MAMMALIAN SPECIES No. 582, pp. 1–3, 3 figs.

# Saccopteryx leptura.

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Published 1 June 1998 by the American Society of Mammalogists

## *Saccopteryx leptura* (Schreber, 1774)

### Lesser White-lined Bat

*Vespertilio lepturus* Schreber, 1774:pl. lvii (name), 1775:173 (description). Type locality "Suriname."

*Saccopteryx leptura,* Peters, 1867:471. First use of current name combination.

**CONTEXT AND CONTENT.** Order Chiroptera, Suborder Microchiroptera, Family Emballonuridae, Subfamily Emballonurinae. *Saccopteryx leptura* is a monotypic species (Jones and Hood, 1993; Koopman, 1993).

**DIAGNOSIS.** *Saccopteryx leptura* is a small bat superficially resembling several other members of the Emballonuridae (Fig. 1). A pair of whitish longitudinal stripes on the dorsum distinguishes this species from other superficially similar bats (e.g., *Balantiopteryx, Peropteryx, Centronycteris, Cormura,* and *S. gymnura*—Sanborn, 1937). Bats that are sympatric and have two dorsal stripes include *Rhynchonycteris naso, Saccopteryx bilineata,* and *S. canescens* (Sanborn, 1937). *S. leptura* can be distinguished from *R. naso* by the presence of wing sacs, which are lacking in *R. naso,* and by the absence of small tufts of whitish hairs on the forearm, which are diagnostic for *R. naso* (Jones and Hood, 1993; Sanborn, 1937). *S. leptura* differs from *S. bilineata* primarily in size and color of the dorsal pelage; *S. leptura* is smaller (length of head and body <45 mm; forearm <43 mm) with a brown dorsal pelage, whereas *S. bilineata* is larger (length of head and body >45 mm; forearm >43 mm) with a black dorsal pelage (Eisenberg, 1989; Jones and Hood, 1993; Linares, 1986; Sanborn, 1937). *S. canescens* is very similar superficially to *S. leptura.* The latter is only slightly larger and is similar in color (Sanborn, 1937). However, the dorsal pelage of *S. canescens* is frosted or grizzled, as opposed to uniformly brown in *S. leptura* (Sanborn, 1937). Also, the dorsal stripes of *S. leptura* often are more distinct, and the length of maxillary tooth row is slightly larger (>5 mm as opposed to ≤5 mm for *S. canescens*—Jones and Hood, 1993). These two species also may be distinguished on the basis of ecological affinities; *S. leptura* is a forest dweller and *S. canescens* favors open areas (Handley, 1976).

**GENERAL CHARACTERS.** The upper parts of *S. leptura* are uniformly brown, with two whitish longitudinal lines extending down the shoulders to the rump (Sanborn, 1937). The longitudinal stripes usually are distinct, but when the pelage becomes worn, they may not be set off sharply (Eisenberg, 1989). The underparts are a somewhat paler shade of brown (Hall, 1981). The tail perforates the upper surface of the interfemoral membrane (Eisenberg, 1989; Hall, 1981). There is a distinct odiferous gland in the antebrachial membrane of each wing (Eisenberg, 1989; Hall, 1981). This sac lies next to the forearm, close to the elbow. The gland opens on the dorsal surface of the antebrachial membrane (Hall, 1981) and is less prominent in females than in males (Bradbury and Vehrencamp, 1976*a*).

The skull of *S. leptura* (Fig. 2) has well-developed postorbital processes. The premaxillaries are usually free, always incomplete, and their boundaries never are obliterated. The humerus has a well-developed trochanter, and the capitellum is nearly in line with the shaft. The second digit of the manus has a metacarpal but no pha-

FIG. 1. Photograph of *Saccopteryx leptura.* Photograph by Richard K. LaVal.

