

Spermophilus perotensis. By Troy L. Best and Gerardo Ceballos

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Spermophilus perotensis Merriam, 1893

Perote Ground Squirrel

Spermophilus perotensis Merriam, 1893:131. Type locality "Perote, Vera Cruz, Mexico."

CONTEXT AND CONTENT. Order Rodentia, Suborder Sciurognathi, Family Sciuridae, Subfamily Sciurinae, Genus *Spermophilus*, Subgenus *Ictidomys*. The genus *Spermophilus* contains 38 species (Wilson and Reeder, 1993). *S. perotensis* is monotypic (Hall, 1981).

DIAGNOSIS. Congeners that closely approach the range of *S. perotensis* are *S. mexicanus* and *S. variegatus*. Compared with *S. mexicanus* (total length, 280-380 mm), *S. perotensis* (total length, 243-261 mm) is smaller and does not have white spots on the dorsum that are arranged in longitudinal rows. Compared with *S. variegatus* (total length, 430-525 mm), *S. perotensis* is smaller and has hypsodont molars (Hall, 1981).

The Perote ground squirrel (Fig. 1) is similar to *S. spilosoma* (total length, 185-253 mm), but when compared with the geographically closest subspecies of *S. spilosoma*, *S. perotensis* is larger, the tail is shorter, the coloration is more yellowish (less pinkish), the dorsal spots are buffy rather than white, and are smaller and less conspicuous (often nearly obsolete), the underparts are buffy instead of white, and the head is marked with blackish. The skull (Fig. 2) of *S. perotensis* is similar to that of *S. s. spilosoma*, but larger, with relatively narrower and higher braincase. The auditory bullae of *S. perotensis* are broader and flatter, and the molariform teeth are heavier than in *S. spilosoma* (Hall, 1981; Howell, 1938).

GENERAL CHARACTERS. The upperparts of the Perote ground squirrel are grizzled yellowish-brown, vermiculated posteriorly by irregularly interrupted lines of black, which in immature individuals and probably also in new pelage in adults, form the posterior borders of indistinct buffy spots. The eyelids are white, and the underparts and the feet are buffy. Dorsally, the tail is grizzled yellowish-brown and black, the black predominating on the distal one-half. Ventrally, the tail is ochraceous buff with a distinct subapical band of black encircling the distal 25-33% (Merriam, 1893). The braincase is high and narrow (Hall, 1981).

There is little variation among individuals of *S. perotensis*, except in the degree of visibility of the obsolescent spots and the tint of the upperparts. This difference results from the wearing off of the tips of the hairs (Merriam, 1893). Means and ranges of external and cranial measurements (in mm; $n = 11$) are: total length, 250 (243-261); length of tail, 71 (57-78); length of hind foot, 39



FIG. 1. *Spermophilus perotensis* near Perote, Veracruz, Mexico. Photograph by G. Ceballos.

(38-40); greatest length of cranium, 43.5 (42.2-44.5); palatilar length, 20.6 (20.0-21.5); zygomatic breadth, 26.4 (25.2-27.3); cranial breadth, 19.5 (19.1-20.0); interorbital breadth, 9.3 (8.8-9.8); postorbital constriction, 14.0 (13.3-14.7); length of nasals, 15.5 (14.5-16.5); length of maxillary toothrow, 8.7 (8.3-9.0—Howell, 1938).

