MAMMALIAN SPECIES No. 400, pp. 1–3, 3 figs.

Dipodomys margaritae.

By Troy L. Best

Published 5 June 1992 by The American Society of Mammalogists

Dipodomys margaritae Merriam, 1907

Santa Margarita Island Kangaroo Rat

Dipodomys margaritae Merriam, 1907:76. Type locality "Margarita Island, Lower California."

Dipodomys merriami margaritae: Goldman, 1951:357. Name combination.

CONTEXT AND CONTENT. Order Rodentia, Family Heteromyidae, Subfamily Dipodomyinae. A key to the 22 species of *Dipodomys* is presented in Best (1991). Goldman (1951) and Lidicker (1960) included *D. margaritae* as a subspecies of *D. merriami*, but Huey (1951, 1964), Hall (1981), and Honacki et al. (1982) considered *D. margaritae* as a distinct species. *D. margaritae* is monotypic (Hall, 1981).

DIAGNOSIS. *Dipodomys margaritae* is the only species of kangaroo rat to inhabit Santa Margarita Island, Baja California Sur (Hall, 1981). It differs from *D. insularis*, which is restricted to San José Island on the eastern coast of Baja California Sur (Best and Thomas, 1991), by its much smaller size, more reddish coloration, and by its relatively small ear. The alveolar length and width of supraoccipital, however, are larger in *D. margaritae* (Lidicker, 1960). Compared with *D. insularis* and *D. merriami*, which have a maxillary plate with a rounded posterior border, *D. margaritae* has a maxillary plate that is more or less square (Alvarez, 1960).

Dipodomys margaritae is smaller in overall size than *D. merriami* (Merriam, 1907). Compared with *D. merriami* from the adjacent mainland of Baja California Sur, *D. margaritae* has bullae that are much smaller and less inflated, and the pelage and tail tuft are decidedly paler. The ratio of length of tail to length of body is smaller than that of *D. merriami* on the nearby mainland (Huey, 1951). *D. margaritae* is more similar to populations of *D. merriami* to the south and east of its range than to populations to the north (Lidicker, 1962). There is no evidence of intergradation (Huey, 1951).

Populations of *D. merriami melanurus* on the adjacent mainland of Baja California Sur approach *D. margaritae* in several features, especially lengths of body, hind foot, and tail. This is regarded as a response to similar climatic influences, rather than to occasional contact between these populations. This is thought to be true particularly because populations farther south along the western coast of Baja California Sur also show this tendency and because many features are not intermediate (Lidicker, 1960).

GENERAL CHARACTERS. *Dipodomys margaritae* is small sized for the genus (Best, in press). Its color is pale-pinkish buff, almost ochraceous buff, and moderately lined with dark hairs (Merriam, 1907). Dorsal and ventral tail stripes are broad and medium brown. The plantar stripes are pale, thin, and fully extended to the toes. Facial markings are pale, the supraorbital spots are inconspicuous, and the cheeks are dusky (Lidicker, 1960). Tail crest is small and weak; the under stripe is continuous and the lateral white stripes reach nearly to the tip of the vertebrae. The skull (Fig. 1) is small and light with slender rostrum and nasals. Bullae are small and there is a rather broad frontoparietal shield and intermastoid. The anterior arm of the zygomata is rather squarely spreading but short. Maxillary arch is broad and strongly angled (Merriam, 1907).

The length of hind foot is 42% of the length of head and body, and the tail is 160% of the length of head and body (Hatt, 1932). Mean measurements (in mm) of three adult males and one adult female, respectively, are: total length, 238.7, 247.0; length of body, 91.3, 97.0; length of tail, 147.3, 150.0; length of hind foot, 38.0, 39.0; length of ear, 13.0, —; basal length of cranium, 19.8, 19.6; greatest length of cranium, 35.0, 34.6; maxillary arch spread, 19.4, 19.3; interorbital width, 11.2, 11.0; nasal length, 13.2, 12.9; intermaxillary width, 7.0, 7.0; alveolar length, 4.9, 4.8; lacrimal length, 3.3, 3.2; maxillary arch width, 5.3, 4.9; basioccipital length, 4.6, 4.4; greatest depth of cranium, 11.4, 11.7; greatest width of cranium, 21.9, 21.5; zygomatic width, 17.6, 17.5; nasal width, 3.3, 3.0 (Best, in press).

DISTRIBUTION. *Dipodomys margaritae* occurs only on Santa Margarita Island, Baja California Sur, Mexico (Fig. 2; Hall, 1981).

