MAMMALIAN SPECIES No. 704, pp. 1–3, 3 figs.

Xenomys nelsoni.

By Gerardo Ceballos, Heliot Zarza, and Michael A. Steele

Published 26 December 2002 by the American Society of Mammalogists

Xenomys Merriam, 1892

Xenomys Merriam, 1892:160. Type species *Xenomys nelsoni* Merriam.

CONTEXT AND CONTENT. Order Rodentia, suborder Sciurognathi, family Muridae, subfamily Sigmodontinae (Musser and Carleton 1993). *Xenomys* is monotypic.

Xenomys nelsoni Merriam, 1892

Magdalena Rat

Xenomys nelsoni Merriam, 1892:161. Type locality "Hacienda Magdalena, Colima, Mexico." The village is now called Pueblo Juárez (Schaldach 1960). First use of name combination.

CONTEXT AND CONTENT. Context as above. *X. nelsoni* is monotypic.

DIAGNOSIS. The Magdalena rat (Fig. 1) is distinguished externally from other sympatric rodents primarily by its size and by a white spot over each eye and behind each ear; *Baiomys musculus*, *Oryzomys*, *Osgoodomys banderanus*, *Nyctomys sumichrasti*, and *Reithrodontomys fulvescens* are smaller; *Hodomys alleni* and *Sigmodon mascotensis* are larger; and *Liomys pictus* has cheek pouches (Ceballos and Miranda 2000; Merriam 1892). It is separated from *H. alleni*, its closest relative, by its shorter cranium; very large auditory bullae that are conspicuously inflated, broadest anteriorly, and larger than the molar series; a condyloid process of the mandible that is longer and more slender than the coronoid process; and a very distinctive S-shaped m3 (Merriam 1892).

GENERAL CHARACTERS. *Xenomys nelsoni* is a large sigmodontine. Its dorsal color varies from cinnamon-brown to light yellow-brown and is pale on head and brightest over rump, flanks, and hips. Many hairs have black tips. Underparts are creamy white (Ceballos and Miranda 1986, 2000; Merriam 1892, 1894). Ears are about half as long as head, nearly naked, and sparsely covered with fine, inconspicuous hairs. Upper lips and cheeks are white more than halfway to eyes. Whiskers are blackish, with terminal third grayish and reach back to shoulders. Fur is vellous. Dorsal hair is 80% gray from base to tip with 20% yellow-brown. Tail is conspicuously scaly, haired, monochromatic (dark umber), and shorter than combined length of head and body (Merriam 1892, 1894).

Upper surfaces of feet are white; underparts are darker. Feet have well-developed tubercles on pads (Ceballos and Miranda 2000; Merriam 1892, 1894). Ranges of external and cranial measurements (in mm) of adults of both sexes are (sample size in parentheses): total length, 300–335 (3); length of tail, 143–170 (3); length of hind foot, 30–32 (3); length of ear, 22 (1); greatest length of skull, 40.5–44.6 (5); condylobasal length, 35.3–39.6 (4); zygomatic breadth, 20.2–21.9 (5); length of nasals, 14.1–15.9 (4); length of maxillary toothrow, 8.0–9.0 (5—Ceballos and Miranda 2000; Merriam 1892; Schaldach 1960). Mean weight of 10 adults from Chamela, Jalisco, including males, nonreproductive females, and 1 pregnant female, was 113 g (range, 90–130 g—Ceballos 1989); 1 lactating female weighed 158 g (López-Forment et al. 1971).

Skull is short and interorbital border is narrow (Fig. 2); supraorbital border is markedly developed and beaded; lachrymals are large; paraoccipital processes are long and stout; and angle of mandible is short. Pterygoid fossae are as broad as they are long (Merriam 1892, 1894). Molars are large and heavy; upper molars have 3 roots each, and lower molars have 2 roots each. Molar crowns are prismatic, and enamel pattern of occlusal surface of 3rd lower molar (m3) is S-shaped, rather than having 2 transverse loops (Hall 1981; Merriam 1892, 1894; Schaldach 1960).

DISTRIBUTION. *Xenomys nelsoni* is endemic to the tropical Pacific Coast of western Mexico (Fig. 3). Known from only 3 localities in the lowlands of central Colima (vicinity of Armería and Pueblo Juárez) and Jalisco (vicinity of Chamela Bay), it has one of the most restricted geographic ranges of all Mexican mammals (Ceballos et al. 1998), occupying an area of ca. 4,600 km^2. Documented altitudinal distribution is from sea level to 450 m (Hall 1981). No fossils are known.

