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Sigmodon alleni.

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Sigmodon alleni Bailey, 1902

Brown Cotton Rat

Sigmodon alleni Bailey, 1902:112. Type locality San Sebastian, Mascota, Jalisco.
Sigmodon vulcani Allen, 1906:247. Type locality Volcán de Fuego, 3050 m, Jalisco.
Sigmodon guerrerensis Nelson and Goldman, 1933:196. Type locality Omilteme, 2440 m, Guerrero.
Sigmodon planifrons Nelson and Goldman, 1933:197. Type locality Juquila, 1525 m, Oaxaca.
Sigmodon macdougalli Goodwin, 1955:3. Type locality Santo Tomas Teipan, 2135 m, 12 km S San Bartolo Yautepec, Yautepec, Oaxaca.
Sigmodon macrodon Goodwin, 1955:4. Type locality Cerro San Pedro, 1098 m, 20 km W Mixtequilla, Tehuantepec, Oaxaca.

CONTEXT AND CONTENT. Order Rodentia, Suborder Myomorpha, Family Muridae, Subfamily Cricetinae. The genus *Sigmodon* now includes at least seven species. A key to them is presented in Baker and Shump, 1977. Three subspecies of *Sigmodon alleni* are recognized (Baker, 1969) as follows:

S. a. alleni Bailey, 1902:112, see above.
S. a. vulcani Allen, 1906:247, see above (*guerrerensis* Nelson and Goldman a synonym).
S. a. planifrons Nelson and Goldman, 1933:197, see above (*macdougalli* Goodwin and *macrodon* Goodwin are synonyms).

DIAGNOSIS. A rich, brownish dorsum together with medium size (for captive animals, maximum weights are 180 g for nonpregnant females and 178 g for males; maximum lengths of head and body are 183 mm and 173 mm, respectively) and strongly recurved incisors (opisthodont) distinguish *S. alleni* from other species in the *S. fulviventer* group (that is, *S. fulviventer*, *S. ochrognathus*, and *S. leucotis*). Distinguishing cranial characters are: skull with flattened appearance when viewed laterally; bulge of capsular projections for the upper incisors slight; and paraoccipital processes, when viewed from below, slightly hooked rather than straight or curved (Baker, 1969).

Sigmodon alleni differs from the *S. hispidus* group (*S. hispidus*, *S. arizonae*, and *S. mascotensis*) by possessing small tail scales, 0.50 mm wide rather than 0.75 mm wide; tail heavily haired instead of sparsely haired; incisors usually more strongly recurved (opisthodont); basioccipital short in relation to breadth rather than long; paraoccipital processes, viewed ventrally, slightly hooked instead of generally straight; and palatal pits moderately deep rather than shallow (Baker, 1969; Zimmerman, 1970).

GENERAL CHARACTERS. No sexual dimorphism in size was found in the brown cotton rat (Baker, 1969; Jiménez, 1971, 1972), and the following measurements (in mm, N = 8, from Baker, 1969) include representatives of both sexes of wild-taken adults from northern Jalisco. External measurements are: length of head and body, 145 (139 to 152); hind foot, 30 (27 to 32); height of ear from notch, 21 (20 to 22). Cranial measurements are: condylopremaxillary length, 31.2 (30.3 to 31.9); zygomatic breadth, 18.3 (17.4 to 19.5); least interorbital constriction, 5.1 (4.9 to 5.3); depth of cranium, 9.3 (8.6 to 9.7); length of nasals, 12.6 (12.3 to 13.1); alveolar length of maxillary toothrow, 6.1 (5.9 to 6.4). The skull is shown in Figure 1.

DISTRIBUTION. The brown cotton rat is the most tropical member of the *S. fulviventer* group. It occurs along the Pacific-facing mountains and foothills from southern Sinaloa southeastward to eastern Oaxaca at the Isthmus of Tehuantepec (see figure 2). This species is most commonly found living in