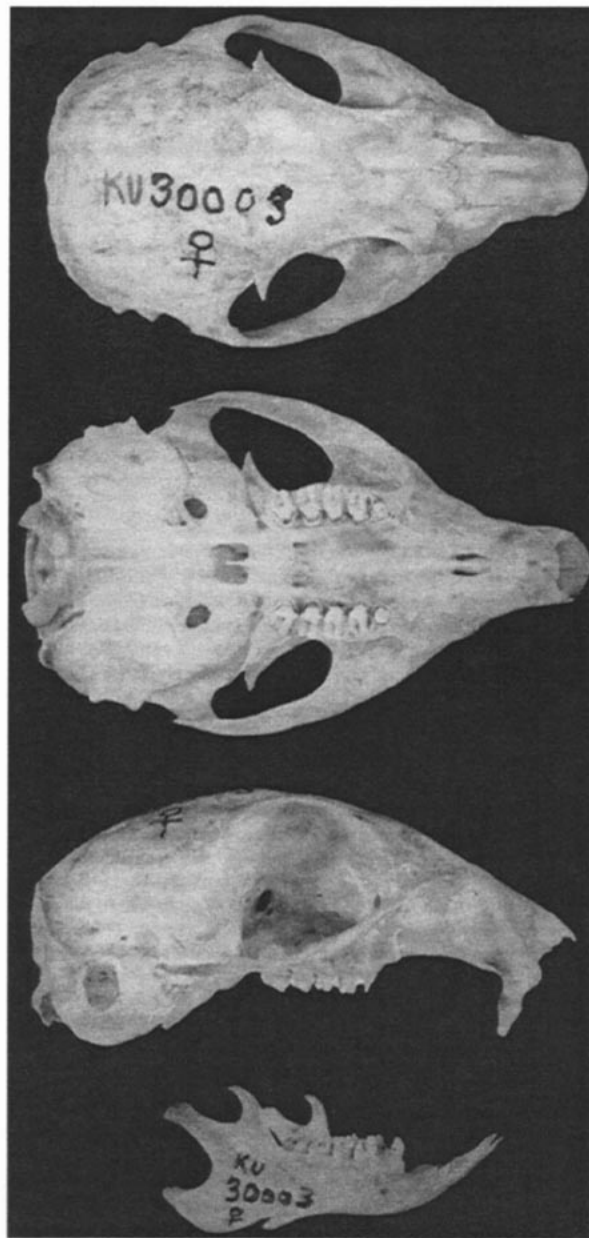


FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of *Spermophilus perotensis* from 2 km W Limon, 2,250 m elevation, Veracruz, Mexico (female, University of Kansas Museum of Natural History 30003). Greatest length of cranium is 41.3 mm.

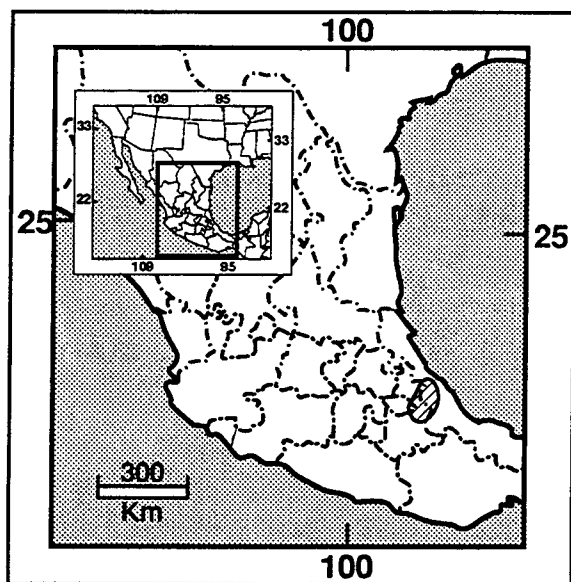


FIG. 3. Distribution of *Spermophilus perotensis* in eastern Mexico (Hall, 1981).

DISTRIBUTION. The Perote ground squirrel is endemic to Mexico, where it occurs on the extreme eastern border of the Mexican Plateau in the vicinity of Perote, Veracruz, at 2,340–2,370 m elev. (Fig. 3). It ranges to a point 16 km S Perote, Veracruz, and eastward to within a few kilometers of Las Vigas, and also occurs near San Salvador and Laguna de las Minas, Puebla. *S. perotensis* occupies the upper Sonoran life zone (Hall, 1981; Merriam, 1893; Miller and Kellogg, 1955).

FOSSIL RECORD. The genus *Spermophilus* evolved by the early Pleistocene (Black, 1972). No fossils of *S. perotensis* are known.

FORM AND FUNCTION. The ears of *S. perotensis* are a mere rim and the tail is short (Merriam, 1893). The Perote ground squirrel is irregularly spotted on a plain background (Howell, 1938). The supraorbital foramina are completely enclosed in the superciliary shelf. The molars are heavy and their crowns are broad antero-posteriorly. The first upper premolar is relatively large (Merriam, 1893). The dental formula of *S. perotensis* is $i\ 1/1, c\ 0/0, p\ 2/1, m\ 3/3$, total 22 (Hall, 1981).

ONTOGENY AND REPRODUCTION. Perote ground squirrels that were about one-third grown were present 30 July, and most adult females in the population were pregnant. On 27 July, one female had seven embryos 19 mm in crown-rump length. On 31 July, another female had six embryos. These data indicate either a late breeding season or two litters each year (Davis, 1944). Mean litter size is four (G. Ceballos, in litt.). Few young were observed, supporting the supposition of a late breeding season. Furthermore, no Perote ground squirrels were exceedingly fat as in related forms to the north (Davis, 1944). On 13 October, an old female that had been nursing young was present near Perote. At this time of year, most individuals were young, and all were fat (Hall and Dalquest, 1963). Some immature individuals are more conspicuously spotted than adults (Howell, 1938).

