Sciurus alleni Nelson, 1898

Allen's Squirrel

Sciurus alleni Nelson, 1899:147. Type locality “Monterey, Tamaulipas [=Nuevo Leon—Nelson, 1899-91], Mexico.”


DIAGNOSIS. Sciurus alleni (Fig. 1) bears a close superficial resemblance to S. carolinensis of Texas (Nelson, 1899) and may be sympathetic with S. aureogaster and S. deppi, but S. alleni differs from these species in having only one upper premolar instead of two (Fig. 2; Hall, 1981; Musser, 1968). The ranges of S. oculatus and S. alleni approach each other in San Luis Potosí, but these taxa are not sympatric (Hall, 1981). S. alleni and S. oculatus are similar (Baker, 1956; Dalquest, 1953), but S. oculatus has a smaller skull, smaller body, grayer feet, and winter venter than S. alleni (Nelson, 1899). Compared with S. alleni, S. oculatus shawi in San Luis Potosí has: buff, rather than brownish or whitish feet; distinct, buffy postauricular patches; undersides that are deep-fuzzy rather than white. In S. alleni, postauricular patches usually are absent and, when present, usually consist of a tiny area where the pelage is slightly shorter and grayer than on the surrounding part of the head (Dalquest, 1950). In Coahuila, some S. alleni have conspicuous pale to dark buffy postauricular patches (Baker, 1956).

GENERAL CHARACTERS. In winter pelage, the back and sides of Allen's squirrel are yellow-brown, finely grizzled with gray and black, usually darker along the back, and grayer along the sides and flanks. The top of the head is similar to the back and sides, but usually a little darker. The eye has a distinct ring of dingy white, shaded with buff on the outer border. The sides of the head are grizzled dusky gray, often suffused with yellowish brown. The ears and basal parts are brownish gray. The forefeet and outside of the forelegs are whitish gray, frequently washed with buff. The hind feet are whitish gray, usually with a spot of dark buff on the middle of the upper surface. The outsides of the thighs are like the flanks, but often with a brownish shade near the feet. The underparts are white. The colors of the upperparts and lowerparts usually are separated by a narrow line of pale grayish. The base of the tail is the same color as the back. Dorsally, the tail is black and heavily washed with white, with the yellowish-brown or yellowish-gray color often showing through. Ventrally, the tail has a broad median area of grizzled yellowish-brown or yellow-gray, narrowly bordered with black and edged with white. The hairs of the back are black, with one or two rings of gray, buff, or buffy brown. In summer, the pelage is darker and more yellowish-brown than in winter due to the absence of most of the gray or white tips on the hairs (Nelson, 1899). In westcentral Nuevo León, no differences in color were found among seasons, populations, ages, or sexes (Morales, 1985). The striking differences in anatomical proportions between S. alleni from the lowlands near Monterey, Nuevo León, and those from the mountains near Miquihuana, Tamaulipas (2,550 m elevation), are not accompanied by similar differences in color. In both locations, the upperparts vary from grizzled brown to nearly gray. One individual from San Pedro Mines, Nuevo León, had upperparts that were dark yellowish-brown, and was darkest (thiny washed with black) on the top of the head. The eye was surrounded by a ring of dark buff, the forefeet were washed with buff, and the hind feet with grayish white. Another Allen's squirrel in similar pelage occurred at Miquihuana in June (Nelson, 1899).

There is no sexual dimorphism, but females average larger in mass (Morales, 1985). Measurements (in mm) of three adult males from Sierra Guadalupe, Coahuila, and one adult female from Diamante Pass, Coahuila, respectively, are: total length, 433, 441, 440, 456; length of tail, 200, 219, 209, 216; length of hind foot, 55, 63, 61, 62; length of ear from notch, 30, 31, 31, 34; greatest length of skull, 59.0, 58.8, 58.7, 59.5; basilar length of cranium, 44.4, 45.1, 45.2; zygomatic breadth, 34.1, 32.2, 33.0, 33.5; length of nasals, 20.4, 19.8, 20.3, 20.2; width across posterior tongues of premaxillae, 16.4, 15.5, 14.8, 16.1; mastoid breadth, 27.2, 25.9, 26.1, 26.5; postorbital constriction, 17.0, 18.3, 17.3, 18.5; alveolar length of maxillary toothrow, 10.4, 10.5, 9.5, 10.4 (Baker, 1956). Average external and cranial measurements (in mm) of specimens from near Monterey and from near Miquihuana, respectively, are: total length, 471, 465; length of tail, 217, 230; length of hind foot, 61, 66; basilar length of cranium, 50.4, 50.0; palatal length, 26.3, 25.6; interorbital breadth, 18.4, 18.1; zygomatic breadth, 33.7, 33.7; length of upper toothrow, 10.5, 10.3 (Nelson, 1899). In San Luis Potosí, averages of external and cranial measurements (in mm) are: total length, 481; length of tail, 230; length of hind foot, 61; greatest length of skull, 60.8; condylobasal length, 53.6; length of maxillary toothrow, 10.2; length of diastema, 15.0; postpalatal length, 20.4; zygomatic breadth, 33.8; interorbital breadth, 18.2; mastoid breadth, 25.7; breadth across upper second molars, 12.8 (Dalquest, 1953). In Coahuila, three non-pregnant females and three males weighed 452, 473, 507, 486, 490, and 491 g, respectively (Baker, 1956). In Nuevo León, mass of 14 adult males was 408 g (range, 290–485) and that of 11 adult females was 461 g (range, 345–510—Morales, 1985).