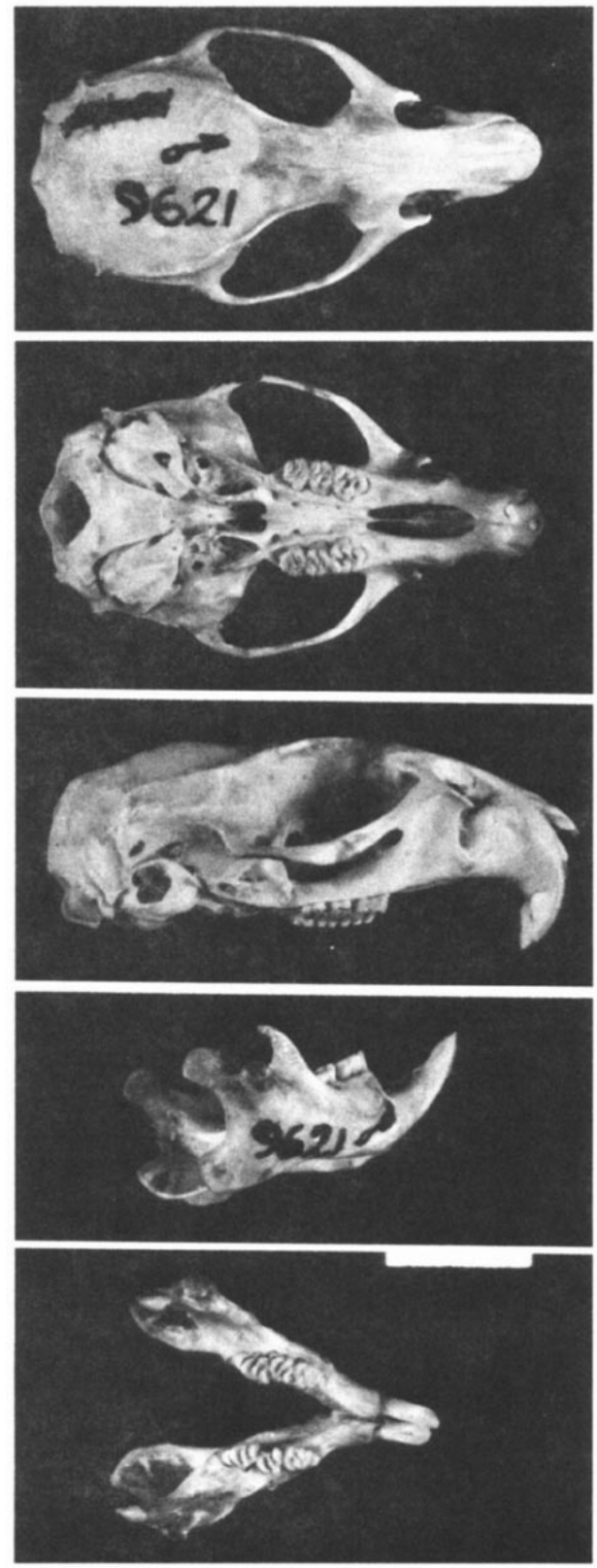

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FIGURE 1. Dorsal, ventral, and lateral views of cranium, and lateral and occlusal views of mandible of *Sigmodon alleni* (MSU 9621, male from 13 km SSW Juchatengo, 1939 m, Oaxaca). Scale represents 10 mm.

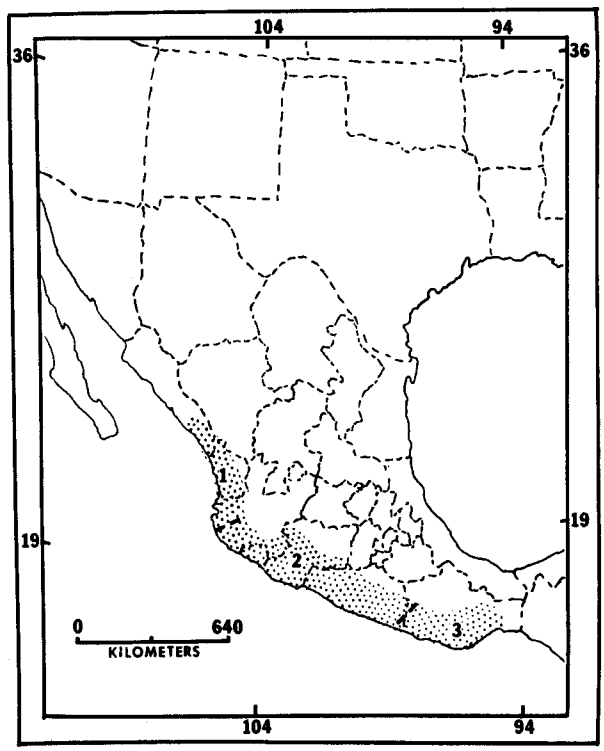

FIGURE 2. Distribution of brown cotton rats: 1, *S. a. alleni*; 2, *S. a. vulcani*; and 3, *S. a. planifrons*.

mixed grass-herb-shrub areas in the Pacific coastal lowlands and extends up to the mesic boreal-tropical ecotone on the Pacific-facing slopes of the Sierra Madre Occidental, the Sierra Madre del Sur, and where these mountain chains join at the western end of the Trans-Mexican Volcanic Belt (Hall and Villa-R., 1949; Hall and Kelson, 1959; Hooper, 1961; Baker and Womochel, 1966; Baker, 1969). *Sigmodon alleni* is recorded from near sea level in Nayarit, Colima, and Oaxaca to as high as 3050 m in Jalisco (Baker, 1969). A fossil record for *S. alleni* is lacking.

