Tamias sonomae. By Troy L. Best

Tamias sonomae (Grinnell, 1915)
Sonoma Chipmunk

Eutamias sonomae Grinnell, 1915:321. Type locality "one mile west of Guerneville, Sonoma County, California."

Eutamias townsendii alleni Howell, 1922:181. Type locality "Inverness, Marin County, California."

T[amias]. sonomae: 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. 25 species (Honacki et al., 1982; Patterson, 1984). *T. sonomae* (Fig. 1) is in the subgenus *Neotamias* and the *townsendii* species group (Levenson et al., 1985). Two subspecies of *T. sonomae* are recognized (Hall, 1981):

T. s. alleni (Howell, 1922:181), see above.
T. s. sonomae (Grinnell, 1915:321), see above.

DIAGNOSIS. Within its geographic range, *T. sonomae* meets *T. amoenus* and three members of the *townsendii* species group (*T. ochrogenys*, *T. senex*, and *T. siskiyou*—Howell, 1929; Johnson, 1943). From *T. amoenus*, *T. sonomae* may be distinguished by its larger size, white-edged tail, and deep-reddish coloration (Johnson, 1943). *T. sonomae* resembles *T. townsendii* (including *T. ochrogenys*, *T. senex*, and *T. siskiyou*), but differs as follows: body paler; legs, tail, and ears longer; tail broader and more bushy; cheeks in winter are gray instead of brown; ears in summer pelage are sparsely furred and unicolored instead of well furred and bicolored; central reddish area on underside of tail paler rather than darker anteriorly; skull narrower; braincase relatively larger and more inflated; zygomatic arches closer to skull; anterior tips of nasals separated by a notch; incisive foramina shorter; posterior edge of palate thickened and having a short spine instead of terminating in a long, slender (thin) spine; upper incisors more recurved and angle of notch across occlusal surfaces more acute; cheekteeth smaller (Hall, 1981).

Compared with *T. ochrogenys*, *T. s. alleni* is smaller, the upperparts are much brighter tawny (less olivaceous), especially in winter pelage; the dorsal stripes are more distinct, the dark stripes are more blackish, the pale stripes are more buffy, and the sides of the face are less extensively washed with ochraceous (Howell, 1922). Compared with *T. siskiyou*, *T. s. sonomae* has summer coloration that is brighter tawny, the median pair of pale dorsal stripes is heavily mixed with pinkish cinnamon, the head is paler (more grayish), the sides of the nose are paler buff, the facial stripes are clearer white, and the hind feet are paler. The winter pelage of *T. s. sonomae* is more brownish (less grayish) on the head and upperparts, the sides are darker tawny, and the tail is darker above and below. Compared with *T. senex*, *T. s. sonomae* has summer coloration that is more grayish (less buffy) and its hind feet are less buffy (more grayish). The winter pelage of *T. s. sonomae* is darker and more tawny (less grayish) on the upperparts; it also has a darker head, the tail is longer, and the undersurface is darker than in *T. senex* (Howell, 1929).

The Sonoma chipmunk is separated from *T. merriami* of the Santa Cruz area by San Francisco Bay and San Pablo Bay, and the extensive areas of grassland bordering them. It is separated from *T. quadrimaculatus* of the Sierra Nevada Mountains by an area >60 km wide in the Mount Lassen region, in which neither species occurs. Over a large area of northwestern California, the range of *T. sonomae* overlaps that of *T. ochrogenys*, *T. siskiyou*, or *T. senex*. Much of this apparent overlapping reflects the intricate interdigitation of ranges caused by the rugged topography and diversified floral associations of the region. *T. ochrogenys*, *T. siskiyou*, and *T. senex* inhabit the boreal forests of white fir (*Abies concolor*) and Douglas fir (*Pseudotsuga menziesii*), and also occur in associated chaparral, dominated by whitethorn (*Ceanothus cordulatus*). *T. sonomae* is in areas characterized by Ponderosa pine (*Pinus ponderosa*), Douglas fir, black oak (*Quercus kelloggii*), and sticky laurel (*Ceanothus velutinus*). In the middle of the transition zone, such associations often are found immediately adjacent to one another, and there is ample opportunity for occupation of the same general area by *T. sonomae* and another of these species of chipmunks. Thus, some intermingling of these species occurs, but there is no evidence of intergradation (Johnson, 1943).