FORM AND FUNCTION. Dental formula is i 1/1, c 0/0, p 0/0, m 3/3, total 16 (Ceballos and Miranda 2000). *Xenomys* has a barrel-shaped, truncated phallus covered externally with tiny spines that reach the terminal crater. Bacular bone is capped with cartilage, and length of baculum and cartilage is similar to length of glans. Morphology of glans is slightly similar to that of *H. alleni*. Crater has relatively long dorsal papilla (Hooper 1960). Testicular dimensions of 1 male were 6 by 13 mm (Schaldach 1960).

ONTOGENY AND REPRODUCTION. Reproductive activity occurs late in the dry season and during rainy season from late May through November (Ceballos 1990; Ceballos and Miranda 2000). Pregnant females were captured in August and September (Ceballos 1990), and females with offspring were captured in May and August. Males with scrotal testes were caught in February to May and in September.

Mean litter size was 1.6 (n = 5). At birth, neonates are blind, hairless, pink, and weigh 5 g (n = 2) in the Chamela–Cuixmala Biosphere Reserve, Jalisco (Ceballos 1989). Two young females found in a nest measured 140 and 141 mm in total length and weighed 17.1 and 18.1 g (López-Forment et al. 1971). One female had 2 embryos ca. 4.3 and 4.4 mm in length and another had 1 embryo ca. 2.4 mm in length (Schaldach 1960).

ECOLOGY. *Xenomys nelsoni* has a patchy distribution in tropical deciduous and semideciduous forests characterized by a strong climatic seasonality (Bullock 1986; Ceballos and Miranda 2000; Lott et al. 1987; Schaldach 1960). It occurs in areas with a closed canopy and a high density of trees and woody vines, which are used as arboreal runaways (Ceballos 1990; Schaldach 1960). In the deciduous forest of Colima, *X. nelsoni* was sighted or captured in *Trichilia* cf. *hirta*, and in the thorn forest, it was found in *Annona reticulata*, *Bursera simaruba*, *Castilla elastica*, and *Rhus* (Schaldach 1960). In Colima, it occurred in a mamey (*Calocarpum*

FIG. 1. *Xenomys nelsoni* from Chamela, Jalisco, Mexico. Photograph by G. Ceballos.

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of an adult *Xenomys nelsoni* from Chamela, Jalisco, Mexico (Instituto de Biología, Universidad Nacional Autónoma de México). Greatest length of skull is 43 mm.

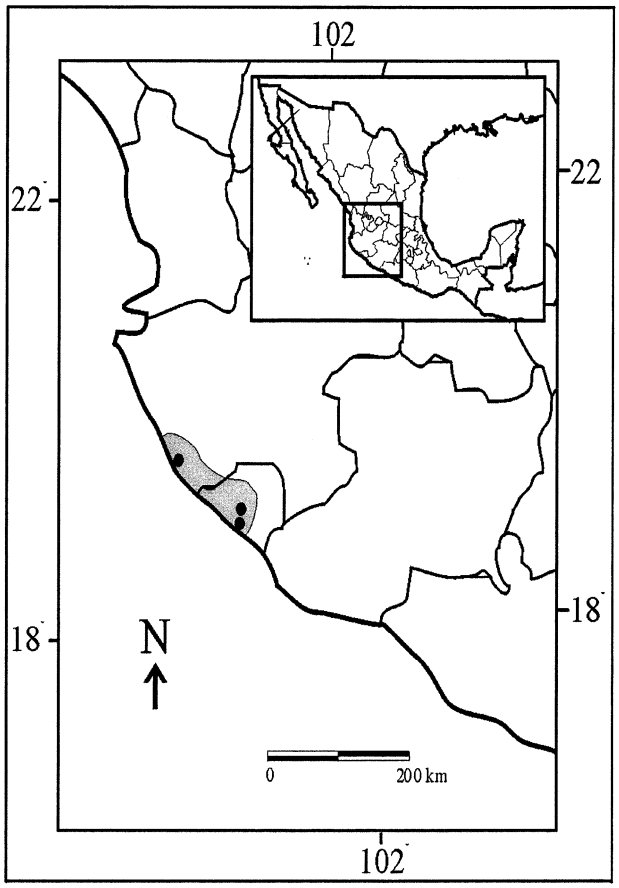

FIG. 3. Geographic distribution of *Xenomys nelsoni* in Mexico. Dark dots indicate the 3 known localities where the species has been recorded.

mammosum) field near the deciduous forest (Schaldach 1960). *X. nelsoni* dwells in hollow trees, and 1 individual was caught in a low, dense wood near a river (E. W. Nelson, vide Merriam 1892).