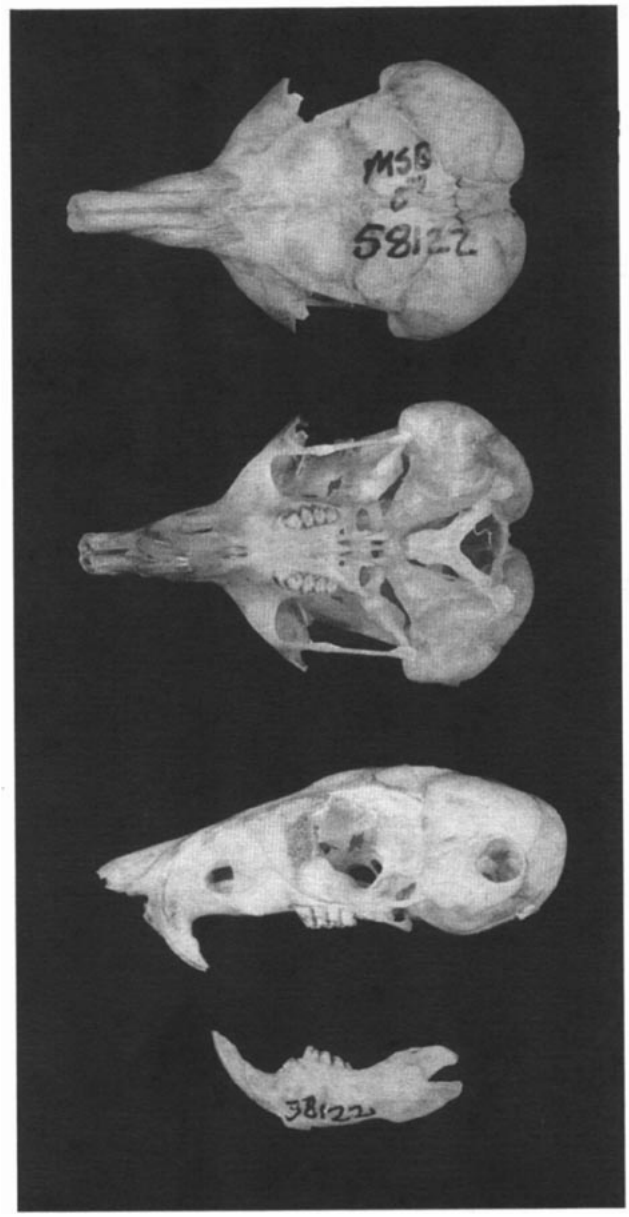

FIG. 1. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of *Dipodomys margaritae* from Santa Margarita Island, Baja California Sur, Mexico (male, University of New Mexico Museum of Southwestern Biology 58122). Greatest length of cranium is 33.7 mm. Photographs by J. H. Dobie and T. L. Best.

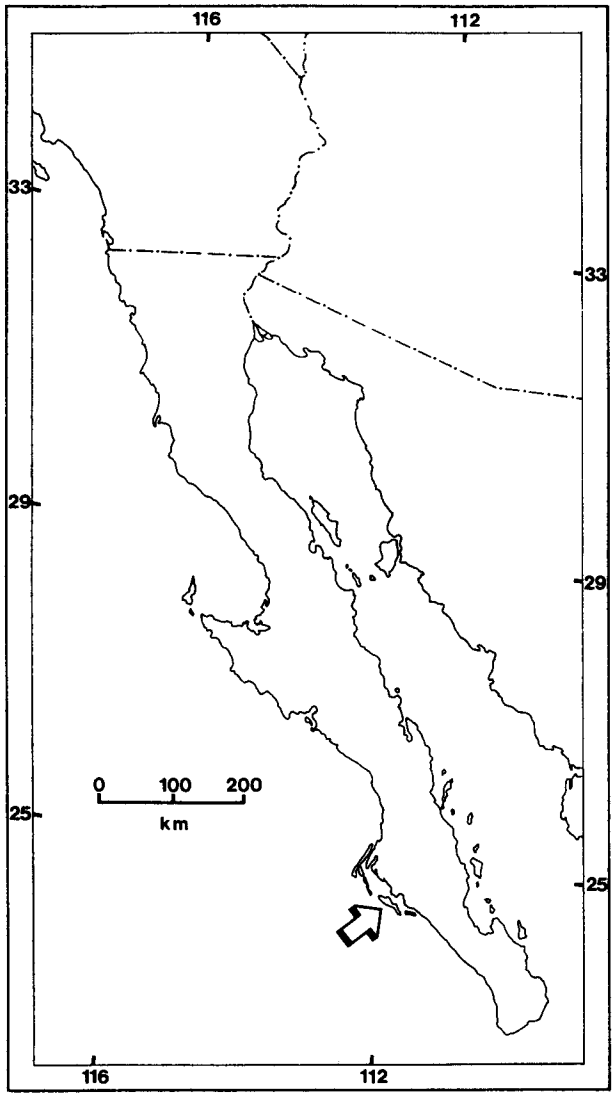

FIG. 2. The distribution of *Dipodomys margaritae* is restricted to Santa Margarita Island (arrow), Baja California Sur, Mexico (Hall, 1981).

