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Peromyscus eva.

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Peromyscus eva Thomas, 1898

Baja California Sur Deer Mouse

Peromyscus eva Thomas, 1898:44. Type locality "San José del Cabo, Baja California."

Peromyscus eremicus propinquus Allen, 1898:154. Type locality "San Pablo point, Baja California."

Peromyscus eremicus carmeni Townsend, 1912:154. Type locality "Carmen island [Isla del Carmen], Gulf of California, Baja California."

CONTEXT AND CONTENT. Order Rodentia, suborder Sciurognathi, family Muridae, subfamily Sigmodontinae, genus *Peromyscus* (Musser and Carleton 1993), subgenus *Haplomylomys*. Two subspecies are recognized currently (Álvarez-Castañeda and Cortés-Calva 1999).

P. e. carmeni Townsend, 1912:154, see above.

P. e. eva Thomas, 1898:44, see above.

DIAGNOSIS. *Peromyscus eva* (Fig. 1) has a gray face and a short pelage with a variable blend of russet, buff, and brown with finely textured appearance (Lawlor 1971). *P. eva* and *P. eremicus* (*P. fraterculus* sensus Hafner et al. 2001) have more or less the same colors, but *P. fraterculus* is noted for a mixture of dark brown or black (Lawlor 1971). Tail of *P. eva* is longer and ears are slightly smaller than those of *P. fraterculus* (= *P. eremicus*—Osgood 1909). In the Isla del Carmen population, *P. eva* is darker and similar to mainland *P. fraterculus*. Compared to *P. fraterculus*, *P. eva* is has larger tail length, greatest length of skull, zygomatic breath, zygomatic notch, naso frontal suture forward of the maxillary-frontal suture, and length and width of toothrows. Bacular morphology differentiates *P. eva* and *P. fraterculus* (Burt 1960 in Lawlor 1971).

GENERAL CHARACTERISTICS. Dorsal surface of *P. eva* is ocherous buff, mixed conspicuously with uniformly distributed fine dusky dorsal lines, except on lower sides. An ocherous buff lateral line, usually distinct only from axillary region to hip, is often wider medially. Head, including nose, cheeks, and orbital region, is pale gray tinged with ocherous buff. A narrow dusky orbital ring extends scarcely beyond eyelids. Ears are pale brown and almost hairless. Ventrum is pure creamy white without pectoral spot. Feet are white (Osgood 1909). Zygoma is generally rounded laterally, and vertebrae number <36 (Fig. 2; Lawlor 1971).

Average measurements with parenthetical *SD* and range for 8 female and 10 male *P. e. carmeni* from Isla del Carmen, México, in the Centro de Investigaciones Biológicas del Noroeste collection are (mm): length of head and body, 185.3 ± 6.2 (175–197); length of tail, 104.5 ± 4.2 (97–113); length of hind foot, 19.3 ± 1.1 (17–21); length of ear, 18.1 ± 1.8 (15–22); greatest length of skull, 24.3 ± 0.6 (22.9–25.1); palatilar length, 11.2 ± 0.3 (10.7–11.7); cranial breadth, 11.6 ± 0.3 (11.1–12.0); interorbital breadth, 4.0 ± 0.1 (3.8–4.4); bullar length, 3.1 ± 0.2 (2.8–3.6); mandibular length, 11.9 ± 0.3 (11.1–12.5); length of maxillary toothrow, 3.6 ± 0.1 (3.3–3.8); length of mandibular toothrow, 3.9 ± 0.2 (3.4–4.2). Mean mass is 15.5 ± 1.5 g (12.7–17.5).

DISTRIBUTION. *Peromyscus eva* occurs on the Baja California Peninsula from the cape region to the border area between the states of Baja California and Baja California Sur (Carleton 1980), including Isla del Carmen (Lawlor et al. 2002). In its southern range, it is not present above 1,800 m in the Sierra de la Laguna (Banks 1967a), nor in the northern part of its range, above 1,200 m in the Sierra de la Giganta (Álvarez 1958). Only 1 specimen was previously recorded, from Isla del Carmen off the coast at Loreto, Baja California Sur (Huey 1964; Lawlor 1983). No fossils are known (Hibbard 1968).

