

*Cynomys mexicanus*. By Gerardo Ceballos-G. and Don E. Wilson

Published 13 December 1985 by The American Society of Mammalogists

*Cynomys mexicanus* Merriam, 1892

Mexican Prairie Dog

*Cynomys mexicanus* Merriam, 1892:157. Type locality La Ventura, Coahuila, México.

**CONTEXT AND CONTENT.** Order Rodentia, Suborder Sciuromorpha, Family Sciuridae, Genus *Cynomys*, Subgenus *Cynomys*. *Cynomys mexicanus* is monotypic (Hollister, 1916; Pizzimenti, 1975). Clark et al. (1971) provided a diagnostic key to the five living species of *Cynomys*.

**DIAGNOSIS.** The Mexican prairie dog (Fig. 1) is one of the largest *Cynomys*, only slightly smaller than *C. ludovicianus*. Total length of adults ranges from 385 to 440 mm; females are slightly smaller than males. This species has a relatively long (80 to 115 mm), black-tipped tail, which places it together with *C. ludovicianus* in the nominate subgenus, and which distinguishes both from species of *Leucocrossuromys* (*C. parvidens*, *C. gunnisoni*, and *C. leucurus*). *C. mexicanus* closely resembles *C. ludovicianus* but is slightly smaller, and the black color covers most of the distal half of the longer tail (Hollister, 1916). Hall (1981:412) noted that the Mexican prairie dog skull differs from that of *C. ludovicianus* by: "... auditory bullae more inflated; cheek-teeth triangular; nasals broad and usually posteriorly truncate ..."

**GENERAL CHARACTERS.** The general color of upperparts is pinkish buff, streaked with numerous black hairs, producing a grizzled effect. Individual hairs have four bands of color: proximally black, then white, then reddish, and tipped with yellow. On the venter, the hairs are dark basally and yellow distally. The head has more individual black hairs, as does the tip of the tail. The black hairs extend proximally along the lateral margins of the tail as a dark border. *C. mexicanus* has eight mammae (four pectoral and four inguinal) differing from the three species of *Leucocrossuromys*, which have 10 (Hollister, 1916).

Pizzimenti (1975) provided the following measurements (in mm) of 57 adults (means, with standard deviations in parentheses): total length, 389.5 (24.5); length of tail, 88.7 (10.6); length of hindfoot, 60.4 (2.9); condylobasal length, 58.7 (2.0); least cranial breadth behind zygoma, 24.5 (0.7); external auditory meatus, 4.4 (0.4); zygomatic breadth, 30.3 (1.5); postorbital constriction, 13.5 (0.8); least interorbital breadth, 12.8 (0.8); rostral height, 12.1 (0.6); rostral width, 11.2 (0.6); length of nasals, 22.4 (0.9); width of nasals, 6.2 (0.5); height of foramen magnum, 6.8 (0.6); width of foramen magnum, 8.3 (0.5); lambdoidal depth, 18.3 (1.0); greatest depth of skull, 26.6 (1.0); occipital breadth, 21.9 (0.8).

The skull is broad and angular, with wide zygomatic arches and well-defined processes, superficially similar to those of other *Cynomys* (Fig. 2). The ascending arm of the jugal and the premaxillaries narrowly contact the upper maxillary root of the zygoma. The jugal has a well-developed triangular plate, especially at the lower point. The posterior end of the ramus ascends at an angle of 90° from the horizontal aspect of the mandible. The dental formula is  $i\ 1/1, c\ 0/0, p\ 1/1, m\ 3/3$ , total 20. The upper incisors are bright yellow and have indistinct grooves on the inner half (Hollister, 1916).

A pregnant female weighed 746.2 g (Baker, 1956); average body masses for four laboratory-reared males and two females (Pizzimenti and McClenaghan, 1974), all 4.5 months old, were 1,200 and 910 g, respectively. Males are slightly larger and heavier than females; Pizzimenti (1975) found significant sexual dimorphism in 13 of 18 mensural characters. Young attain adult proportions (size and mass) at approximately 4.5 months. Animals from southern localities are larger than those from northern areas (Pizzimenti, 1975).

