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Tamias durangae.

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Tamias durangae (J. A. Allen, 1903)

Durango Chipmunk

Eutamias durangae J. A. Allen, 1903:594. Type locality "Arroyo de Bucy [in the Sierra del Candella, at an altitude of about 7500 feet—Allen, 1903:595], northwestern Durango, Mexico."

Tamias nexus Elliot, 1905:233. Type locality "Coyotes, Durango, Mexico."

T[amias]. durangae Levenson et al., 1985:242. First use of current name combination.

CONTEXT AND CONTENT. Order Rodentia, Suborder Sciuromorpha, Family Sciuridae. The genus *Tamias* contains ca. 24 species (Honacki et al., 1982). *T. durangae* (Fig. 1) is in the subgenus *Neotamias* and the *amoenus* species group (Levenson et al., 1985). Two subspecies of *T. durangae* are recognized (Callahan, 1980):

T. d. durangae (J. A. Allen, 1903:594), see above (*nexus* Elliot is a synonym).

T. d. solivagus (A. H. Howell, 1922:179). Type locality "Sierra Guadalupe, Coahuila, Mexico."

DIAGNOSIS. Differences are not extreme among *T. bulleri*, *T. d. solivagus*, and *T. d. durangae* (Baker, 1956). The upper parts of *T. d. durangae* and *T. d. solivagus* are suffused with cinnamon, and the underside of the tail, except in a few *T. d. durangae* taken outside the range of *T. bulleri*, is dark reddish-brown. By contrast, *T. bulleri* consistently lacks the cinnamon dorsal coloration and the underside of the tail is pale yellowish-tan (Callahan, 1980). The shaft of the baculum (Fig. 2) of *T. d. durangae* is longer, the angle is greater, and the height of the keel is less than in *T. bulleri* (Fleharty, 1960).

Compared with *T. durangae*, *T. canipes* from the Sacramento Mountains, New Mexico, does not differ significantly in most cranial and external measurements. *T. canipes* from the Guadalupe Mountains, New Mexico and Texas, are smaller than *T. durangae* in both cranial and external measurements (Fleharty, 1960). Compared with *T. canipes*, *T. d. solivagus* has a more blackish outer pair of dorsal stripes, darker sides and rump, less distinct postauricular patches, more buffy (less grayish) feet, a tail that is darker beneath and edged with a darker shade of buff (Howell, 1929).

The skull (Fig. 3) of *T. d. durangae* is significantly larger on average than in *T. dorsalis* in all measurements, except breadth of braincase; length of maxillary toothrow shows less overlap than other measurements (Anderson, 1972). *T. d. solivagus* differs little from *T. cinereicollis* from New Mexico (Baker, 1956). However, when length of baculum is plotted against greatest length of skull, *T. d. durangae* differs significantly from *T. canipes*, *T. cinereicollis*, and *T. quadrivittatus* (Patterson and Thaeler, 1982).

GENERAL CHARACTERS. *Tamias durangae* has nine distinct dorsal stripes, alternating dark and pale (Anderson, 1972). In summer pelage (July), the top of the head of *T. d. durangae* is mixed sayal brown and grayish white, bordered on each side with fuscous. The ocular stripe is black and mixed with verona brown between the eye and ear. The submalar is verona brown. The ears are fuscous anteriorly with the posterior one-third grayish or buffy white, this color forming a band ca. 4 mm wide. The postauricular spots are larger and grayish white. Shoulders have a distinct grayish wash. The median dorsal stripe is black, bordered with mikado brown, becoming paler and less distinct on the nape and occiput. The outer dorsal stripes are broad and mikado brown; the lateral stripes are of the same color and width as the inner pair. The pale dorsal stripes are dull buffy white, mixed with cinnamon. Sides are dull cinnamon or cinnamon buff, shaded with smoke gray on the shoulders. Rump and thighs are cinnamon buff mixed with smoke gray. Feet are pinkish buff. Dorsally, the tail is fuscous (bases of hairs are pinkish cinnamon) overlaid with pale-pinkish buff. Ventrally, the tail is dark tawny or russet, bordered with fuscous and tipped with pale-pinkish buff. Underparts are creamy white tinged with pale buff. In winter, the pelage of *T. d. durangae* is similar to the summer pelage, but upper parts are less strongly suffused with brownish and the outer pair of dorsal stripes is more blackish (color nomenclature follows Ridgway, 1912—Howell, 1929).