FORM AND FUNCTION. *Peromyscus eva* changes considerably over its geographic range. Specimens in the southern area are smaller than those in the north (Lawlor 1971). Color of dorsum varies from bright, sandy russet in the south to ocherous brown in the north (Lawlor 1971). Dorsal hair of the Isla del Carmen population is gray with ocherous tips, and sides are more ocherous than dorsum.

Average bacula measurements (mm) of 3 specimens from Cabo San Lucas are length 8.1 (7.9–8.3) and width 0.8 (0.8–0.8). One baculum from Isla del Carmen was 8.0 mm long and 0.7 wide (Burt 1960). Dental formula is i 1/1, c 0/0, p 0/0, m 3/3, total 16.

REPRODUCTION. Females of *P. eva* captured near La Paz during February, March, and June were pregnant, and lactation was observed mainly in February, April, and July. Males had scrotal testes mainly from December to May. Breeding was observed in July (Cortés-Calva in litt.).

In May, 1 male *P. e. carmeni* had 5.9-mm testes. In July, 3 pregnant and lactating females were captured. Two embryos measured 7.7 by 5 mm. Number of embryos averaged 3, and size of embryos ranged from 1.5–22 mm (Sánchez et al. 1997). Testes of 2 mainland males in May were 4 and 5 mm, and those of 1 male in June were 5 mm (Sánchez et al. 1997).

ECOLOGY. *Peromyscus eva* was collected in fields of chili, corn, oranges, palms, sugarcane, and tamarind; in areas with secondary vegetation; and in natural arid tropical scrub (Álvarez-Castañeda 1994). It occurred in stony areas and natural habitats containing matorral sarcocaule such as chain fruit cholla/cholla (*Cilindro opuntia*), Adam's tree/palo Adan (*Fouquieria diguetii*), ashy limberbush/lomboy (*Jatropha cinerea*), viejito (*Mammilaria*), cardon (*Pachicereus pringlei*), and organ-pipe cactus/pitaya agria (*Stenocereus gummosus*—Cortés-Calva and Álvarez-Castañeda 1997). The population of *P. eva* near La Paz increases more during the cooler months October to February than other species of rodents, such as *Chaetodipus arenarius*, *C. rudinoris*, *C. spinatus*, and *Dipodomys merriami*. *P. eva* is associated with patches of succulent vegetation (Cortés-Calva, in litt.).

On the slopes of the Sierra de la Laguna, the relative abundances of *P. eva* and *P. truei* are closely related to elevation and vegetation (Banks 1967a; Woloszyn and Woloszyn 1982). *P. eva*

FIG. 1. Subadult male *Peromyscus eva eva* from north of La Paz, Baja California Sur, Mexico. Photograph by Patricia Cortés-Calva.

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of *Peromyscus eva carmeni* (subadult, female, Isla del Carmen, Baja California Sur, Mexico, in the collection of the Centro de Investigaciones Biológicas del Noroeste, number 567). Greatest length of cranium is 24.8 mm. Photograph by A. Gutiérrez.

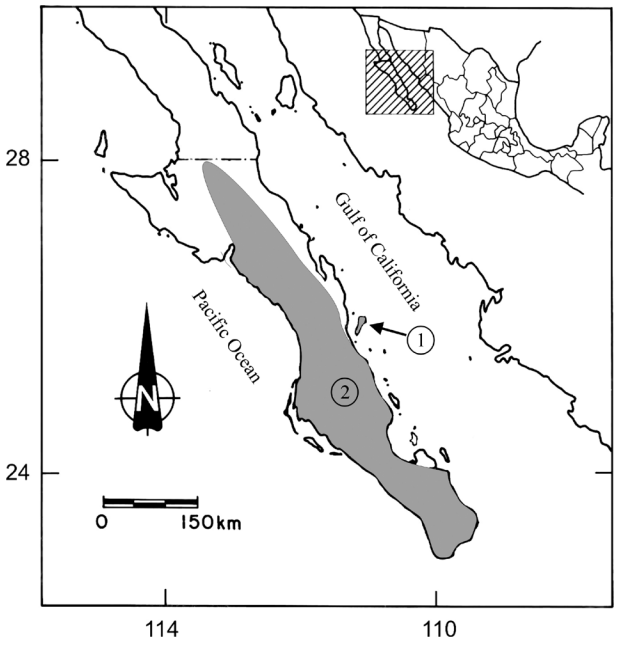

FIG. 3. Distribution of *Peromyscus eva* in Baja California Sur, Mexico (modified from Hafner et al. 2001): 1, *P. e. carmeni*; 2, *P. e. eva*.

and *P. fraterculus* are sympatric in central Baja California Peninsula (Lawlor 1971).