GENERAL CHARACTERS. In summer pelage (July–September), the top of the head of *T. s. alleni* is fuscous sprinkled with smoke gray and cinnamon. The dark facial stripes are fuscous or fuscous black, shaded with cinnamon or tawny. The pale facial stripes are grayish white and clouded with pinkish cinnamon. The shoulders, foreback, and median pair of pale dorsal stripes are tawny or ochraceous tawny, and the stripes are mixed with white on the posterior back. The outer pair of pale dorsal stripes is dull whitish washed with cinnamon buff. The dark dorsal stripes are black (rarely fuscous). The lateral stripes are fuscous black, often indistinct and obscured by color of the sides. The sides are deep tawny. The rump is ochraceous tawny and mixed with cinnamon. The thighs are mixed fuscous and cinnamon buff, sprinkled with grayish white. The hind feet are cinnamon or cinnamon buff and shaded with fuscous. The front feet are cinnamon buff. Dorsally, the tail is fuscous black and mixed with tawny. Ventrally, the tail is tawny and bordered with fuscous black and tipped with a small amount of pale tilleul-buff. The underparts are grayish white and moderately washed with pale ochraceous buff or pinkish buff shading to cinnamon around the base of the tail (color nomenclature follows Ridgway, 1912—Howell, 1929).

In summer pelage (July–September), the top of the head of *T. s. sonomae* is pale smoke-gray, mixed with sayal brown and bordered with fuscous. The pale facial stripes are grayish white. The postocular (posterior to eye) streak is fuscous and shaded with sayal brown. The submalar stripe (below eye) is shaded anteriorly to cinnamon. The ears are sayal brown anteriorly and mouse gray posteriorly. The postauricular patches (posterior to ear) are creamy white. The shoulders and posterior part of the back are between pinkish cinnamon and cinnamon buff, and shaded with fuscous. The median dorsal stripe is blackish and bordered with cinnamon. The outer pair of dark dorsal stripes is black or fuscous black, overlaid with ochraceous tawny. The median pair of pale stripes is smoke gray, sprinkled