In summer pelage, the top of the head of *T. d. solivagus* is fuscous and is overlaid with grayish white, shaded on the front of the face with snuff brown, and bordered on the sides of the crown with fuscous. Sides of the nose are cinnamon buff. Ocular stripe is fuscous black, shaded posteriorly with verona brown. Submalar stripe is fuscous, mixed with verona brown. Ears are fuscous, margined posteriorly with grayish white, and washed on the anterior margin with mikado brown. Postauricular patches are small, indistinct, and buffy white. Shoulders are faintly and indistinctly washed with smoke gray mixed with dull cinnamon buff. Dorsal stripes are rather broad, black, and margined with mikado brown. The pale dorsal stripes are dull white and the median pair is more grayish. The lateral stripes are bister, broad, and not sharply defined. Sides are cinnamon and

FIG. 1. *Tamias durangae durangae* near El Salto, Durango, Mexico. Photograph by T. L. Best.

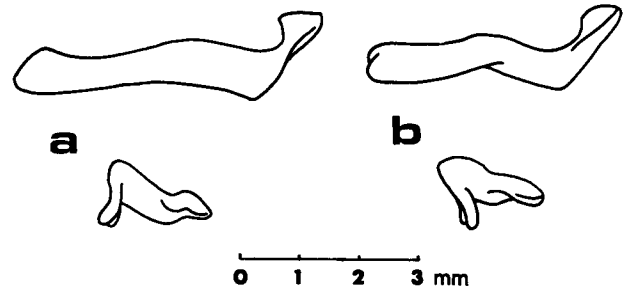

FIG. 2. Right lateral view of male (above) and female (below) ossa genitalia of (a) *Tamias durangae durangae* and (b) *T. d. solivagus* (modified from Callahan, 1980).

FIG. 3. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of *Tamias durangae* from 14.4 km SW Las Adjuntas, 2,670 m, Durango, Mexico (male, University of Kansas Museum of Natural History 54522). Greatest length of cranium is 37.9 mm. Photographs by T. H. Henry.

sayal brown washed on the shoulders with smoke gray and cinnamon buff. Rump and thighs are smoke gray shaded with cinnamon buff. Feet are pinkish buff, shaded with grayish. Dorsally, the tail is fuscous (bases of hairs are pinkish cinnamon) and overlaid with pinkish buff. Ventrally, the tail is ochraceous tawny, bordered with fuscous and tipped with pinkish buff. Underparts are creamy white. In winter, the pelage of *T. d. solivagus* is similar to fresh summer pelage, but the dorsal stripes are snuff brown and faintly shaded with fuscous black. The median stripe often is black on the posterior back (color nomenclature follows Ridgway, 1912—Howell, 1929).

Average and range of measurements (in mm) of male and female *T. d. durangae*, respectively, are: length of head and body, 137 (125–156), 138 (131–150); length of tail vertebrae, 91 (80–100), 98 (87–110); length of hind foot, 35 (31–37), 36 (34–38); greatest length of skull, 37.4 (36.0–38.9), 38.0 (36.9–39.5); length of rostrum, 14.2 (13.6–15.1), 14.4 (13.5–15.8); length of braincase, 23.2 (22.0–24.2), 23.5 (23.1–24.0); length of maxillary toothrow, 6.2 (5.8–6.4), 6.3 (6.0–6.6); length of nasals, 11.7 (10.2–12.6), 12.1 (11.2–13.3); zygomatic breadth, 20.2 (19.9–21.2), 20.6 (19.5–21.3); depth of cranium, 15.2 (14.8–16.0), 15.2 (14.7–15.7); least interorbital breadth, 8.5 (7.5–9.3), 8.4 (7.9–9.1); breadth of cranium, 17.7 (17.0–18.2), 17.7 (17.2–18.5); breadth of rostrum, 9.2 (8.3–9.9), 9.3 (8.4–10.3); width of nasals, 2.9 (2.5–3.6), 2.9 (2.4–3.4—Callahan, 1980).