Peromyscus eva carmeni is endemic to Isla del Carmen, 15 km east of Loreto. The closest distance from this island to the peninsula is 6 km (Nieto-Garibay 1999). The island measures 27 by 9 km (151 km^2). A range of altitude 479 m crosses the island. *P. e. carmeni* occupies the stony areas of valleys and slopes (Sánchez et al. 1997). Dominant vegetation includes elephant tree/torote (*Bursera microphylla hindsiana*), desmanthus/frijolillo (*Desmanthus fruticosus*), spurge/liga (*Euphorbia polycarpa*), barrel cactus/viznaga (*Ferocactus diguetii*, var. *carmensis*), Adam's tree/palo Adan (*Fouquieria diguetii*), leatherplant/matacora (*Jatropha cuneata*), ironwood/palo fierro (*Olneya tesota*), chain fruit cholla/cholla (*Opuntia burrageana*), cardon (*Pachicereus pringlei*), Spanish needle/aguja (*Palafoxia leucophylla*), passion flower/granadilla (*Pasiflora palmeri*), slipper plant/candelilla (*Pedilanthus macrocarpus*), honey mesquite/mesquite (*Prosopis glandulosa*), pickleweed/salicornia (*Salicornia subterminalis*), and organ-pipe cactus/pitaya agria (*Stenocereus gummosus*—Moran 1983).

Peromyscus eva hosts the following parasites: Acarina: *Hexidionis macropus* (Loomis and Lucas 1970) and Coccidia: *Eimera arizonensis* and *E. langebarteli* (McAllister et al. 1993).

P. eva is prey to *Lanius ludovicianus* (Álvarez-Castañeda 2002), *Bubo virginianus* (Llinas-Gutiérrez et al. 1991), *Tyto alba* (López-Forment and Urbano 1977), *Canis latrans* (López-Forment et al. 1996), *Urocyon cinereoargenteus* (Arnaud and Acevedo 1990), and snakes (Townsend 1912). Other mammals associated with *P. eva* are *Ammospermophilus leucurus*, *Chaetodipus arenarius*, *C. rudinoris*, *C. spinatus*, *Dipodomys merriami*, *Lepus californicus*, *Neotoma lepida*, *Peromyscus fraterculus*, *P. maniculatus*, *P. truei*, and *Sylvilagus audubonii* (Álvarez-Castañeda 1994; Banks 1967b; Cortés-Calva and Álvarez-Castañeda 1997).

GENETICS. Karyotype of *P. eva* closely resembles that of *P. eremicus*. All chromosomes are biarmed, 2n = 48 (Lawlor 1971). Allozymes of *P. e. carmeni* differ from *P. eremicus* of the Baja California Peninsula (Avise et al. 1974).

CONSERVATION STATUS. *P. eva carmeni* is listed as threatened in the Norma Oficial Mexicana (2001). Factors that threaten *P. e. carmeni* in Isla del Carmen include nonnative species such as cats and goats and human activities like fishing, mining, and tourism (Álvarez-Castañeda and Ortega-Rubio 2003). *P. e. eva* does not have conservation status in Mexico.

REMARKS. *P. eva* was described as a species by Thomas (1898) but was considered a subspecies of *P. eremicus* by Osgood (1909) and Hooper (1968). Burt (1960) used bacular differences to distinguish *P. eva* from *P. eremicus*. Lawlor (1971) mentioned that *P. eva* was derived from an *eremicus*-like ancestor and said that some specimens of the Sierra de la Giganta have features that are combinations of *P. eremicus* and *P. eva*. Molecular techniques suggest a sister-group relationship between *eva* and *eremicus*-like forms on the Baja Peninsula (Riddle et al. 2000). The Latin name *carmeni* derives from the Isla del Carmen.

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