DISTRIBUTION. Sciurus alleni occurs in the Mexican states of Coahuila, Nuevo León, Tamaulipas, and San Luis Potosí.

Fig. 1. Sciurus alleni in pine-oak forest at Iturbi, 1,500 m elevation, Nuevo León, Mexico. Photograph courtesy of J. A. Guevara G.
nearly one-half of S. allenii were black (Leopold, 1959), but no other melanistic individuals are known (Nelson, 1989).

The dental formula of Allen’s squirrel is i 1/1, c 0/0, p 1/1, m 3/3, total 20 (Hall, 1981). The hyoid apparatus consists of a single basihyal and paired thyrohyals, ceratohyals, and stylohyals; the basihyal is thick, triangular in cross-section, long, and fuses with the short thyrohyals at an early age (Hoffmeister and Hoffmeister, 1991). The four pair of mammae are arranged as follows: one pectoral; two abdominal; one inguinal (Dice, 1937). Rectal temperature averages 39.9°C (range, 37.5–41.3—Morales, 1985).

The baculum of S. allenii (Fig. 4) is most like bacula of S. deepsi and S. granatensis. The basal portion of the shaft is circular or nearly so in cross section. The shaft tapers distally, with an apparent twist, to its smallest diameter. At this point the shaft usually curves dorsally and expands into a broad circular disc that is concave on the right side and convex on the left. Ventral to this expanded disc is a spur. Compared to other Sciuerus, the baculum of S. allenii is average in size and proportions, and lacks a supplementary spur. One specimen had a small tuberosity just posterior to the prominent spur. The postero-dorsal edge of the expanded tip ends in a blunt point and an acute notch is formed with the shaft, which has a pronounced dorsal keel. Measurements (in mm) of two bacula from Nuevo León are: length, 11.0, 11.0; length of expanded tip, 3.1, 2.9; height of tip, 3.2, 3.0; height of base, 2.8, 2.9; width of base, 2.2, 2.3 (Burt, 1960).

ONTOGY AND REPRODUCTION. In Coahuila, a female Allen’s squirrel had two embryos averaging 25 mm in crown-rump length on 20 March, and two females were lactating on 23 April (Baker, 1956). In Nuevo León, adult males have scrotal testes from January to August. Juveniles were present in January and April, and subadults were present from April to November. Some evidence of reproduction is present each month of the year, e.g., pregnancy and lactation (Morales, 1985). In Tamaulipas, a nest containing several small young was found 23 August in a hollow branch of a tree. On 21 July, a female had four embryos that were ca. 20 mm in length, and on 10 August, another female had four embryos ca. 37 mm in length (Dice, 1937).

ECOLOGY. S. allenii occurs in the Tamaulipas biotic province (Goldman, 1951) in puecán (Carya), oak (Quercus), pine (Pinus), and other forests (Nelson, 1899). Allen’s squirrel may be uncommon in some parts of its range (Davis, 1944), e.g., in Diamante Pass and east of San Antonio de las Alazanas, Coahuila, where coniferous timber predominates, and in other places it may be common, e.g., in oak groves in the Sierra de Guadalupe, Coahuila (Baker, 1956). In westcentral Nuevo León, relative abundance among localities had no relation to the type of vegetation, season of the year, presence of water, or proximity to areas disturbed by the activities of humans. At some localities >10 S. allenii were observed during the early morning hours, but at nearby, similar-appearing localities, it was uncommon (Morales, 1985).

In Nuevo León, Allen’s squirrel occurs throughout deciduous and coniferous forests, from the lower elevations to the limit of trees on Cerro Potosí (Koestner, 1941). In Coahuila, S. allenii inhabits the mountains of the southeastern part of the state, and is known to occur in groves of pine and cedar (Juniperus) and in fir-pine-aspen (Abies-Pinus-Populus) associations. In Tamaulipas, Allen’s squirrel is numerous in: oak woodlands and chaparrel in the foothills of the Sierra Madre Oriental directly west of Ciudad Victoria (Baker, 1956); oak, pine, puecán, and madroña (Arbutus) forests (Dice, 1937); dry, open pine and oak woods (Goodwin, 1954, 1955); stands of oak and hickory (Carya) trees that grow along streams and arroyos (Alvarez, 1963). In San Luis Potosí, Allen’s squirrel lives in oak forests of the Sierra Madre Oriental and, where the lowlands to the east of the Sierra Madre are desert, S. allenii descends into the lowlands along streams and rivers. Where lowlands to the east of the Sierra Madre are tropical in San Luis Potosí, S. allenii is not present (Dalquest, 1953).