FIG. 1. An adult *Tamias sonomae* in Taylor State Park, Marin Co., California. Photograph courtesy of H. E. Broadbooks.
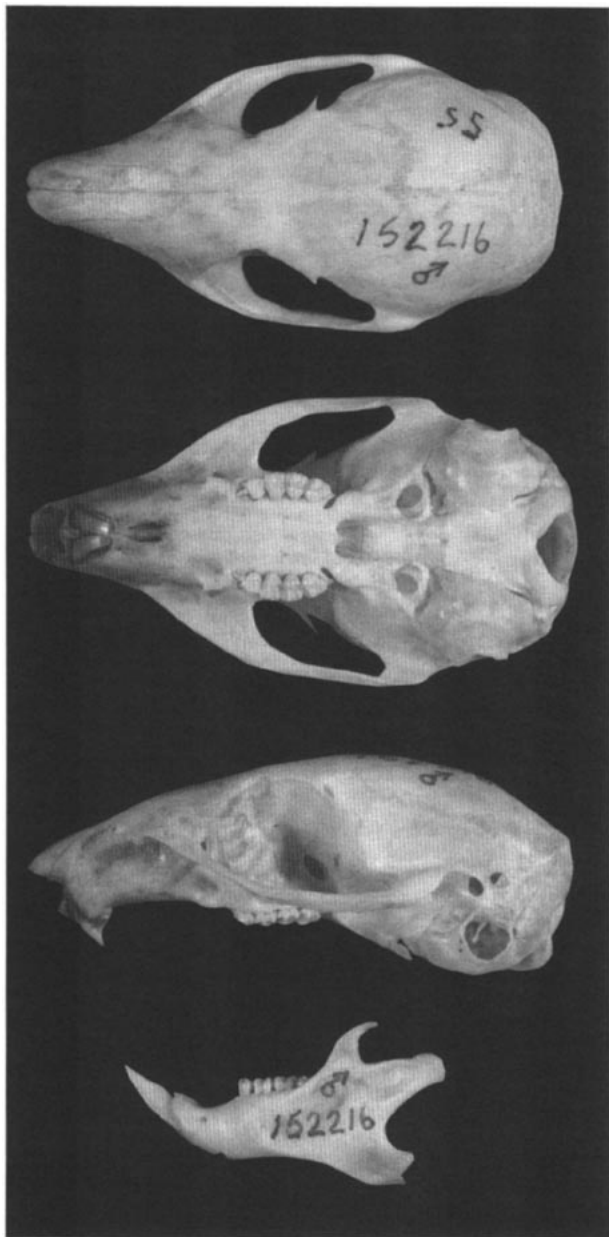
FIG. 2.   Dorsal, ventral, and lateral views of cranium and lateral view of mandible of *Tamias sonomae* from near Soda Creek Station, Lake Pillsbury, 840 m elev., Lake Co., California (male, Museum of Vertebrate Zoology, University of California, Berkeley 152216). Greatest length of cranium is 38.6 mm. Photographs by T. H. Henry.

with cinnamon and overlaid with a wash of cinnamon on the anterior back. The outer pair of pale stripes is clear creamy white. The lateral stripes are nearly obsolete and the sides are ochraceous tawny. The rump and thighs are mouse gray, mixed with cinnamon buff. The hind feet are cinnamon buff, shading on the inside of the legs to pale pinkish-cinnamon. Dorsally, the tail is fuscous black, sprinkled with pale buff. Ventrally, the tail is between tawny and ochraceous tawny and is bordered with fuscous black and edged with tilleul buff. The underparts are creamy white and sometimes tinged with pale pinkish-cinnamon (color nomenclature follows Ridgway, 1912—Howell, 1929).

In winter pelage (November–June), *T. s. alleni* is similar to summer pelage, but duller and more brownish (less tawny). The dark dorsal stripes sometimes are fuscous black. The shoulders and sides are ochraceous tawny and shaded with russet. The median pair of pale dorsal stripes is grayish white obscured on the anterior part of the back with tawny. The rump and thighs are tawny olive and

shaded with ochraceous tawny. The underparts are grayish white and washed with tilleul buff or cinnamon buff (color nomenclature follows Ridgway, 1912—Howell, 1929).

The winter pelage (November) of *T. s. sonomae* is similar to the summer pelage, but darker. The head is vandyke brown and sprinkled with grayish white. The dark facial stripes are vandyke brown, shaded with blackish. The ears are fuscous anteriorly and smoke gray posteriorly. The median dorsal stripe is blackish and edged with russet. The outer dorsal stripes are russet and shaded with blackish. The sides are dull tawny sprinkled with fuscous and shade above is russet. The dorsal stripes are pale smoke-gray; the median pair is washed with tawny. The thighs are hair brown and sprinkled with grayish white. The hind feet are cinnamon buff and shaded with fuscous. Dorsally, the tail is sayal brown, overlaid with blackish and sprinkled with grayish white. Ventrally, the tail is hazel bordered with blackish and edged with grayish white. The underparts are creamy white (color nomenclature follows Ridgway, 1912—Howell, 1929).

