

Geomys texensis. By Michael J. Cramer and Guy N. Cameron

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***Geomys texensis* Merriam, 1895**

Llano Pocket Gopher

Geomys texensis Merriam, 1895:137. Type locality “Mason, Mason County, Texas.”

Geomys breviceps llanensis Bailey, 1905:129. Type locality “Llano, Texas.”

Geomys lutescens llanensis Davis, 1940:32. Renaming *Geomys breviceps llanensis* Bailey.

Geomys bursarius llanensis Villa-R. and Hall, 1947:234. Renaming *Geomys breviceps llanensis* Bailey.

Geomys breviceps texensis Davis, 1948:488. Renaming *Geomys texensis* Merriam.

Geomys bursarius texensis Baker, 1950:349. Renaming *Geomys breviceps texensis* Davis.

CONTEXT AND CONTENT. Order Rodentia, family Geomyidae, subfamily Geomyiinae. Three subspecies are recognized (Smolen et al. 1993):

G. t. bakeri Smolen, Pitts, and Bickham, 1993:19. Type locality “1 mile E D’Hanis, Medina Co., Texas.”

G. t. llanensis Block and Zimmermann, 1991:29. Type locality “Llano Texas.”

G. t. texensis Merriam, 1895:137, see above.

DIAGNOSIS. *Geomys texensis* (Fig. 1) is a cryptic species with *G. knoxjonesi* and *G. bursarius*. Thus differentiating among species using external characters is difficult (Davis and Schmidly 1994, Smolen and Bickham 1995). However, palatal length is greater in *G. texensis* (22.1 mm; $n = 3$) than in *G. knoxjonesi*, (21.4 mm; $n = 6$); mastoid breadth is narrower (22.1 versus 22.8 mm, respectively); and skull is shallower with palatofrontal depth averaging 13.6 mm for *G. texensis* and 14.9 mm for *G. knoxjonesi* (Honeycutt and Schmidly 1979). Cranial measurements of *G. bursarius* generally are larger than those of *G. texensis* (Smolen et al. 1993). Greatest length of skull, length of rostrum, palatal length, mastoid breadth, palatofrontal depth of *G. bursarius major* are larger than those for *G. texensis* ($n = 3$ —Honeycutt and Schmidly 1979). In addition, condylobasal length, zygomatic breadth, and mastoid breadth of *G. bursarius major* (Baker and Genoways 1975) are larger than for *G. texensis* (Smolen et al. 1993).

GENERAL CHARACTERS. Adult *G. texensis* have a liver-brown dorsum mixed with black-tipped hairs, a white venter, and white feet (Merriam 1895), whereas subadults have a tawny brown pelage (Cameron 1999). Winter pelage is darker overall and hairs on venter are plumbeous at base, but are white throughout in summer (Merriam 1895). Additionally, throat has a fulvous buffy collar that can be interrupted along midline (Merriam 1895). Juveniles have black-tipped hairs concentrated along midline of dorsum, but this color is not found in adults (Merriam 1895).

Skull of *G. texensis* (Fig. 2) is generally small and smooth, with short nasals and jugals (Merriam 1895). In addition, interparietal is broader than long, and ascending branches of premaxilla are long. A sagittal crest is absent, but between the temporal bones is an interspace of ca. 1–3 mm in adults (Merriam 1895). Dental formula is $i\ 1/1, c\ 0/0, p\ 1/1, m\ 3/3$, total 20 (Davis and Schmidly 1994).

Geomys texensis is sexually dimorphic, with males larger than females (Mauk et al. 1999; Smolen et al. 1993). External measurements (in mm; mean \pm SE) of 8 male and 13 female *G. t. texensis* from Mason, Gillespie, and Kimble counties, Texas, were, respectively (Smolen et al. 1993): total length, 246.1 ± 5.03 , 215.5 ± 5.22 ; length of tail, 68.7 ± 2.64 , 60.9 ± 1.45 ; and length of hind

foot, 31.6 ± 0.62 , 28.4 ± 0.60 . Cranial measurements of male and female (in mm; mean \pm SE) *G. t. texensis* from Mason, Gillespie, and Kimble counties, Texas, were, respectively (Smolen et al. 1993): condylobasal length, 42.1 ± 0.59 , 38.7 ± 0.25 , $n = 15$, 19; basal length, 39.6 ± 0.59 , 36.3 ± 0.26 , $n = 15$, 19; palatal length, 27.4 ± 0.38 , 24.9 ± 0.19 , $n = 15$, 19; prefrontal depth, 16.3 ± 0.24 , 15.3 ± 0.13 , $n = 15$, 19; length of nasals, 15.6 ± 0.34 , 13.3 ± 0.16 , $n = 14$, 19; diastema, 14.5 ± 0.25 , 12.9 ± 0.15 , $n = 15$, 19; zygomatic breadth, 26.4 ± 0.40 , 23.7 ± 0.21 , $n = 15$, 19; mastoid breadth, 23.6 ± 0.27 , 21.5 ± 0.16 , $n = 15$, 19; squamosal breadth, 17.9 ± 0.19 , 17.0 ± 0.12 , $n = 15$, 19; rostral breadth, 10.2 ± 0.14 , 9.2 ± 0.09 , $n = 15$, 19; least interorbital constriction, 5.9 ± 0.08 , 5.8 ± 0.06 , $n = 15$, 19; breadth across M3s, 7.7 ± 0.08 , 7.4 ± 0.05 , $n = 15$, 19; and length of maxillary toothrow, 9.1 ± 0.13 , 8.6 ± 0.08 , $n = 15$, 19.