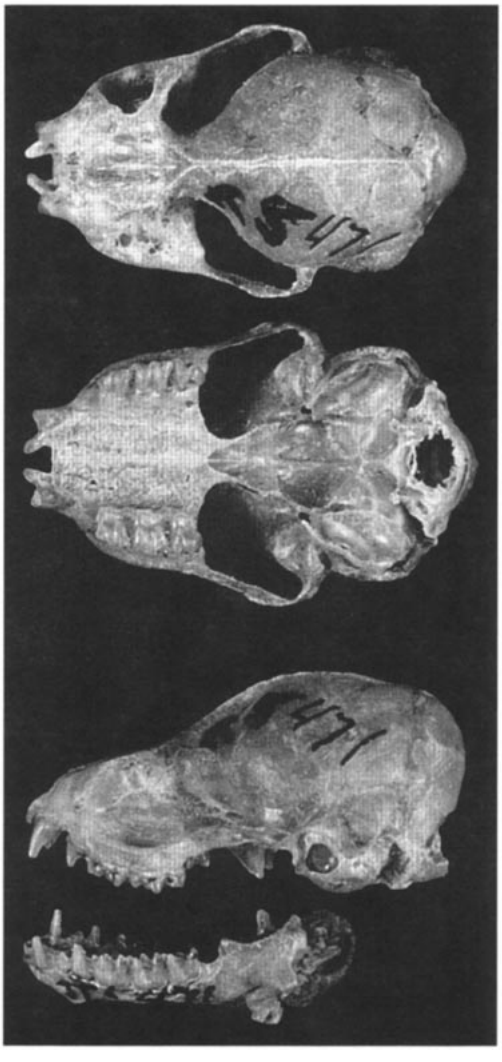

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of a male *Saccopteryx leptura* from Blanchisseuse, Trinidad (Texas Tech University 5442). Greatest length of cranium is 13.6 mm.

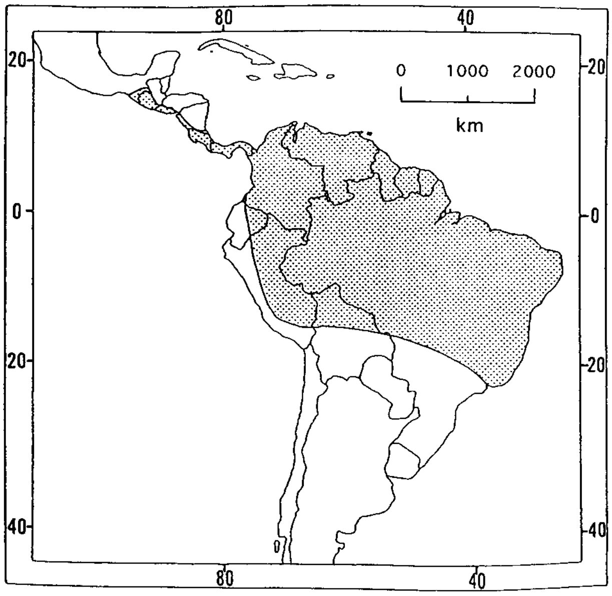

FIG. 3. Geographic distribution of *Saccopteryx leptura* (Hall, 1981; Jones and Hood, 1993).

langes. The seventh cervical vertebra is not fused to the pectoral girdle (Hall, 1981).

Males of this species are somewhat smaller in size than females (Bradbury and Vehrencamp, 1976*a*). Average external measurements (in mm) of males and females, respectively, from Venezuela are as follows: total length, 57.40 (*n* = 5), 59.91 (*n* = 11); length of tail, 15.20 (*n* = 5), 16.09 (*n* = 11); length of ear, 13.60 (*n* = 5), 14.82 (*n* = 11); length of hind foot, 8.20 (*n* = 5), 8.45 (*n* = 11); and length of forearm, 37.57 (*n* = 6), 39.43 (*n* = 12). Average body mass (in g) of adult males and females from Venezuela is 4.72 (*n* = 6) and 5.74 (*n* = 5), respectively (Eisenberg, 1989). Ranges of measurements of the skull (in mm) are as follows: greatest length of skull, 13.1–14.4; interorbital breadth, 3.2–3.8; zygomatic breadth, 8.4–9.1; and length of upper toothrow, 5.1–5.5 (Hall, 1981). The dental formula of *S. leptura* is i 1/3, c 1/1, p 2/2, m 3/3, total 32 (Hall, 1981).

**DISTRIBUTION.** The geographic range of this species (Fig. 3) extends from Chiapas and Tabasco, Mexico, southward to Peru, northern Bolivia, and eastern Brazil; it is also known from Margarita Island, Venezuela, and Trinidad and Tobago (Jones and Hood, 1993; Koopman, 1993). No fossils are known for this species.