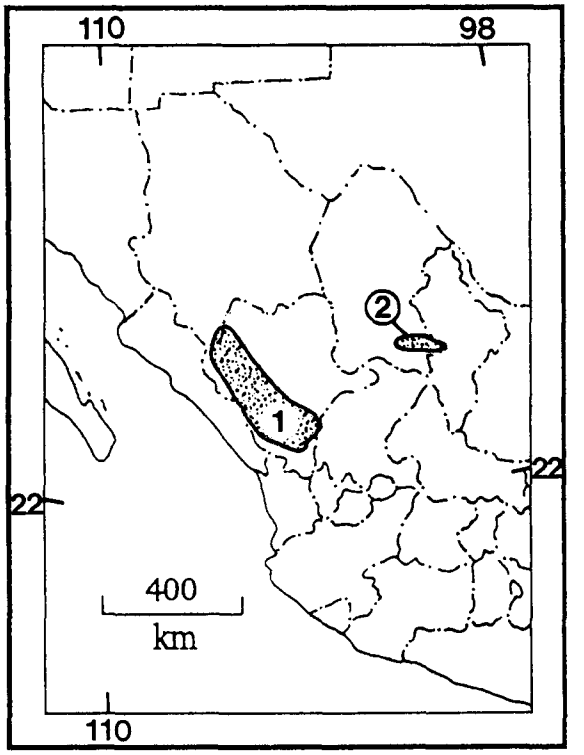

FIG. 4. Distribution of *Tamias durangae* in Mexico: 1, *T. d. durangae*; 2, *T. d. solivagus* (Callahan, 1980; Hall, 1981).

Average and range of measurements (in mm) of male and female *T. d. solivagus*, respectively, are: length of head and body, 129 (121–137), 129 (119–144); length of tail vertebrae, 96 (85–112), 103 (86–112); length of hind foot, 34 (30–34), 34 (31–36); greatest length of skull, 36.4 (35.7–38.2), 36.3 (35.4–37.2); length of rostrum, 13.2 (12.7–13.9), 13.2 (12.8–13.8); length of braincase, 23.2 (22.7–24.3), 23.1 (22.3–23.9); length of maxillary toothrow, 5.7 (5.3–6.0), 5.8 (5.4–6.3); length of nasals, 11.2 (10.0–11.9), 11.2 (10.2–12.1); zygomatic breadth, 19.4 (18.7–20.1), 19.6 (19.2–20.5); depth of cranium, 14.6 (14.3–14.8), 14.5 (14.0–14.9); least interorbital breadth, 8.0 (7.7–8.3), 8.1 (7.7–8.6); breadth of cranium, 17.2 (16.7–17.8), 17.2 (16.8–17.6); breadth of rostrum, 8.3 (7.6–9.1), 8.3 (7.8–9.1); width of nasals, 2.8 (2.4–3.2), 2.7 (2.1–3.2—Callahan, 1980); body mass of two adult males was 70.0 and 68.4 g and of two adult, non-pregnant females was 88.0 and 79.5 g (Baker, 1956).

Sexual dimorphism is present in *T. d. durangae*, but not in *T. d. solivagus*. Males generally are smaller than females in *T. d. durangae* (six of 14 characters), but proportions are similar (Callahan, 1980). Another study failed to detect sexual dimorphism (Levenson, 1990).

DISTRIBUTION. *Tamias d. durangae* occurs in the Sierra Madre of Mexico from southern Durango northward to southern Chihuahua in the transition zone at elevations of 1,950–2,550 m. *T. d. solivagus* occurs on Sierra Guadalupe, Coahuila, in the transition zone at elevations of 2,550–2,850 m (Fig. 4; Callahan, 1980; Hall, 1981; Miller and Kellogg, 1955). No fossils of *T. durangae* are known.