The skull is long and narrow (Fig. 2), the zygomatic breadth averaging ca. 54% of greatest length of skull. The rostrum is deep, the nasals are separated at the tips by a small median notch, and the braincase is long and inflated. The incisive foramina are short. The upper incisors are recurved, with a sharp-angled notch in the occlusal surfaces, as seen from the side. The molariform teeth are small (Johnson, 1943).

There is no significant sexual dimorphism in size (Levenson, 1990). Average and range of measurements (in mm) of *T. s. alleni* and *T. s. sonomae*, respectively, are: total length, 240 (231–250), 250 (220–264); length of tail vertebrae, 107 (100–113), 116 (100–126); length of hind foot, 35.6 (34.0–37.0), 37.0 (35.5–39.0); length of ear from notch, 16.1 (15.0–18.0), 17.2 (15.5–19.0); greatest length of cranium, 37.9 (36.8–39.3), 38.7 (38.0–39.7); zygomatic breadth, 20.3 (19.2–20.9), 20.8 (19.4–21.3); breadth of cranium, 15.5 (15.0–16.2), 16.1 (15.4–16.5); interorbital breadth, 8.5 (8.1–9.0), 8.9 (8.4–9.2); length of nasals, 11.9 (11.2–12.4), 11.9 (11.3–12.7—Howell, 1929).

Tamias s. alleni is smaller than *T. s. sonomae*. In *T. s. alleni*, the head and upperparts are darker throughout the year, the outer pair of pale dorsal stripes usually is washed with buff, the underparts average more buffy (less whitish), the hind feet are darker, the tail averages darker ventrally, and the skull averages smaller (Howell, 1922).

DISTRIBUTION. *Tamias sonomae* occurs in California north of San Francisco Bay (Fig. 3; Hall, 1981). It occupies the upper Sonoran and transition life zones from near sea level to 1,800 m elev. (Johnson, 1943).

FOSSIL RECORD. *Tamias* evolved by the early Miocene (Black, 1972). No fossils of *T. sonomae* are known.

FORM AND FUNCTION. The dorsal guard hairs have a maximum length of 10 mm, a width of ≤36 μm, there is a compound medulla with two rows of aggregations abreast, and the dark basal portion of the shaft usually is colored by dull-brown granules (Mayer, 1952). On 24–27 October, the change from summer to winter pelage in *T. s. sonomae* was shown by new pelage covering the posterior one-half of the body (Howell, 1929).

As in all members of the subgenus *Neotamias*, the dental formula is c 1/1, i 0/0, p 2/1, m 3/3, total 22 (Howell, 1929; Ingles, 1965). The hyoid usually consists of five bones: the basihyal and thyrohyal are fused into a horseshoe-shaped structure with the sides (thyrohyals) pointing caudally; two linear ceratohyal–epihyal elements; two long and curving stylohyals. The anterior horns of the hyoid have separate ceratohyal and epihyal bones. Average measurements (in mm) of the hyoid are: length of stylohyal, 4.74; length of epihyal and ceratohyal, 3.81; length of basihyal and thyrohyal, 3.66; length of chondrohyal, 0.08; arch of basihyal and thyrohyal, 2.70; width of basihyal, 2.92; width of thyrohyal, 3.61; thickness of basihyal, 0.57 (Adams, 1967).

The baculum (Fig. 4) has a thin shaft and a low keel that extends 10% of the length of the tip. The tip is 27–31% of the length of shaft, the angle formed by the tip and shaft is 130°, the distal 25% of the shaft is slightly compressed laterally, the base is deeper and wider than the shaft, the shaft is 3.03–3.30 mm in length, and the ridges on either side of the tip are strongly developed and partly obscure the keel when viewed from the side (White, 1953).