FORM. In *Sigmodon alleni*, the pelage consists of three hair types (see Baker and Shump, 1977), excluding vibrissae. The dorsal surface is rich brown; venter white or buffy; feet yellowish brown; and tail black above and brownish beneath (Bailey, 1902; Baker, 1969). The general body shape does not vary much in the genus, being somewhat elongate, with pinnae partially covered by fur, a form that is typical of a grass-eating rodent (Baker, 1971).

FUNCTION. The metabolism of brown cotton rats has been determined for a population from Oaxaca and one from Michoacán (Bowers, 1971). The mean values of oxygen consumption were 1330 and 1620 mm^3 O_2/g/hr, respectively. These two measurements of Mexican populations of *S. alleni* did not differ significantly from each other.

ONTOGENY AND REPRODUCTION. Growth curves for *Sigmodon alleni* are represented in Baker and Shump, 1977. No sexual dimorphism in size was found. In laboratory-raised animals, female *S. alleni* produced offspring at 87 days and would have mated about 35 days earlier (Baker, 1969).

ECOLOGY. *Sigmodon alleni* seems to prefer moist slopes covered with vines and shrubs in tropical or mixed tropical-boreal situations (Baker, 1969), and thereby occupies parts of the Tropical Deciduous Forest and humid Pine-Oak Forest (vegetation zones of Leopold, 1959). Vegetation associated with this species includes: *Rubus, Lupinus, Adiantum, Castilleia, Solanum, Acalypha, Vlaeriana, Geranium, Cerastium, Cyperus, Hedyotis, Bomarea, Arbutus, Hyptis, Pinus, Quercus, Eragrostis limbata, Phytolacca decandra, Zegites mexicana, Toxidendron radicans,* and *Ostrya virginiana* (Hooper, 1961, 1962; Baker and Womochel, 1966; Baker, 1969).

Runways of brown cotton rats are evident in thick grassy areas but indistinct in brushy areas with little ground cover. This species constructs grass nests in a variety of places, including rotten pine logs, beneath volcanic rocks, under piles of bark, and in grass-shrub clumps (Baker, 1969).

Sigmodon alleni has never been reported living in ecological association with *S. fulviventer, S. leucotis,* or *S. ochrognathus*. The ranges of *S. leucotis* and *S. alleni* might meet at the junction of the pine-oak belt and the tropical habitat on the western slopes of the Sierra Madre Occidental in Durango. It is also possible that *S. alleni* and *S. fulviventer* occupy somewhat the same areas near Patzcúaro in Michoacán, where Nelson and Goldman caught a series of the latter in the 1890's and Hall and Villa-R. (1949) took the former species (which they mistakenly identified as *S. melanotis*) as well as *S. hispidus*. In the vicinity of Patzcúaro, *S. alleni* may occupy brushy areas and *S. fulviventer* and *S. hispidus* the grassy parts. However, *S. hispidus* has been captured near Santa Lucia in Sinaloa in a runway under dense vegetation on a moist, tropical hillside near where the brown cotton rat was taken a few years previously (Baker, 1969).

GENETICS. Sex chromosomes are subtelocentric, X, and submetacentric, Y, with sex determination being of the XX/XY type. The diploid chromosomal number of *S. alleni* was found to be 52 with FN of 64 (Zimmerman, 1970). This chromosomal number was based on a sample size of two from one locality in Michoacán.

REMARKS. The precise phylogenetic relationship of *S. alleni* to other members of the genus is still in doubt. Morphological considerations (Baker, 1969) together with serological evidence (Dalby and Lillevik, 1969) show the brown cotton rat to be closely related to *S. fulviventer*. However, a karyology study (Zimmerman, 1970) indicates this species to be most closely related to *S. ochrognathus* and distantly related to *S. fulviventer*.

A laboratory colony maintained in the Division of Living Vertebrates of The Museum at Michigan State University was docile, thrived, but was less productive of offspring in captivity than colonies of *S. fulviventer, S. hispidus,* or *S. mascotensis*.

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