**DISTRIBUTION.** *Cynomys mexicanus* is endemic to Méxi-

co. It has a relictual, restricted distribution of less than 800 km<sup>2</sup> in the states of Coahuila, Nuevo León, Zacatecas, and San Luis Potosí (Fig. 3). The most northerly known population is from Saltillo, Coahuila, where Dr. Edward Palmer originally discovered them and wrote (*in* Allen, 1881:185), "Only a single small colony was met with, in a little valley surrounded by mountains, not far from Saltillo, confined to an area of some thirty or forty acres." Baker (1956) suggested that Palmer's locality was likely east-southeast of Saltillo near San Antonio de las Alazanas. Clark P. Streater obtained the type series at La Ventura, Coahuila in March, 1891. In contrast to Palmer, Streater found the animals abundant, and described (*in* Merriam, 1892) the colony as the largest he had ever seen. In July and August 1896, Nelson and Goldman collected 27 additional specimens from the type locality, and Goldman (1951) described the area as an interior basin-like plain known as llano de los perros because of the large number of animals. In July and November 1949, W. K. Clark collected several more specimens from the area, and found them abundant at that time (Baker, 1956).

From there, the range extends east to Providencia, Nuevo León (Jiménez, 1966), and south to the northeastern corner of Zacatecas (Matson, 1979), and to Salado, in the northern part of San Luis Potosí (Dalquest, 1953). The species is confined to valleys, prairies, and intermontane basins from 1,600 to 2,200 m above sea level. These flat areas are covered with herbs and grasses and usually surrounded by mature desert vegetation. Preferred habitats are those with deep, rock-free soils, and such habitats have a patchy distribution. Many areas support colonies of 50 or fewer individuals, but some contain hundreds. The former range has been reduced, mainly because of agriculture and cattle-raising activities; many colonies have been exterminated by poisoning because the animals are considered agricultural pests.

**FOSSIL RECORD.** There are no fossil records of the species. The genus *Cynomys* is unknown before the Pleistocene (Black, 1963). Although several Pleistocene species have been described, none provides a direct link to *C. mexicanus* (Clark et al. 1971). Mexican prairie dogs may be derived from *C. ludovicianus*, which had a more southern distribution during Wisconsin glaciation (Hoffmann and Jones, 1970). Expansion and contraction of the range of *C. ludovicianus* was responsible for the relict population of *C. mexicanus* (Pizzimenti, 1975). At the present time, the nearest populations of the two species are separated by at least 530 km (Baker, 1956).



FIG. 1. *Cynomys mexicanus* photographed by Alberto González Romero.