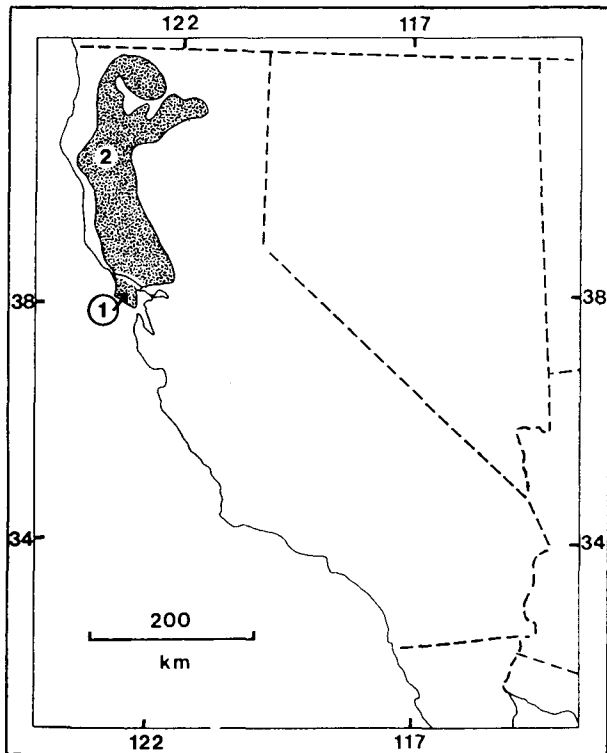Average and range of measurements (in mm) of the baubellum

FIG. 3. Distribution of *Tamias sonomae* in California (Hall, 1981): 1, *T. s. alleni*; 2, *T. s. sonomae*.

FIG. 4. Baculum of *Tamias sonomae sonomae* from Redding, Shasta Co., California. The bar represents 1 mm (modified from White, 1953).

(os clitoris) are: length of base, 0.70 (0.49–1.10); length of shaft, 0.72 (0.46–0.98); depth of shaft, 0.31 (0.26–0.33); length of tip, 0.61 (0.49–0.72); length of keel, 0.16 (0.13–0.23); angle of the tip-shaft, 150.4° (136–163°). The baubellum of *T. sonomae* is long and slender, with the base and shaft curved together into a wide U-shape. The proximal end of the base has only a slight taper toward the single, rounded end. The heel projects slightly and the keel is small but obvious on a thin tip. The side of the tip opposite the keel is convex. The tip is bent to the right ca. 6°, with no counterclockwise twist. The narrow flanges start somewhat back from the point of the tip and extend about halfway across the shaft (Sutton, 1982).

ONTOGENY AND REPRODUCTION. In late March, testes of adults are 13–16.5 mm in length (Adams, 1967). Males with testes in the scrotum enter the home range of a female in estrus to breed, and then move on, thereby vying with other similarly attracted males for estrus females over a wide area during the breeding season. Males travel extensively when they have scrotal testes (December–June), a time period fairly uniform for males at elevations of 300–2,100 m, and which includes all times when females are in estrus at any elevation. Females breed once per year in the spring. However, females from low elevations may enter estrus ≥5 months earlier than females from high elevations (Smith, 1978). Litters consist of three to five (usually four) young (Jameson and Peeters, 1988). Females alone raise the litter. They stay with the young and suckle them, at least at night, for at least 3 weeks after the young emerge. Weaned young remain together for some weeks after the mother no longer associates with them (Smith, 1978).