**FORM AND FUNCTION.** The basal metabolic rate of *S. leptura* is 2.26 ± 0.62 $\text{cm}^3\ \text{O}_2\ \text{g}^{-1}\ \text{h}^{-1}$, which is relatively high for an insectivorous bat (McNab, 1982, 1989). This high metabolism may be related to the abundance and temporal and seasonal stability of the prey species of this bat (Genoud and Bonaccorso, 1986). Individuals appeared to be molting on 14 and 15 August (Carter et al., 1981).

*S. leptura* concentrates the majority of its echolocation energy in the fundamental of a harmonic series, which consists of a rapid frequency modulation sweeping from 95 to 45 kHz. A small, constant frequency tail also may be present (Bradbury and Vehrencamp, 1976*a*).

**ONTOGENY AND REPRODUCTION.** In Trinidad, *S. leptura* produces young at the onset of the rainy season in May, whereas at La Pacifica, Costa Rica, females produce young in May and November (Bradbury and Vehrencamp, 1976*a*). Following birth, females carry their young for 10–15 days, after which time the young can fly on their own (Nowak, 1991). The young are weaned at ca. 2.5 months of age, and first parturition occurs at up to 18 months of age (Bradbury and Vehrencamp, 1976*a*). One 12-month-old female dispersed from a colony in Trinidad shortly before giving birth to a single young. Females taken in August in Trinidad (Carter et al., 1981) and Ecuador (Webster and Jones, 1984) were non-gravid. In Trinidad, females produce one young per year, but elsewhere females may give birth to two successive young per year (Bradbury and Vehrencamp, 1976*a*, 1977*b*). Two breeding periods are thought to occur at La Selva, Costa Rica (Bradbury and Vehrencamp, 1976*a*). Males are not known to utilize any specialized behavior patterns to attract mates (Jones and Hood, 1993).

**ECOLOGY.** The lesser white-lined bat roosts in small colonies in parts of its range. Colony sizes ranging from two to nine bats per colony have been reported from Costa Rica, and the mean size for 24 colonies studied on Trinidad over a year's time was 2.6 bats per colony (Bradbury and Vehrencamp, 1976*a*). In Trinidad, roosting groups seldom consisted of more than five individuals (Goodwin and Greenhall, 1961). Mean colony sizes tend to have low temporal variations and unimodal distributions when sampled over a large area (Bradbury and Vehrencamp, 1976*b*). Population densities of *S. leptura* ranged from 2.5/ha in Costa Rica to 17.6/ha in Trinidad (Bradbury and Vehrencamp, 1976*a*), and the biomass of this bat in these areas has been estimated at 14–97 g/ha (Bradbury and Vehrencamp, 1977*a*). *S. leptura* roams between roosting sites and colonies, and group compositions change over time (Bradbury and Vehrencamp, 1976*a*).

Other species of bats known to roost with *S. leptura* include *S. bilineata, Micronycteris megalotis, M. minuta, M. hirsuta, Carollia perspicillata, Vampyrops helleri, Artibeus jamaicensis, A. lituratus, Uroderma bilobatum,* and *Molossus major* (Goodwin and Greenhall, 1961).

In Costa Rica, roosting sites of *S. leptura* were found within riparian forests, where roosts usually were located in exposed boles of a large variety of trees (Bradbury and Vehrencamp, 1976*a*, 1976*b*). This bat also has been captured in mature evergreen forest habitats in Peru (Tuttle, 1970). Roosts are not always located in the immediate vicinity of water. *S. leptura* seems to prefer relatively low-lying areas, as the majority of individuals captured in Costa Rica where taken at elevations <60 m above sea level (Starrett and Casebeer, 1968), and all specimens taken during a study in Bolivia were from low elevations (Anderson et al., 1982). However, this species has been recorded from elevations up to 914 m in the Andes Mountains of Peru (Thomas, 1893), and has been taken at an elevation of 825 m on the Caribbean slope of Costa Rica (Starrett and Casebeer, 1968).

