mexicanus*. His only reference to intergradation between the two forms is in the account of *P. m. saxatilis* where he listed specimens from Chicharras, Chiapas and stated, "(approaching *gymnotis*?)" (1909, p. 204). I have studied large series of *P. mexicanus* from Chiapas and Guatemala, including specimens at the United States National Museum. My studies indicate that populations of *P. gymnotis* are morphologically and ecologically more like those of *P. mexicanus* than any other form now placed in the

*mexicanus*-group of species, but I have not detected morphological intergradation between samples of *P. mexicanus* and *P. gymnotis*. Until the *mexicanus*-group is taxonomically revised, *gymnotis* should be considered a species rather than a subspecies of *P. mexicanus*, a taxonomic arrangement that presently best reflects known facts. *Peromyscus allophylus* Osgood is considered to be synonymous with *P. gymnotis* Thomas.

#### ACKNOWLEDGMENTS

Mr. John Edwards Hill of the British Museum (Natural History), London; Dr. Charles O. Handley, Jr. of the United States National Museum, Washington, D.C.; and Dr. Emmet T. Hooper of the University of Michigan Museum of Zoology, generously allowed me to study specimens in collections under their care. Mr. Richard Archbold, of Archbold Expeditions, the American Museum of Natural History, and the Council of the Scientific Staff of that Institution, provided financial support for my studies in Europe and Washington, D.C.

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