When juveniles first emerge from the nest, the sex ratio does not differ from 1:1, but favors females among older juveniles in late autumn. This may result from differential dispersal by juvenile males and reflect mortality incurred during dispersal. In a field study, no juvenile males returned as adults, whereas ca. 50% of juvenile females matured and remained in the population. In spring, first-year females outnumber first-year males. By autumn, first-year adults have 1:1 sex ratios, suggesting high reproduction-related mortality among females during their initial breeding attempt. Among older adults, females show higher survivorship than males, especially at 3–5 years of age. Male nomadism and conflict during the winter and spring reproductive period subject adult males to greater exposure to sources of mortality than adult females, which maintain a limited home range (Smith, 1978).
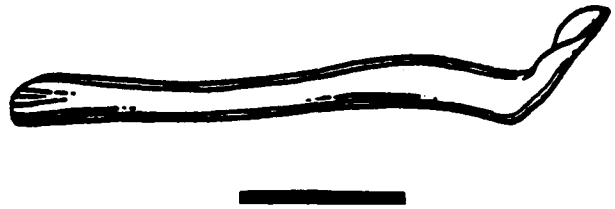
ECOLOGY. The Sonoma chipmunk occurs in chaparral and open areas in redwood (*Sequoia sempervirens*) forests and the lower and dryer forests of Ponderosa pine (Ingles, 1965). It requires habitat with trees, shrubs, logs, snags, and litter (Barrett et al., 1980). Habitat includes chaparral (*Adenostoma, Arctostaphylos, Quercus*), small brushy clearings in forests, and streamside thickets. *T. sonomae* is found in association with black oak, Ponderosa pine, digger pine (*Pinus sabiniana*), Douglas fir, white fir, redwood, sticky laurel, incense cedar (*Libocedrus decurrens*), madrone (*Arbutus menziesii*), manzanita (*Arctostaphylos*), and serviceberry (*Amelanchier alnifolia*—Johnson, 1943).

In Napa Co., the range of *T. sonomae* generally coincides with the distribution of conifers, such as digger pine, Ponderosa pine, Douglas fir, and redwood (Longhurst, 1940). In Humboldt and Trinity counties, it did not inhabit virgin forests or clearcuts at 600–1,200 m elev. The only site where *T. sonomae* occurred was a high rocky ridge covered with scrub tan oaks (*Lithocarpus densiflorus*) and other brush, a habitat too dry to support Douglas fir (Tevis, 1956). In Trinity Co., the Sonoma chipmunk also occurs in exposed, hence warm, tracts of brush of several hundred meters in extent. Common plants are whitethorn, chokecherry (*Prunus*), serviceberry, and silk tassel (*Garrya*—Miller, 1944).

In Trinity Co., *T. siskiyou* occurs in fir forests, which are upper transition and Canadian in character, and may surround habitat of *T. sonomae*. The forest trees are white and red fir (*Abies magnifica*), with some incense cedar and Douglas fir. *T. siskiyou* is active among downed logs on the forest floor, but ranges into bushes of whitethorn at the edge of the forest where it meets *T. sonomae* (Miller, 1944). *T. s. sonomae* occurs in valley areas in the Salmon Mountains. Here, *T. siskiyou* occurs at higher elevations than *T. s. sonomae* (ca. 1,800 m elev.). On the west slope of this range at 990 m elev., both taxa occur sympatrically (Howell, 1929). *T. sonomae* also may occur with *Sorex trowbridgii, Neurotrichus gibbsii, Scapanus, Sylvilagus bachmani, Spermophilus beecheyi, Glaucomys sabrinus, Tamiasciurus douglasii, Sciurus griseus, Clethrionomys occidentalis, Phenacomys longicaudus, Peromyscus maniculatus, P. truei, Neotoma cinerea,* and *N. fuscipes* (Tevis, 1956).

In Marin Co. (on 19 June), a tree nest was in a 55-m Douglas fir near large tan oaks at the foot of a north-facing slope covered with mature redwoods. The 45 by 25-cm nest of dry grass was 15 m from the ground. Although out in the open on a limb 2.5 m from the trunk, the nest was beneath a dense growth of small branches and dry dead twigs (Broadbooks, 1977).

A predator of *T. sonomae* is the red-tailed hawk (*Buteo jamaicensis*—Smith, 1978). Plague (*Yersinia pestis*) has not been detected in *T. sonomae* (Nelson, 1980), and the only parasites reported are the sucking lice *Hoplopleura arboricola* and *Neohaematopinus pacificus* (Ferris, 1951).