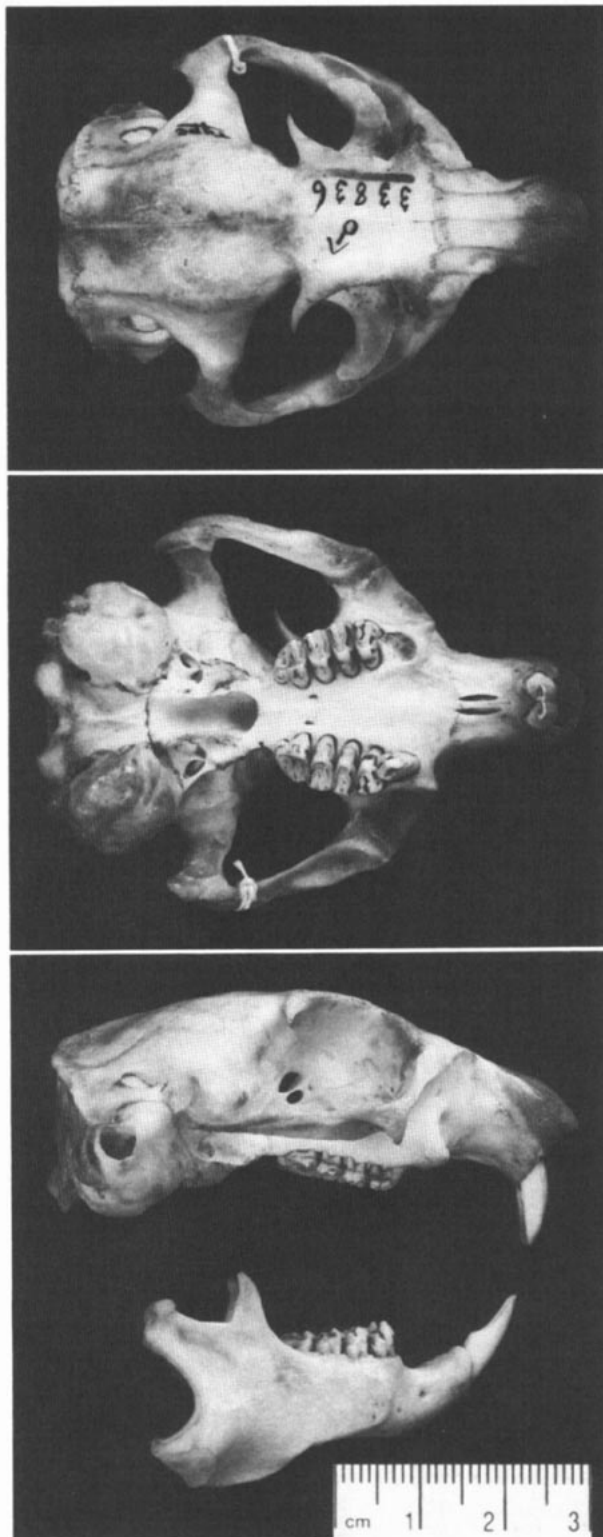


FIG. 2. Dorsal, ventral, and lateral views of the cranium and lateral view of the mandible of the holotype of *Cynomys mexicanus*, a male from La Ventura, Coahuila (USNM 33836).

**FORM AND FUNCTION.** Electrophoretic properties of serum proteins of all *Cynomys* species include invariant (leucine amino peptidase) and variable (transferrin and albumin) types (Pizzimenti, 1975). Using the transferrin terminology of Nadler et al. (1971), *C. mexicanus* is polymorphic for Tf2 and Tf3 alleles, and lacks Tf1. Tf2 is the most common allele in *C. mexicanus*, just as it is in *C. ludovicianus*. *C. mexicanus* has albumin mobilities iden-

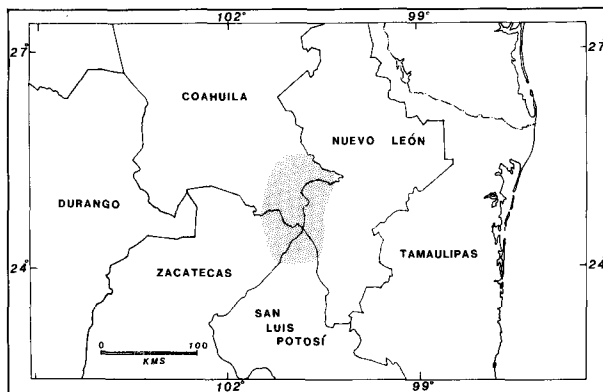


FIG. 3. Geographic distribution (hatched area) of *Cynomys mexicanus*.

tical with *C. ludovicianus* and slightly slower than those species of the subgenus *Leucocrossuromys*. Both *C. mexicana* and *C. ludovicianus* also lack a large alpha-globulin fraction characteristic of the albumin of the white-tailed species (Pizzimenti, 1975).

The baculum of the Mexican prairie dog is long (4.92 mm), slender, narrow at the base and broader, with five to eight teeth, at the distal end. Means and ranges (in parentheses) of measurements (in mm) of bacula of six specimens (Pizzimenti, 1975) are: greatest length, 4.92 (4.78 to 5.15); width of distal end, 1.84 (1.68 to 1.95); width of base, 1.58 (1.42 to 1.73); least width of shaft, 0.55 (0.52 to 0.60); teeth—left side, 3.66 (3 to 5); teeth—right side, 2.50 (2 to 3); teeth—total, 6.16 (5 to 8).

The complex molting pattern has not been described accurately, but there probably are two (possibly three) complete pelage renewals annually (Baker, 1956; Hollister, 1916). Different phases are difficult to separate because they are continuous and overlapping. Spring pelage, characterized by a heavy coat with considerable underfur, is present in specimens collected in March and April. A shorter summer pelage, with much less underfur, is seen in some specimens from June through August. In September, the animals begin to renew the winter pelage and are essentially in fresh winter pelage with heavy underfur by November.

**ONTOGENY AND REPRODUCTION.** Reproduction in all *Cynomys* is annual, parous females bearing a single litter each year (Clark et al., 1971; Pizzimenti and Hoffmann, 1973). The breeding season of *C. mexicanus* seems to be extremely protracted, occurring from late winter to summer. Captive males with enlarged testes contained mature sperm in January, February, and July, but animals with smaller testes contained no recognizable sperm when sacrificed in September (Pizzimenti and McClenaghan, 1974). The length of the gestation period is unknown; however, it may be about 1 month as in other *Cynomys*. The only litter reported, two females and four males, was born in May in captivity (Pizzimenti and McClenaghan, 1974). A pregnant female collected on 25 March had three embryos (Baker, 1956). Average litter size in other *Cynomys* ranges from 4.0 to 5.6 (Clark et al., 1971). The young of *C. mexicanus* are born blind, hairless, and pink. Hair begins to develop after 2 weeks, and the young are completely furred after 3 to 4 weeks. Pigmentation is developed after 12 days. At 4 to 5 weeks, the eyes are open, and the locomotion is entirely quadrupedal. Weaning occurs at 41 to 50 days; by that time the young have a repertoire of vocalizations including alarm and chatter barks.