DISTRIBUTION. *Geomys texensis* is limited to central Texas (Fig. 3). *G. t. bakeri* occurs in Medina, Uvalde, and Zavala counties (Smolen et al. 1993); *G. t. llanensis* occurs in Gillespie, Kimble, and Llano counties (Block and Zimmerman 1991; Smolen et al. 1993); *G. t. texensis* occurs in Mason, McCullough, and San Saba counties (Davis and Schmidly 1994; Smolen et al. 1993).

FOSSIL RECORD. Although fossils of *Geomys* have been found in Pleistocene deposits from the Great Plains, few have been identified to species (Russell 1968). *G. bursarius* fossils, perhaps of *G. b. texensis*, have been found in Klein Cave, Kerr County, near the current range of *G. texensis* (Dalquest and Kilpatrick 1973; Roth 1972). Even though the current distribution of this pocket gopher consists of 2 isolated areas, fossil evidence suggests that the range of *G. texensis* extended over the Edwards Plateau to the west of its present distribution (Dalquest and Kilpatrick 1973).

FORM AND FUNCTION. In a comparative study of ear morphology of several geomyid species, *G. texensis* was similar qualitatively to *G. bursarius* (Wilkins et al. 1999).



FIG. 1. Adult *Geomys texensis* near Mason, Mason County, Texas. Used with permission of Jeff and Heather Roberts.

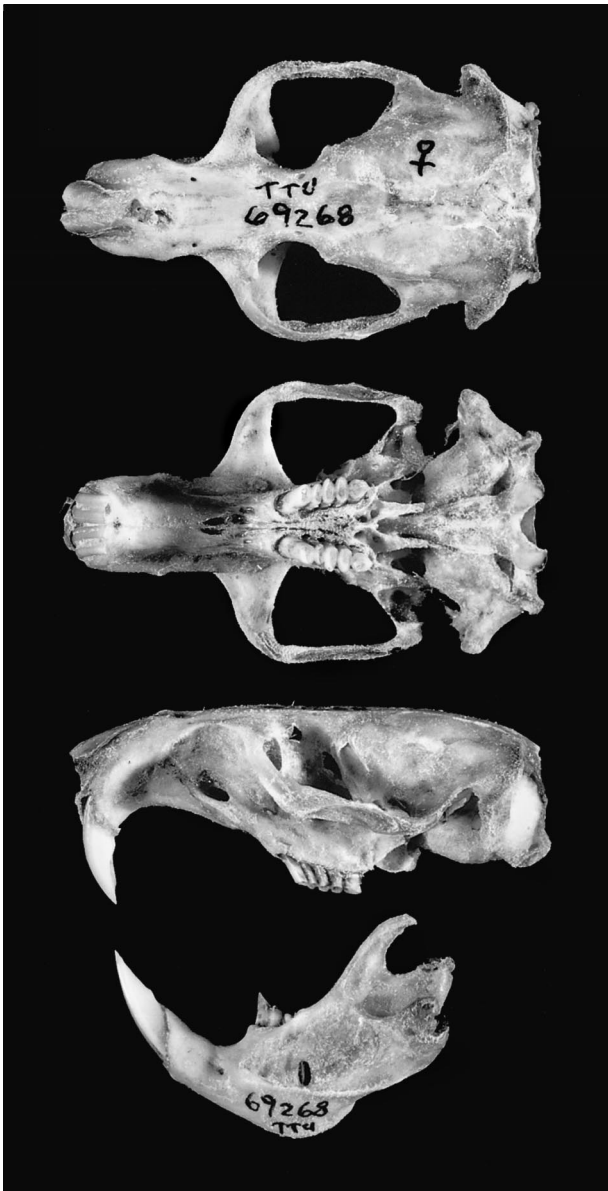


FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of an adult female *Geomys texensis* skull (TTU [The Museum, Texas Tech University] 69268) from 2.5 mi N, 6 mi E Mason, Mason County, Texas. Greatest length of skull is 43.0 mm.