BEHAVIOR. The Sonoma chipmunk has a shy retiring nature (Longhurst, 1940). Most foraging is done by climbing through the smaller branches of bushes, but individuals often seek elevated positions, such as stumps, lower limbs of pine and oak (*Quercus*) trees, and rock outcroppings, where they rest, watch intruders, and eat food gathered elsewhere (Johnson, 1943); *T. sonomae* probably eats seeds and leaves of chaparral plants (Jameson and Peeters, 1988).

Tamias sonomae calls from trees, bushes, the ground, and under bushes (Brand, 1970). Average and range of calling rates and temporal arrangements of chipping sequences of *T. sonomae* from Shasta, Tehama, and Colusa counties, respectively, are: chips/min, 56 (14–97), 54 (3–94), 107 (16–224); chips/burst, 3.4 (1.0–5.5), 4.8 (1.2–7.8), 2.6 (1.0–7.5); bursts/min, 19 (10–64), 12 (6–22), 84 (11–224); length of syllable (in s), 0.035 (0.025–0.050), 0.035 (0.025–0.045), 0.040 (0.025–0.055); interval between chips within

bursts (in s), 0.170 (0.110–0.265), 0.135 (0.075–0.180), 0.195 (0.110–0.325); top of downsweep (in kilocycles), 12.5 (10.5–15.5), 11.0 (9.0–12.5), 11.5 (9.5–14.0); bottom of downsweep (in kilocycles), 7.5 (4.5–10.5), 7.0 (4.5–10.0), 7.0 (4.0–10.0); top of upsweep (in kilocycles), 11.5 (7.5–14.0), 11.0 (5.0–14.0), 10.5 (5.5–14.0). The chips of *T. sonomae* are high-pitched and bird-like, and have the form of a "V" when depicted on a sonogram; the downsweep is followed by an upsweep. This call differs from those of *T. alpinus, T. amoenus, T. merriami, T. minimus, T. panamintinus, T. quadrimaculatus, T. senex, T. siskiyou, T. speciosus,* and *T. umbrinus* (Brand, 1976).

In Trinity Co., Sonoma chipmunks rarely respond to squeaking noises made by a human. Never did a running Sonoma chipmunk stop in response to a squeak. However, a few were heard giving the mellow, low "pok" note. Its excited bark is different from that of *T. siskiyou*; instead of being quick and shrill, as in *T. siskiyou*, it is labored, blunt, and sounds almost like a fox sparrow (*Passerella iliaca*). There may be only three to five notes in the series. In Humboldt Co., Sonoma chipmunks also are not very responsive to squeaks made by humans, but when they do respond, the sounds are less sharp, i.e., lower pitched and more slowly repeated than in *T. siskiyou* (Miller, 1944).

In reaction to alarm calls, *T. sonomae* moves rapidly either over a direct path to the center of the tree or bush in which it is foraging or directly to the nearest log, tree, or bush from open ground, where it becomes still and attentive. This behavior appears to enable chipmunks responding to alarm calls to be less accessible to predators with the briefest amount of obvious movement. Further, those in less-exposed circumstances make no obvious movements (Smith, 1978).

Alarm calls are emitted more often by females than males, in all age groups. Although males with scrotal testes appear to call less often than nonscrotal males, the difference is not significant. Lactating first-year females emit alarms less often than older lactating females. Juvenile and adult females do not differ in their tendency to emit alarm calls, nor do juvenile and adult males (Smith, 1978).

Kin selection may be responsible for the evolution of alarm calls in *T. sonomae*. Juvenile females tend to stay near the natal area while males disperse. This produces mother–daughter groups along with less-related males. Mothers have their youngest offspring and their older daughters near them. Among reproductive females, pregnant females may give first priority to protection of their forthcoming litter and emit fewer alarms. Lactating first-year females have no independent offspring as yet, whereas older lactating females may have daughters around from previous years. Unlike older females, first-year females experience high reproductive mortality (Smith, 1978).