FORM AND FUNCTION. On 1–3 May, six of 15 *T. d. solivagus* were in faded winter pelage, while the remainder were in fresh summer pelage. Molt apparently begins on the posterior back and sides and spreads in both directions (Howell, 1929).

Average and range of measurements (in mm) of bacula of five specimens from Durango (either *T. bulleri* or *T. durangae*) are:

length, 5.3 (5.1–5.7); length of tip, 2.1 (2.0–2.2); width of tip, 0.7 (0.5–0.8); height of base, 0.9 (0.8–1.1); width of base, 1.4 (1.2–1.5—Burt, 1960).

ONTOGENY AND REPRODUCTION. In Chihuahua, the sex ratio was 8 males : 19 females. No embryos were present in a female *T. d. durangae* on 30 June (Anderson, 1972). In Durango, a female (either *T. bulleri* or *T. durangae*) had two embryos on 18 July and another had three embryos on 26 June. Lactating females were observed 27 June to 20 July (Baker and Greer, 1962). West of El Salto, Durango, one female had four embryos in May; two-thirds grown juveniles also were present (J. R. Callahan, in litt.). In Coahuila, lactating females occurred on 28 July and 3 August (Baker, 1956). Two non-adults were among 13 *T. durangae* observed in Durango on 22–30 May (Allen, 1903).

Specimens of *T. d. durangae* may be separated into three age classes on the basis of condition of the third upper molar. Animals are considered as adults if the molar is so worn that dentine can be seen, as subadults if the molar is fully erupted and dentine is not visible, and as juveniles if the molar is not fully erupted (Fleharty, 1960; Patterson, 1980).

ECOLOGY. *Tamias d. durangae* occupies the Sierra Madre Occidental biotic province, located in western Mexico. General conditions are fairly uniform throughout this area, which takes the form of a rolling plateau at 2,100–2,400 m altitude; the western side is deeply cut by canyons bearing drainage out to the Pacific Ocean. The climate is rather dry, although heavy rains are frequent during summer and some snow falls on upper slopes in winter and as late as May. Upper slopes of the mountains primarily are covered with forests of pine (*Pinus*) and oak (*Quercus*) with scattered pinabete (*Abies religiosa*), Douglas fir (*Pseudotsuga menziesii*), and quaking aspen (*Populus tremuloides*). At lower levels in the upper Sonoran zone, oaks, many shrubs (including manzanita, *Arctostaphylos pungens*), several species of mountain mahogany (*Cercocarpus*), and *Ceanothus* become dominant (Goldman, 1951). In Durango, *T. d. durangae* occupies pine–oak forests of the Sierra Madre Occidental. It is common in mesic pine–oak woodlands >2,250 m in elevation. The Durango chipmunk frequently is seen along the Mazatlan–Durango highway in the vicinity of La Ciudad, where it uses rotting piles of stacked timbers as home sites. It seems less abundant in drier woodlands (Baker and Greer, 1962).

Tamias d. solivagus occupies the Sierra Madre Oriental Biotic Province. This region receives a moderate amount of rainfall. Occasional winter storms leave some snow for a short time on upper slopes of the mountains (Goldman, 1951). In these montane mesic forests of the Sierra de Guadalupe and the Sierra Madre Oriental of southeastern Coahuila, *T. d. solivagus* occurs in stands of pine (*Pinus*), fir (*Abies*), and aspen (*Populus*), at elevations ≥2,700 m. In April, it was observed under moss-covered rock ledges along a small mountain stream under a dense canopy of coniferous trees. In late July and early August, it was more abundant in this area (Baker, 1956).

There is a paucity of information regarding foods consumed by *T. durangae*. However, four *T. d. durangae* from three localities in Durango had cheekpouches stuffed with corn and acorns (Goodwin, 1954). In early May, this species was observed feeding on pine nuts and on a large, green oak gall west of El Salto, Durango (J. R. Callahan, in litt.).