FOSSIL RECORD. No fossils are known. Because there is evidence for continued crustal emergence in Baja California Sur at the present time, it is not possible to postulate by using sea-level changes alone as to when this island became inhabited by kangaroo rats. Invasion by kangaroo rats may have taken place during some Pleistocene glacial period when sea levels were relatively low. Since then, higher sea levels presumably have maintained the isolation of Santa Margarita Island, and now crustal emergence is threatening again to bring an end to its separation. If this postulated invasion by kangaroo rats occurred during Wisconsin times, the population has been isolated for 20,000–30,000 years (Lidicker, 1960).

FORM AND FUNCTION. The interparietal is variable. In two specimens, the interparietal was composed of one bone and there were two bones present in a third specimen (Beer, 1965). The baculum of an immature specimen captured in July 1986 was 9.8 mm in length, 1.5 mm in height of base, and 1.0 mm in width of base. Nothing is known about the ontogeny and reproduction of *D. margaritae*.

ECOLOGY. Santa Margarita Island lies southeast of the southern end of Magdalena Island and encloses Magdalena Bay on the south (Nelson, 1922). The depth of Magdalena Bay is well above the 100-fathom contour (Lidicker, 1960). The northwestern end of Santa Margarita Island presents a bold headland facing the southern end of Magdalena Island across a channel ca. 5 km wide, forming the entrance to the bay. From this point, Santa Margarita Island

FIG. 3. Habitat occupied by *Dipodomys margaritae* on Santa Margarita Island, Baja California Sur, Mexico.

extends ca. 40 km southeasterly approximately parallel to the mainland coast and varies from 3 to 8 km in width. The island is mainly mountainous in character, the barren rocky slopes rising to peaks along a crest extending lengthwise of the island and varying from 300 to >540 m in elevation, but separated into two sections. The shoreline is almost entirely rocky and precipitous, except in the middle, where a low pass, ca. 1.5 km broad in its narrowest place and ca. 30 m above the sea, separates the island into two nearly equal islandlike parts. On the northeastern side of the island this pass is ca. 1.5 km wide, but broadens to a low plain extending >8 km along the southwestern side between the mountain ridges and the shore. Through the pass on the seaward or southwestern side the low plain is bordered along the beach by a belt of sand dunes (Nelson, 1922).

Santa Margarita Island generally is barren and desertlike in character with sparse vegetation (Fig. 3). The low area in the middle contains more abundant vegetation. Among the most notable species are giant cactuses (*Pachycereus calvus* and *P. pectenaboriginum*), *Machaerocereus gummosus*, *L. thurberi*, ocotillo (*Fouquieria peninsularis*), *Jatropha canescens*, and *Pedilanthus macrocarpus* (Nelson, 1922).

Dipodomys margaritae apparently is not common on Santa Margarita Island and probably is restricted in its distribution to the lowland area between the northern and southern mountain ranges. One specimen was captured during 80 trap-nights in July 1986 and none were captured during 440 trap-nights in September 1990. During these trapping efforts, ca. 90 *Chaetodipus* (*C. arenarius* and *C. spinatus*) and 5 *Neotoma lepida* were captured. Currently, all of Santa Margarita Island is designated as a military reservation by the Mexican government. Though several hundred navy personnel and fisherman inhabit the east-central coast of the island, the remainder of the island is relatively pristine (T. L. Best, pers. observ.).

Other mammals known from Santa Margarita Island include the black-tailed jackrabbit (*Lepus californicus magdalenae*), little desert pocket mouse (*C. arenarius ammophilus*), spiny pocket mouse (*C. spinatus margaritae*), cactus mouse (*Peromyscus eremicus polypolius*), deer mouse (*P. maniculatus margaritae*), and desert wood rat (*N. lepida pretiosa*). Except for *L. californicus magdalenae*, which also occurs on nearby Magdalena Island, all are endemic (Hall, 1981).

Land birds are the same as those of the mainland, such as caracaras (*Caracara cheriway*), American kestrels (*Falco sparverius*), gilded flickers (*Colaptes chrysoides*), flycatchers (*Myiarchus*), ravens (*Corvus*), rock wrens (*Salpinctes obsoletus*), and cactus wrens (*Campylorhynchus brunneicapillum*). Man-of-war birds (*Fregata magnificens*) and Farallon cormorants (*Phalacrocorax dilophus*) nest on the mangroves about the lagoon on the inner side of the island. California brown pelicans (*Pelecanus occidentalis*) also nest in considerable numbers farther south on the island (Nelson, 1922). Reptiles observed on the island in September 1990 included the desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus draconoides*), desert spiny lizard (*Sceloporus magister*), side-blotched lizard (*Uta stansburiana*), brush lizard (*Urosaurus*), whiptail lizard (*Cnemidophorus*), and rattlesnake (*Crotalus*—T. L. Best, pers. observ.).