Lactating females that are ≥2 years of age and previously lactating females probably have close relatives (their daughters or their newest litter) nearby. Thus, they are more prone to emit alarms. Lactating females also may alert their newest litter in the interval between emergence from the nest and weaning. Adult females spend more of their active time giving alarms after the juveniles emerge from the nest than they do earlier in the spring and summer. Pregnant and early lactating females spend 2.1% of their time giving alarms during April–June. In July, when all litters had emerged, breeding females spent 2.8% of the time giving alarms. By August, after all litters were weaned, parous females spent 9.5% of their time calling (Smith, 1978).

Because males disperse as juveniles, they tend to be removed from their mothers and siblings. Males with scrotal testes, by their greater wandering, are more apt to be farther from relatives than nonscrotal ones. In the spring (April and May), even though scrotal males were numerous and caught (often repeatedly) in live traps, they seldom were observed outside the traps. Those that were observed were furtive, skittish, and quiet. Giving alarm calls may be more risky on unfamiliar ground where retreats are less well known, and this risk also may have contributed through selection to the low frequency of male alarms (Smith, 1978).

GENETICS. *Tamias sonomae* has a type B karyotype of *Tamias*. The diploid karyotype contains 38 chromosomes including four pair of large metacentric, six pair of large submetacentric, four pair of large acrocentric, one pair of small metacentric, and three pair of small acrocentric chromosomes. The X chromosome is submetacentric and the Y is acrocentric (Sutton and Nadler, 1969). Based upon 20 allozymes, *T. sonomae* has an average heterozygosity of

0.0320 and two polymorphic loci (serum transferrin and red cell phosphoglucomutase—Levenson et al., 1985).

REMARKS. Phenetic analyses of morphologic characters have grouped *T. sonomae* in clusters with *T. merriami, T. quadrimaculatus,* and *T. townsendii* (Levenson et al., 1985; Nadler et al., 1985). Cladistic analyses of electrophoretic data have placed *T. sonomae* and *T. palmeri, T. quadrimaculatus,* and *T. townsendii* (Levenson et al., 1985; Nadler et al., 1985). One cladogram resulting from cladistic analyses of electrophoretic data (with *Marmota* as an outgroup) placed *T. sonomae* nearest *T. townsendii cooperi* and *T. senex,* and another (with *T. sibiricus* as an outgroup) placed it between *T. townsendii* and *T. sibiricus* (Levenson and Hoffmann, 1984).

Tamias sonomae has been placed in the *townsendii* group with *T. dorsalis, T. merriami, T. obscurus, T. ochrogenys, T. quadrimaculatus, T. senex, T. siskiyou,* and *T. townsendii* based upon cranial and external morphology and coloration (Howell, 1929; Johnson, 1943). Based on bacular morphology *T. sonomae* was placed in the *minimus* group with *T. alpinus, T. amoenus, T. dorsalis, T. merriami, T. minimus,* and *T. townsendii* (White, 1953). However, *T. sonomae* more recently has been placed in the *townsendii* species group with *T. quadrimaculatus* and *T. townsendii* (Levenson et al., 1985).

Currently, chipmunks previously assigned to the genus *Eutamias* are included in the genus *Tamias* (Honacki et al., 1982; Levenson et al., 1985; Nadler et al., 1969, 1977). However, there are indications that *Eutamias* and *Tamias* may be distinct genera, e.g., divergence in the late Miocene (Ellis and Maxson, 1979; Hafner, 1984), differences in pattern of dorsal stripes, structure of the hyoid, chromosomes, dental formulas, bacula (Hoffmeister, 1986), microcomplement-fixation reactions, and allozymes (Ellis and Maxson, 1979; Hafner, 1984).

Tamias is from the Greek *tamias* meaning a storer or distributor (Jaeger, 1955). The specific epithet *sonomae* apparently refers to Sonoma Co., where the type specimen was obtained.

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