**ECOLOGY AND BEHAVIOR.** Mexican prairie dogs are social and live in colonies whose size depends on habitat availability. The colonies are well organized, with complex behavioral interactions among individuals. According to Pizzimenti (1975), *C. ludovicianus* has the greatest degree of organization among *Cynomys*, but *C. mexicanus* is probably equally complex behaviorally (Pizzimenti and McClenaghan, 1974). Animals are active from early morning to sunset throughout the year; rainy weather does not seem to affect the activity patterns (Dalquest, 1953). In contrast to other *Cynomys* living at higher latitudes, this species has no period of inactivity or hibernation in the winter, although Dalquest (1953) noted that specimens taken in late September were fat, and suggested that they might be preparing for hibernation.

Prairie dogs live in burrows spaced several meters apart and characteristically marked by mounds of earth of 1 to 2 m in diameter (Baker, 1956; Dalquest, 1953). Soil from the excavations in the burrow is accumulated at the entrance. The mounds often serve as observation posts in the animal's vigilance against predators. Dalquest (1953:90) described the tunnels in the burrow system as "... four or eight inches [10 to 20 cm] in diameter and descend vertically or in a steep spiral for three feet [92 cm] or more before they become horizontal." Several individuals (males and females; young and adults) live together in each burrow. Spotted ground squirrels (*Spermophilus spilosoma*) and burrowing owls (*Speotyto cunicularia*) often share the burrows (Dalquest, 1953).

Predation on *C. mexicanus* has not been recorded; probable predators are badgers (*Taxidea taxus*), coyotes (*Canis latrans*), weasels (*Mustela frenata*), golden eagles (*Aquila chrysaetos*), red-tailed hawks (*Buteo jamaicensis*), and rattlesnakes (*Crotalus* sp.). Young animals are presumably more vulnerable than adults. Individuals flee into their burrows at any signal of danger, remaining inside until the intruder leaves (Dalquest, 1953). Two species of fleas, *Pulex simulans* and *Opisocrostis hirsutus*, have been collected on *C. mexicanus* (Barrera, 1956; Pizzimenti, 1975; Tipton and Mendez, 1968). These fleas may carry *Pasteurella* (= *Yersinia*) *pestis*, the causative agent of plague. Varela and Vasquez (1954) reported populations of Mexican prairie dogs naturally infected with *Pasteurella* in Gomez Farias, Coahuila. Other species of prairie dogs are susceptible to plague, and entire populations can die or be drastically reduced from epidemics (Lechleitner et al., 1962).

**GENETICS.** The diploid number is 50, with 12 pairs of metacentric, 11 pairs of submetacentric, and 1 pair of acrocentric autosomes, for a fundamental number of 74. The X-chromosome is large and submetacentric, and the Y is a small acrocentric. *C. mexicanus* and *C. ludovicianus* have similar karyotypes, but *C. ludovicianus* has a totally biarmed autosomal complement, lacking the single pair of acrocentrics (Pizzimenti, 1975).

**REMARKS.** There have been no comprehensive studies on the ecology of this species, and there is no available information regarding many basic features of its biology. The Mexican prairie dog's range has been reduced by human activities. Even though the present range and population sizes are unknown, the species is considered in danger of extinction, particularly because of its restricted distribution and the increasing pressure of human activities. This species is classified as vulnerable by the International Union for the Conservation of Nature, as endangered by the United States Department of the Interior, and is on Appendix I of the Convention in Trade of Endangered Species (Nowak and Paradiso, 1983).

We thank Drs. Kathleen Fagerstone and Alfred L. Gardner for reading the manuscript.