Stomachs of 11 individuals contained finely ground green plant material (Ceballos 1990; Schaldach 1960), and a young female had a leaf fragment of *Trichilia* in her mouth (Schaldach 1960). Sex ratio of *X. nelsoni* livetrapped in the Chamela–Cuixmala region was 1.5:1 based on 7 individuals (Ceballos 1989). The area of activity for males was larger than that for females; average distance between captures was 38.5 m for males (n = 15) and 19.2 m for females (n = 14—Ceballos 1989). Density of Magdalena rats in the Chamela–Cuixmala region was 0.4–3 individuals/ha in the deciduous and semideciduous forest, respectively (Ceballos 1990). *X. nelsoni* coexists with other small mammal species such as *H. alleni*, *Marmosa canescens*, *N. sumichrasti*, *Oryzomys couesi*, *O. melanotis*, *Osgoodomys banderanus*, *Peromyscus perfulvus*, *R. fulvescens*, and *Sigmodon alleni* (Ceballos 1990; Helm et al. 1974; Schaldach 1960).

BEHAVIOR. The Magdalena rat is arboreal and nocturnal. It is active from 1 to 1.5 h after dusk until midnight (Schaldach 1960). In Chamela–Cuixmala Biosphere Reserve, 65% (n = 22) of captures were in trees and the remainder in traps set on the ground, at ≤40 cm from base of trees (Ceballos 1990). It is common at heights from 1 to 4 m (Helm et al. 1974). Nests (n = 5) occur in tree hollows of *Caesalpinia eriostachys*, *Cordia eleagnoides*, and *Couepia polyandra* (Ceballos 1990). Spherical nests are built with fruit fibers (e.g., *Ceiba pentandra*) and grasses (Ceballos 1990; Schaldach 1960). The Magdalena rat defecates and urinates in latrines, usually found at forks of tree branches or in tree hollows (Ceballos 1990).

GENETICS. The Magdalena rat has 2n = 24 chromosomes. Based on the G-banded karyotype that includes a biarmed chromosome 1, it may share a common ancestry with the *Peromyscus–Onychomys* lineage after diverging from other cricetines (Haiduk et al. 1988).

CONSERVATION BIOLOGY. *Xenomys nelsoni* is classified as endangered because of its restricted geographic range and the high deforestation rates of its primary habitat (Ceballos and Navarro 1991; Ceballos et al. 1998). Western tropical forests are among the most threatened habitats in Mexico. The species is officially considered endangered by the Mexican government (SEMARNAT 2002) and at lower risk by the International Union for the Conservation of Nature and Natural Resources (IUCN 2000). The 2 localities where it has been collected in Colima have been severely disturbed, and it is not known whether the species still exists there. Its habitat along the Jalisco coast is protected and includes 15,000 ha of the Chamela–Cuixmala Biosphere Reserve (Ceballos and Miranda 2000).

REMARKS. The systematics of the genus *Xenomys* are not well known (Musser and Carleton 1993). *Xenomys* and *Neotoma* (*Hodomys*) *alleni* share characters and probably have close affinities (Hooper 1960). *Xenomys* has been included within the neotomine-peromyscine group (Hooper and Musser 1964). However, *Xenomys* is related phylogenetically with the genera *Hodomys*, *Nelsonia*, and *Neotoma* (Carleton 1980). *Xenomys* may share its most recent common ancestor with *Hodomys* because both genera possess characters unique from those of *Neotoma* (Carleton 1980). The name *Xenomys* is derived from the Greek *xenos*, meaning

strange, and *mys,* meaning mouse. *X. nelsoni* was named in honor of its collector E. W. Nelson (Merriam 1892).

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Associate editor of this account was Serge Larivière. Editor was Virginia Hayssen.

Gerardo Ceballos and Heliot Zarza, Instituto de Ecología, UNAM, Ap. Postal 70-275, México, D.F., 04510, México. Michael A. Steele, Department of Biology, Wilkes University, Wilkes-Barre, Pennsylvania 18766.