No parasites are known (Whitaker, in press). No genetic data are available.

REMARKS. Grinnell (1921) placed *D. margaritae* in the *merriami* group with *D. insularis*, *D. merriami*, and *D. nitratoides*. Subsequent studies to elucidate relationships between *D. margaritae* and other species of *Dipodomys* have used: skeletal and visceral measurements (closest affinities are with *D. elator*, *D. insularis*, *D. merriami*, *D. nitratoides*, and *D. phillipsii*; Setzer, 1949); field experience (*D. insularis*, *D. merriami*, and *D. nitratoides*; Lidicker, 1960); and phenetic analyses of cranial and skeletal characters (*D. insularis*, *D. merriami*, *D. nitratoides*, and *D. phillipsii*; Best, in press).

Dipodomys is from the Greek words *di* (two), *podos* (foot), and *myos* (mouse) that refer to its enlarged hind feet and bipedal mode of locomotion. The name *margaritae* comes from the Greek *margarites* meaning a pearl (Jaeger, 1955) and refers to Santa Margarita Island, Baja California Sur.

G. D. Baumgardner, G. W. Folkerts, C. Guyer, G. R. Hepp, and W. Z. Lidicker, Jr., critically evaluated a draft of the manuscript. This is journal article no. 15-912903P of the Alabama Agricultural Experiment Station.

LITERATURE CITED

ALVAREZ, T. 1960. Sinopsis de las especies Mexicanas del genero Dipodomys. Revista de la Sociedad Mexicana de Historia Natural, 21:391–424.

BEER, J. R. 1965. The interparietal in kangaroo rats. The Southwestern Naturalist, 10:145–150.

BEST, T. L. 1991. Dipodomys nitratoides. Mammalian Species, 381:1–7.

———. In press. Patterns of morphologic and morphometric variation in heteromyid rodents. *In* Biology of the Heteromyidae (H. H. Genoways and J. H. Brown, eds.). Special Publication, The American Society of Mammalogists, 10.

BEST, T. L., AND H. H. THOMAS. 1991. Dipodomys insularis. Mammalian Species, 374:1–3.

GOLDMAN, E. A. 1951. Biological investigations in Mexico. Smithsonian Miscellaneous Collections, 115:1–476.

GRINNELL, J. 1921. Revised list of the species in the genus Dipodomys. Journal of Mammalogy, 2:94–97.

HALL, E. R. 1981. The mammals of North America. Second ed. John Wiley and Sons, New York, 1:1–600 + *90*.

HATT, R. T. 1932. The vertebral columns of ricochetal rodents. Bulletin of the American Museum of Natural History, 63:599–738.

HONACKI, J. H., K. E. KINMAN, AND J. W. KOEPPL (EDS.). 1982. Mammal species of the world: a taxonomic and geographic reference. Allen Press, Inc. and The Association of Systematics Collections, Lawrence, Kansas, 694 pp.

HUEY, L. M. 1951. The kangaroo rats (Dipodomys) of Baja California, Mexico. Transactions of the San Diego Society of Natural History, 11:205–255.

———. 1964. The mammals of Baja California, Mexico. Transactions of the San Diego Society of Natural History, 13:85–165.

JAEGER, E. C. 1955. A source-book of biological names and terms. Charles C Thomas Publisher, Springfield, Illinois, 323 pp.

LIDICKER, W. Z., JR. 1960. An analysis of intraspecific variation in the kangaroo rat Dipodomys merriami. University of California Publications in Zoology, 67:125–218.

———. 1962. The nature of subspecies boundaries in a desert rodent and its implications for subspecies taxonomy. Systematic Zoology, 11:160–171.

MERRIAM, C. H. 1907. Descriptions of ten new kangaroo rats. Proceedings of the Biological Society of Washington, 20:75–79.

NELSON, E. W. 1922. Lower California and its natural resources. National Academy of Sciences, First Memoir, 16:1–194.

SETZER, H. W. 1949. Subspeciation in the kangaroo rat, Dipodomys ordii. University of Kansas Publications, Museum of Natural History, 1:473–573.

WHITAKER, J. O., JR. In press. Parasites of heteromyids. *In* Biology of the Heteromyidae (H. H. Genoways and J. H. Brown, eds.). Special Publication, The American Society of Mammalogists, 10.

Editors of this account were GUY N. CAMERON and KARL F. KOOPMAN. Managing editor was CRAIG S. HOOD.

T. L. BEST, DEPARTMENT OF ZOOLOGY AND WILDLIFE SCIENCE AND ALABAMA AGRICULTURAL EXPERIMENT STATION, 331 FUNCHESS HALL, AUBURN UNIVERSITY, ALABAMA 36849-5414.