#### LITERATURE CITED

- ALLEN, J. A. 1881. List of mammals collected by Dr. Edward Palmer in northeastern Mexico, with field notes by the collector. *Bull. Mus. Comp. Zool.*, 8:183-189.
- BAKER, R. H. 1956. Mammals of Coahuila, Mexico. *Univ. Kansas Publ., Mus. Nat. Hist.*, 9:125-335.
- BARRERA, A. 1956. Nota preliminar sobre sifonápteros de *Cynomys* de la zona de enzootia pestosa del sureste de Coahuila, México. *Acta Zool. Mexicana*, 1:1-4.
- BLACK, C. C. 1963. A review of the North American Tertiary Sciuridae. *Bull. Mus. Comp. Zool.*, 130:109-248.
- CLARK, T. W., R. S. HOFFMANN, AND C. F. NADLER. 1971. *Cynomys leucurus*. *Mamm. Species*, 7:1-4.
- DALQUEST, W. W. 1953. Mammals of the Mexican state of San Luis Potosi. *Louisiana State Univ. Studies, Biol. Ser.*, 1:1-229.
- GOLDMAN, E. A. 1951. Biological investigations in Mexico. *Smithsonian Misc. Coll.*, 115:1-476.
- HALL, E. R. 1981. The mammals of North America. Second ed. John Wiley and Sons, New York, 1:1-600 + 90.
- HOFFMANN, R. S., AND J. K. JONES, JR. 1970. Influence of late glacial and postglacial events on the distribution of Recent mammals on the northern Great Plains. Pp. 355-394, in *Pleistocene and Recent environments of the central Great Plains* (W. Dort, Jr. and J. K. Jones, Jr., eds.). *Spec. Publ. Dept. Geol., Univ. Kansas*, 3:1-433.
- HOLLISTER, N. 1916. A systematic account of the prairie-dogs. *N. Amer. Fauna*, 40:1-37.
- JIMENEZ, A. 1966. Mammals of Nuevo Leon, Mexico. Unpubl. M.A. thesis, Univ. Kansas, Lawrence, 247 pp.
- LECHLEITNER, R. R., J. V. TILESTON, AND L. KARTMAN. 1962. Die-off of a Gunnison's prairie dog colony in central Colorado. I. Ecological observations and description of the epizootic. *Zoonoses Res.*, 1:185-199.
- MATSON, J. O. 1979. An analysis of rodent distribution patterns in Zacatecas, Mexico. Unpubl. Ph.D. dissert., Michigan State Univ., East Lansing, 154 pp.
- MERRIAM, C. H. 1892. Description of a new prairie dog (*Cynomys mexicanus*) from Mexico. *Proc. Biol. Soc. Washington*, 7:157-158.
- NADLER, C. F., R. S. HOFFMAN, AND J. J. PIZZIMENTI. 1971. Chromosomes and serum proteins of prairie dogs and a model of *Cynomys* evolution. *J. Mamm.*, 52:545-555.
- NOWAK, R. M., AND J. L. PARADISO. 1983. Walker's mammals of the world. Fourth ed. Johns Hopkins Univ. Press, Baltimore, 1:1-568.
- PIZZIMENTI, J. J. 1975. Evolution of the prairie dog genus *Cynomys*. *Occas. Papers Mus. Nat. Hist., Univ. Kansas*, 39:1-73.
- PIZZIMENTI, J. J., AND R. S. HOFFMANN. 1973. *Cynomys gunnisoni*. *Mamm. Species*, 25:1-4.
- PIZZIMENTI, J. J., AND L. R. MCCLENAGHAN, JR. 1974. Reproduction, growth and development, and behavior in the Mexican prairie dog, *Cynomys mexicanus* (Merriam). *Amer. Midland Nat.*, 92:130-145.
- TIPTON, V. J., AND E. MENDEZ. 1968. New species of fleas (Siphonaptera) from Cerro Potosí, México, with notes on ecology and host-parasite relationships. *Pacific Insects*, 10:177-214.
- VARELA, G., AND A. VASQUEZ. 1954. Hallazgo de la peste selvática en la República Mexicana. Infección natural del *Cynomys mexicanus* (perros llaneros) con *Pasteurella pestis*. *Revista del Instituto de Salubridad y Enfermedades Tropicales*, 14:219-223.

Editors of this account were B. J. VERTS and J. K. JONES, JR. Managing editor was TIMOTHY E. LAWLOR.

GERARDO CEBALLOS-G., DEPARTMENT OF ECOLOGY AND EVOLUTIONARY BIOLOGY, UNIVERSITY OF ARIZONA, TUCSON 85721, AND DON E. WILSON, U.S. FISH AND WILDLIFE SERVICE, NATIONAL MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. 20560.