ECOLOGY AND BEHAVIOR. *Spermophilus perotensis* is endemic within the Trans-Mexican neovolcanic belt (Fa and Morales, 1991; Goldman, 1951), and it lives on the plains around the borders of wheatfields and cornfields (Howell, 1938). The Perote ground squirrel is common in the semi-desert region immediately north and west of the Perote-Orizaba mountains, where it occupies sandy areas, but is not restricted to them (Davis, 1944).

Spermophilus perotensis is active ca. 9 months of the year, from early March to November (G. Ceballos, in litt.). By early October, most Perote ground squirrels have gone into hibernation. On 13 October, two fleas were present on about eight individuals (Hall and Dalquest, 1963). Predators probably include long tailed

weasels (*Mustela frenata*) and domestic dogs (*Canis familiaris*—G. Ceballos, in litt.).

The Perote ground squirrel is a threatened species. Habitat destruction and fragmentation due to encroachment by agriculture is the greatest threat to the survival of *S. perotensis* (Ceballos and Navarro L., 1991; Ceballos and Rodriguez, 1993).

GENETICS. The diploid number of chromosomes is 32 and the fundamental number of chromosomal arms is 58. The X chromosome is large and the Y chromosome is minute. The chromosomes of *S. perotensis* are structurally and numerically identical to those of *S. spilosoma*, which indicates a close relationship between these species (Uribe Alcocer et al., 1979).

REMARKS. *Spermophilus* is derived from the Greek *sperma* and *philos* meaning seed loving (Jaeger, 1955). The specific epithet *perotensis* refers to the type locality of Perote, Veracruz. *S. perotensis* also has been referred to as the Perote spermophile (Elliot, 1905) and in Spanish as moto (Hall and Dalquest, 1963).

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LITERATURE CITED

- BLACK, C. C. 1972. Holarctic evolution and dispersal of squirrels (Rodentia: Sciuridae). *Evolutionary Biology*, 6:305–322.
- CEBALLOS, G., AND D. NAVARRO L. 1991. Diversity and conservation of Mexican mammals. Pp. 167–198, in *Latin American mammalogy: history, biodiversity, and conservation* (M. A. Mares and D. J. Schmidly, eds.). University of Oklahoma Press, Norman, 468 pp.
- CEBALLOS, G., AND P. RODRIGUEZ. 1993. Diversidad y conservación de los mamíferos de México: II. Patrones de endemidad. Pp. 87–108, in *Avances en el estudio de los mamíferos de México* (R. A. Medellín and G. Ceballos, eds.). Asociación Mexicana de Mastozoología, Publicaciones Especiales, 1:1–464.
- DAVIS, W. B. 1944. Notes on Mexican mammals. *Journal of Mammalogy*, 25:370–403.
- ELLIOT, D. G. 1905. A check list of mammals of the North American continent the West Indies and the neighboring seas. *Field Columbian Museum Publication 105, Zoological Series*, 6:1–701.
- FA, J. E., AND L. M. MORALES. 1991. Mammals and protected areas in the Trans-Mexican neovolcanic belt. Pp. 199–226, in *Latin American mammalogy: history, biodiversity, and conservation* (M. A. Mares and D. J. Schmidly, eds.). University of Oklahoma Press, Norman, 468 pp.
- GOLDMAN, E. A. 1951. Biological investigations in México. *Smithsonian Miscellaneous Collections*, 115:1–476.
- HALL, E. R. 1981. *The mammals of North America*. Second ed. John Wiley & Sons, New York, 1:1–600 + 90.
- HALL, E. R., AND W. W. DALQUEST. 1963. *The mammals of Veracruz*. University of Kansas Publications, Museum of Natural History, 14:165–362.
- HOWELL, A. H. 1938. Revision of the North American ground squirrels, with a classification of the North American Sciuridae. *North American Fauna*, 56:1–256.
- JAEGER, E. C. 1955. A source-book of biological names and terms. Third ed. Charles C Thomas Publisher, Springfield, Illinois, 323 pp.
- MERRIAM, C. H. 1893. Descriptions of eight new ground squirrels of the genera *Spermophilus* and *Tamias* from California, Texas, and Mexico. *Proceedings of the Biological Society of Washington*, 8:129–138.
- MILLER, G. S., JR., AND R. KELLOGG. 1955. List of North American Recent mammals. *Bulletin of the United States National Museum*, 205:1–954.
- URIBE-ALCOECER, M., A. AHUMADA-MEDINA, A. LAGUARDA-FIGUERAS, AND F. RODRIGUEZ-ROMERO. 1979. The karyotype of *Spermophilus perotensis*. *Mammalian Chromosomes Newsletter*, 20:139–141.

WILSON, D. E., AND D. M. REEDER (EDS.). 1993. Mammal species of the world: a taxonomic and geographic reference. Second ed. Smithsonian Institution Press, Washington, D.C., 1206 pp.

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