Along a river in Nuevo León, S. allenii frequented large cypress (Taxodium) trees, many of which had cavities (Davis, 1944). Nests may be inside natural cavities of trees or built of leaves and sticks placed on branches of trees. All nest cavities were observed in oaks at heights of 1.5–8 m; openings to nests were round and 5–8 cm in diameter. Nests placed on branches of trees were in pine and oaks at heights of 7–13 m (Morales, 1985). In San Luis Potosí, nests are made of sticks and leaves, and one Allen’s squirrel was living in a hollow tree (Dalquest, 1953).

In Coahuila, acorns seem to provide the basic food. S. allenii

Fig. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of Sciuerus allenii from 11.2 km S Aramberri, 1,140 m elevation, Nuevo León, Mexico (female, University of Kansas Museum of Natural History 57087). Greatest length of cranium is 55.7 mm.

(Fig. 3; Hall, 1981). It mainly occupies the lower Sonoran, upper Sonoran, and transition life zones at 900–1,500 m elevation, but Allen’s squirrel has been reported at elevations of 600–2,550 m (Dalquest, 1953; Dice, 1937; Goodwin, 1954; J. A. Guerra G., pers. comm.; Hall, 1981; Kurntén and Anderson, 1980; Nelson, 1899).

FOSSIL RECORD. The genus Sciuerus evolved by late Oligocene-early Miocene (Black, 1972; Haifner, 1984). S. allenii is known only from the Pleistocene (late Wisconsinan) fauna of San Josecito (Kurntén and Anderson, 1980).

FORM AND FUNCTION. The pelage on the back of Allen’s squirrel is soft and dense, and the tail is full (Nelson, 1899). In Tamaulipas, S. allenii may be in fresh pelage or in old, faded, brown pelage in July (Goodwin, 1954). Near General Terán, Nuevo León,
also may eat cones of Pinus arizonica (Baker, 1956). In Nuevo León, it consumes acorns, which are abundant from July to January. Flowers and buds of oaks, and seeds of pines. Larvae and adult insects are common in the diet; peanuts, corn, oats, apples, peaches, mangos, plums, grapes, tomatoes, and anurans also are consumed (Morales, 1985). It occasionally enters cornfields and does considerable damage to the ripening corn (Davis, 1944). Allen’s squirrel has suffered severe habitat loss through logging, burning, and the clearing of forests for agriculture (Leopold, 1959; Nowak, 1991).

Sciurus allenii may be sympatric with S. aureogaster (Mussier, 1968). In Nuevo León, Allen’s squirrel lives in forests of Pinus montezumae with Microtus mexicanus, Peromyscus maniculatus, Thomomys, Sylvilagus floridanus (Koestner, 1944), and Spermophilus variegatus (J. A. Guevara G., pers. comm.). Potential predators include rattle snakes (Crotalus), hawks (Accipiter striatus, Buteo jamaicensis), golden eagles (Aquila chrysaetos), great horned owls (Bubo virginianus), ringtails (Bassariscus astutus), coyotes (Canis latrans), gray foxes (Urocyon cinereogentilis), and bobcats (Lynx rufus—Morales, 1985).

Ectoparasites include the lice Neoohaematoptus scirurius, Endolelinellus longiceps (Ferris, 1951), E. arizonensis, and E. ocellatus (Kim, 1960), the ticks Ixodes and Dermacentor, and the fleas Hoplopleysus (Morales, 1985), Opiosyis robustus, and Orchopoda fuleri (Traub et al., 1983). Endoparasites include the anatocephalans Moniliformis (Moniliformidae) and nematodes of the families Physalopteridae (Physaloptera) and Trichostrongyldae (Morales, 1985).

BEHAVIOR. Allen’s squirrel gives a soft “chirring” call. In Tamaulipas, it is active from sunrise to ca. 1000 h, and again late in the afternoon (Alvarez, 1963). In San Luis Potosi, S. allenii is active in summer, and often is seen on the ground and at the bases of trees. In winter,Allen’s squirrel is extremely shy and retiring, and in November none was found in an area where it was common and prominent in summer (Dalquest, 1953). In Nuevo León, it is active from day light to dark throughout the year at ambient temperatures of 2°C to 30°C. Greatest activity occurs from sunrise to 1100 h and from 1700 h to dark (Morales, 1985). Nothing is known concerning the genetic characteristics of S. allenii.

REMARKS. Sciurus allenii is similar to S. ocellatus (Nelson, 1899), and S. allenii has been considered to be a subspecies of S. ocellatus (Moore, 1960). Squirrels ancestral to S. nayaritensis, S. ocellatus, and S. allenii may have spread from western Mexico across the Mes de Reo Norte by way of mountains in western Coahuila, Durango, and Zacatecas (Baker, 1956).

Sciurus is from the Latin meaning squirrel (Jaeger, 1955). The specific epithet allenii is dedicated to J. A. Allen, former Curator of Mammals at the American Museum of Natural History (Nelson, 1998).

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