ONTOGENY AND REPRODUCTION. *Geomys texensis* has a single litter per year (Goetze et al. 1996).

ECOLOGY AND BEHAVIOR. *Geomys texensis* is limited to brown loamy sands or gravelly sandy-loam surfaces (Block and Zimmerman 1991) and is solitary (Goetze et al. 1996). Generally, tunnels of different individuals were more than 2–3 m apart, although the tunnels of 2 individuals were found within 5 cm of each other (Welty 1995). All burrow systems contained only a single individual. Burrow systems for 11 individuals contained many chambers, which were classified as food caches, latrines, and nest chambers (Welty 1995). Additionally, paired spiral vertical passageways, ostensibly used to deter predators that enter the burrow system, were located close to nests.

The chewing louse *Geomydoecus heaneyi* occurs only on *G. texensis* (Timm and Price 1980). The coccidian *Eimeria geomydis* was documented in the intestinal tract of *G. texensis* (Upton et al. 1992).

GENETICS. *Geomys texensis* is included in the *lutescens* complex, with *G. knoxjonesi* and *G. bursarius major* (Honeycutt

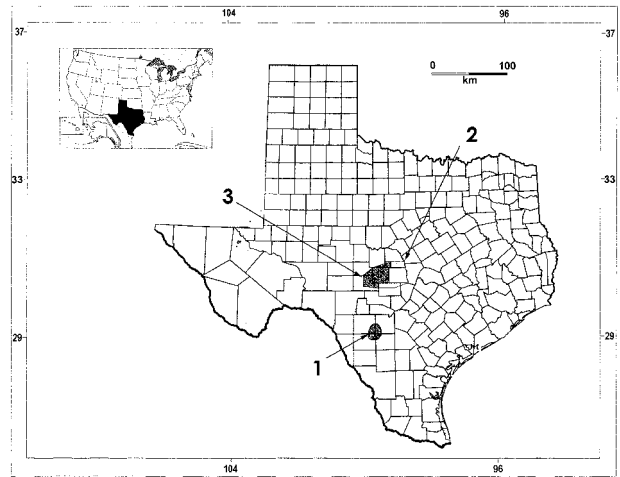


FIG. 3. Distribution of *Geomys texensis*, showing counties where: 1, *G. t. bakeri*; 2, *G. t. llanensis*; and 3, *G. t. texensis* have been collected (Davis and Schmidly 1994; Smolen et al. 1993).

and Schmidly 1979). G- and C-banded chromosomes differ between *G. bursarius* and *G. texensis* (Qumsiyeh et al. 1988). *G. texensis* has 3 bands of chromomycin A_3 on the X chromosome, whereas *G. bursarius* has 1 (Smolen and Bickham 1994). Karyotypes of *G. texensis* and *G. knoxjonesi* are indistinguishable (Baker and Genoways 1975). *G. texensis* has a $2n = 70$, and a $FN = 68$ (Kim 1972), and sex chromosomes are acrocentric (Baker and Genoways 1975). Populations of *G. t. texensis* had a mean heterozygosity of 0.029, for 25 loci, and the proportion of polymorphic loci per population ranged from 12% to 16% (Block and Zimmerman 1991). Polymorphic loci included the following proteins: esterases, alcohol dehydrogenase, lactate dehydrogenase, and isocitrate dehydrogenases (Block and Zimmerman 1991). Populations of *G. t. texensis* were polymorphic at 53% of 19 loci; individuals were heterozygous at 9.6% of loci; and each locus contained an average of 1.74 alleles (Kim 1972).

Morphological data indicate that *G. texensis* is a sister taxon with either *G. bursarius major* (Honeycutt and Schmidly 1979) or *G. knoxjonesi* (Baker and Genoways 1975). Allozyme data corroborate that *G. texensis* is a sister taxon with *G. bursarius major*, but both share a common ancestor with *G. knoxjonesi* (Block and Zimmerman 1991). Sequence data from the alcohol dehydrogenase locus indicate that *G. texensis* is more closely related to *G. atwateri* than to *G. knoxjonesi* or *G. bursarius*, both of which are in a separate clade (Bradley et al. 1998). Sequence data from the mitochondrial 12S rRNA gene indicate that *G. texensis* is a sister group with *G. bursarius* and *G. lutescens* (Jolley et al. 2000). The divergence estimate of *G. texensis* from *G. pinetis* based on DNA sequence of the 12S rRNA gene is 0.04–0.06 million years, and that of *G. texensis* from *Cratogeomys* is 0.52–0.96 million years (Jolley et al. 2000).

REMARKS. The generic name *Geomys* was derived from the Greek *geo* meaning “earth,” and *mys* meaning “mouse” (Baker and Williams 1974). The specific name, *texensis*, is derived from the state of Texas, where this species was first described.

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