It has been stated that the deeply entrenched canyon of the Río Mezquital–Río San Pedro, which cuts entirely through the Sierra Madre Occidental to drain parts of the open lands to the eastward, presents a barrier separating *T. bulleri* and *T. d. durangae* (Baker and Greer, 1962). As predicted, *T. d. durangae* occurs north of the canyon; however, *T. bulleri* occurs on both sides of this deep canyon (Callahan, 1980).

In Durango, *T. d. durangae*, which occurs in more mesic habitat, is not sympatric with *T. dorsalis* (Baker, 1966). However, in southern Chihuahua, *T. d. durangae* and *T. dorsalis* are sympatric. To the north of this region, only *T. dorsalis* occurs; to the south and in adjacent parts of Durango, only *T. d. durangae* occurs (Anderson, 1972).

Mammals occurring in the same biotic province as *T. durangae* include *Sorex vagrans, Ursus americanus, Procyon lotor, Spilogale gracilis, Mephitis mephitis, Urocyon cinereoargenteus, Canis latrans, C. lupus, Felis concolor, Spermophilus variegatus, S. madrensis, Tamias dorsalis, Sciurus aberti, S. apache, Glaucomys volans, Thomomys umbrinus, Peromyscus melanotis, P. boylii, P. truei, P. difficilis, Sigmodon hispidus, Neotoma albigula, N. mexicana, Nelsonia neotomodon, Microtus mexicanus, Sylvilagus floridanus, Odocoileus virginianus, Corynorhinus phyllotis, Idionycteris mexicanus, Conepatus pediculus,* and *Cratogeomys castanops* (Goldman, 1951). No parasites are known.

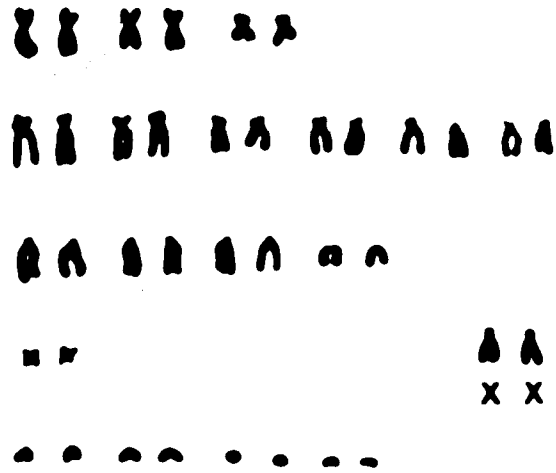

FIG. 5. Karyotype of *Tamias d. durangae* (modified from Callahan, 1977).

BEHAVIOR. The Durango chipmunk often is secretive and difficult to see in its habitat among the rocks, logs, and litter on the floor of forests of pine and oak. One was observed at a cavity, apparently its den, in a rock outcrop. Another was in a forest of Douglas fir and pine (Hooper, 1955). This species gives both the "chuck" and "trill" vocalizations (Callahan, 1980).

GENETICS. This species has karyotype A of *Tamias* (Fig. 5—Callahan, 1975). The diploid karyotype contains 38 chromosomes including three pair of large metacentric, six pair of large submetacentric, four pair of large acrocentric, one pair of small metacentric, and four pair of small acrocentric chromosomes. The X chromosome is submetacentric and the Y is acrocentric (Sutton and Nadler, 1969).

REMARKS. Based upon phenetic analyses of morphologic data, *T. durangae* is similar to *T. bulleri, T. canipes, T. cinereicollis, T. dorsalis,* and *T. obscurus. T. durangae* is placed in the same species group as *T. amoenus, T. canipes, T. cinereicollis, T. palmeri,* and *T. umbrinus* (Levenson et al., 1985; Nadler et al., 1985). The ossa genitalia of *T. d. durangae* and *T. d. solivagus* resemble those of the *T. canipes–T. cinereicollis* group. Both subspecies of *T. durangae* may be conspecific with *T. canipes* (Callahan, 1980).

Tamias is from the Greek *tamias* meaning a storer or distributor (Jaeger, 1955). The specific epithet *durangae* refers to the Mexican state of Durango, site of the type locality. Another common name is Coahuila chipmunk (Howell, 1929).

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