In Trinidad and Costa Rica, *S. leptura* seems to restrict its foraging activities to forest areas or their margins. Mature lowland and lower montane forests are preferred (Bradbury and Vehrencamp, 1976*a*). At a site at La Pacifica, Costa Rica, *S. leptura* foraged only within or at the margins of riparian forests (Bradbury and Vehrencamp, 1976*a*). Lesser white-lined bats occasionally may forage over streams, but a closed canopy appears to be an essential element of preferred foraging habitat. This species has been found underneath mango (Greenbaum and Jones, 1978) and banana leaves, under a coconut tree frond (Goodwin and Greenhall, 1961), within old ruins, and over roads through tropical woodlands (Polanco et al., 1992). In Costa Rica and Trinidad, *S. leptura* began foraging at dusk and continued to forage throughout the middle half of the night. In Trinidad, the species sometimes has been observed foraging in the understory during daylight hours (Bradbury and Vehrencamp, 1976*a*). During the twilight period of the evening, foraging activities have been observed at heights up to 13.5 m, where flight appeared to be concentrated within a small, open area below the lower canopy of an evergreen, seasonal forest (McCarthy, 1987). Where the two species are sympatric, *S. leptura* may forage slightly earlier in the evening hours than its congener, *S. bilineata* (McCarthy, 1987).

Nothing is known of the specific food habits of this species. Based on the mass of *S. leptura,* Bradbury and Vehrencamp (1976*a*) estimated the mean length of prey items at about 2.6 mm. Bradbury and Vehrencamp (1976*a*) implied that foraging segregation between two species was a function of the ratio of mean prey length; high ratios were observed in nonsegregated pairs of species, whereas low ratios were noted among pairs that maintained strict segregation. In Trinidad and Costa Rica, *S. leptura* was found to forage near *S. bilineata* without habitat or altitudinal partitioning. However, *S. leptura* was observed to maintain a strict separation from *Rhynchonycteris naso,* either by utilizing separate habitats or by occupying different heights. *S. leptura* was observed foraging only in forested areas, often above the canopy, whereas *R. naso* foraged only above water at heights no greater than 3 m (Bradbury and Vehrencamp, 1976*a*).

*Saccopteryx leptura* is known to harbor an unidentified species of trematode. All individuals examined for rabies during a study of *S. leptura* from Trinadad and Togago were negative for the virus (Goodwin and Greenhall, 1961).

**BEHAVIOR.** *Saccopteryx leptura* forms small colonies or groups with approximately equal numbers of males and females. In Costa Rica and Trinidad, single pairs of *S. leptura* typically were composed of one adult of each sex. Following dispersal of large colonies, male and female pairs were observed roosting together, suggesting that monogamous bonds are formed in this species (Bradbury and Vehrencamp, 1976*a*, 1977*a*). Males are known to defend females (Bradbury and Vehrencamp, 1977*a*).

Foraging territories are maintained and actively defended by colonies of *S. leptura*. Territorial defense mechanisms include aerial chases and vocalizations. The size of foraging territories appears to vary according to location and population density, but has been estimated to range from 0.10 to 1.8 ha/colony (Bradbury and Vehrencamp, 1976*a*). *S. leptura* forages throughout a territory both singly and in groups. Single bats forage within separate but adjacent beats, whereas several bats may share a common area of 5–10 m in diameter while group foraging (Bradbury and Vehrencamp, 1976*a*). Males do not actively defend individual territories within a colony's foraging area (Jones and Hood, 1993). *S. leptura* is wary and is disturbed easily, especially while roosting in trees or vines (Goodwin and Greenhall, 1961).

**GENETICS.** For *S. leptura* $2n = 28$ and $FN = 38$. Both the X and Y chromosomes are acrocentric (Baker and Jordan, 1970; Hood and Baker, 1986). The phylogenetic relationships among members of the family Emballonuridae, including *S. leptura*, were evaluated by use of protein electrophoresis and immunology; three major subdivisions within the family were identified. Eight genera from the New World, including *S. leptura*, comprise one monophyletic group, the Old World genera *Taphozous* and *Saccolaimus* make up the second group, and the Old World genera *Emballonura* and *Coleura* form the third group. The Old World subdivision that consists of *Emballonura* and *Coleura* is more closely related to the New World subdivision than to the other Old World group. (Robbins and Sarich, 1988).

**REMARKS.** The generic name *Saccopteryx* refers to the glandular sac in the antebrachial membrane. The specific epithet *leptura* refers to the yellowish longitudinal stripes on the dorsum (Jaeger, 1955). Another common name for this species is the yellow-lined sac-winged bat.

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