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Myotis keaysi.

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Myotis keaysi Allen, 1914

Hairy-legged Myotis

Myotis ruber keaysi Allen, 1914:383. Type locality "Inca Mines, Peru (altitude 6000 feet; lat. 13° 30′ S., long. 70° W)."

Myotis nigricans keaysi: Miller and Allen, 1928:179. Name combination.

Myotis keaysi: LaVal, 1973:1. First use of current name combination.

CONTEXT AND CONTENT. Order Chiroptera, suborder Microchiroptera, family Vespertilionidae, subfamily Vespertilioninae, subgenus *Selysius* (Koopman 1993). *M. keaysi* was originally considered a subspecies of *M. ruber* (Allen 1914), then a subspecies of *M. nigricans* (Miller and Allen 1928), and finally an independent species (LaVal 1973). Two subspecies are recognized:

M. k. keaysi Allen, 1914:383, see above.

M. k. pilosatibialis LaVal, 1973:24. Type locality "1 km W Talanga, Francisco Morazán, Honduras (altitude 750 m above sea level)."

DIAGNOSIS. *Myotis keaysi* (Fig. 1) is smaller than *M. ruber*. Compared with *M. nigricans*, fur is shorter and woollier, size of wing is larger, and width across canines to postorbital constriction is larger (*M. keaysi*: maximum, 1.12 mm; *M. nigricans*: minimum, 1.00 mm). In *M. keaysi*, sagittal crest is present, slope of forehead is steeper, and ratio of width across canines to postorbital constriction is greater than that of *M. oxyotus* (LaVal 1973). Distribution of fur on uropatagium is more extensive in *M. keaysi* than *M. elegans*; distal two-thirds of uropatagium is bare in *M. elegans*. Sagittal crest is absent in *M. elegans* but present in *M. keaysi*. Bacula of *M. elegans*, *M. nigricans*, and *M. oxyotus* are similar in size, but baculum of *M. keaysi* is wider and triangular in shape (LaVal 1973). Compared with *M. californicus*, *M. keaysi* has hair on upper surface of wing and on leg below knee (Reid 1997).

GENERAL CHARACTERS. *M. keaysi* is a small Neotropical bat with fur usually along uropatagium from base of legs to feet. Body size varies geographically. Specimens from Yucatan are smallest, and size gradually increases to north and south and reaches a maximum on the Pacific versant of Guatemala and Chiapas. Specimens from the Andes slopes of Ecuador and Peru are larger (ca. 1 mm greater in mean length of skull) than those from Venezuela and are considered a distinct subspecies (*M. k. keaysi*—LaVal 1973; Pacheco et al. 1993).

Fur on back ranges from 4 to 6 mm and can be woolly, but is never silky. Dorsal hairs have brown tips and somewhat darker bases. Upper parts range in color from pinkish gray or dark gray brown to reddish brown or orange. Individuals in Yucatan, Mexico, molt from reddish brown to blackish pelage; dorsum molts 1st, judging from presence of small old patches on venter (Jones et al. 1973). Dorsal fur of uropatagium reaches at least halfway from knee to foot along tibia, and is thick in some specimens. Fur is sparse to thick on dorsum of plagiopatagium between tibia and elbow. Membranes are dark brown to black. Skull is small to moderate in size. Sagittal crest is well developed and forehead has an evident slope (Fig. 2). Width across canines is greater than postorbital constriction (ratio > 1.12 mm—LaVal 1973). Cranial and external measurements (mean ± 2 *SE*, in mm, body mass in g, sexes combined) from published data are: total length, 47 ± 0.45 (41–53; *n* = 27—Allen 1914; Álvarez-Castañeda and Álvarez 1991; Eisenberg 1989; Eisenberg and Redford 1999; Reid 1997); length of tail, 38 ± 0.38 (33–41; *n* = 26—Allen 1914; Álvarez-Castañeda and Álvarez 1991; Eisenberg 1989; Eisenberg and Redford 1999; Reid 1997); length of hind foot, 8 ± 0.57 (7–9; *n* = 27—Allen 1914; Álvarez-Castañeda and Álvarez 1991; Eisenberg 1989; Eisenberg and Redford 1999; Reid 1997); length of ear, 12 ± 0.29 (10–14; *n* = 26—Álvarez-Castañeda and Álvarez 1991; Eisenberg 1989; Eisenberg and Redford 1999; Reid 1997); length of tibia, 14.25 ± 0.37 (*n* = 41—Allen 1914; LaVal 1973); length of forearm, 35.92 ± 0.50 (32–39; *n* = 74—Allen 1914; Álvarez-Castañeda and Álvarez 1991; Eisenberg 1989; Eisenberg and Redford 1999; LaVal 1973; Reid 1997; Rydell et al. 2002); length of 3rd metacarpal, 34.6 ± 0.42 (*n* = 41—Allen 1914; LaVal 1973); wing loading (mass × gravity/wing and body area, in N/m^2), 5.3 (*n* = 34—Rydell et al. 2002); aspect ratio, 6.4 (*n* = 34—Rydell et al. 2002); greatest length of skull, 13.55 ± 0.8 (*n* = 61—Allen 1914; Álvarez-Castañeda and Álvarez 1991; LaVal 1973); depth of braincase, 5.15 ± 0.06 (*n* = 41—Allen 1914; LaVal 1973); mastoid width, 7.1 ± 0.55 (*n* = 40—LaVal 1973); zygomatic width, 7.9 ± 0.23 (*n* = 20—Álvarez-Castañeda and Álvarez 1991); width across upper canines, 3.7 ± 0.05 (*n* = 61—Allen 1914; Álvarez-Castañeda and Álvarez 1991; LaVal 1973); length of mandibular toothrow, 6.45 ± 0.05 (*n* = 61—Allen 1914; Álvarez-Castañeda and Álvarez 1991; LaVal 1973); length of maxillary toothrow, 4.9 ± 0.20 (*n* = 20—Álvarez-Castañeda and Álvarez 1991); postorbital constriction, 3.3 ± 0.2 (*n* = 39—LaVal 1973); length of fur, 4.6 ± 0.02 (*n* = 40—LaVal 1973); body mass, 5.0 ± 0.4 (4–6; *n* = 40—Eisenberg 1989; Eisenberg and Redford 1999; Reid 1997; Rydell et al. 2002).

Measurements of bacula (mean ± 2 *SE*, in mm) from North American and Venezuelan specimens are length, 0.53 ± 0.12; depth, 0.15 ± 0.07; width, 0.24 ± 0.10 (*n* = 46—LaVal 1973). One specimen from Puno, Peru, had a larger baculum than North American or Venezuelan specimens (LaVal 1973).

DISTRIBUTION. *Myotis keaysi* occurs from southern Tamaulipas, Mexico, through Yucatan Peninsula and central America to northern Venezuela, including Trinidad, and into western Colombia following the foothills of the Andes in Peru to northern Argentina (Fig. 3—Eisenberg and Redford 1999; Hall 1981; Koopman 1982; Reid 1997). *M. k. keaysi* occurs from the foothills of the Andes in western Colombia to northern Argentina. Most localities are from 2,000 to 2,400 m elevation, but some occur at 3,350 m (Pacheco et al. 1993). *M. k. pilosatibialis* occurs from southern Tamaulipas Mexico to Venezuela and east to Trinidad. Elevational distribution of *M. k. pilosatibialis* ranges from sea level to 2,500 m (LaVal 1973). No fossils are known.

FIG. 1. Photograph of an adult *Myotis keaysi*. Used with permission of the photographer R. K. LaVal.

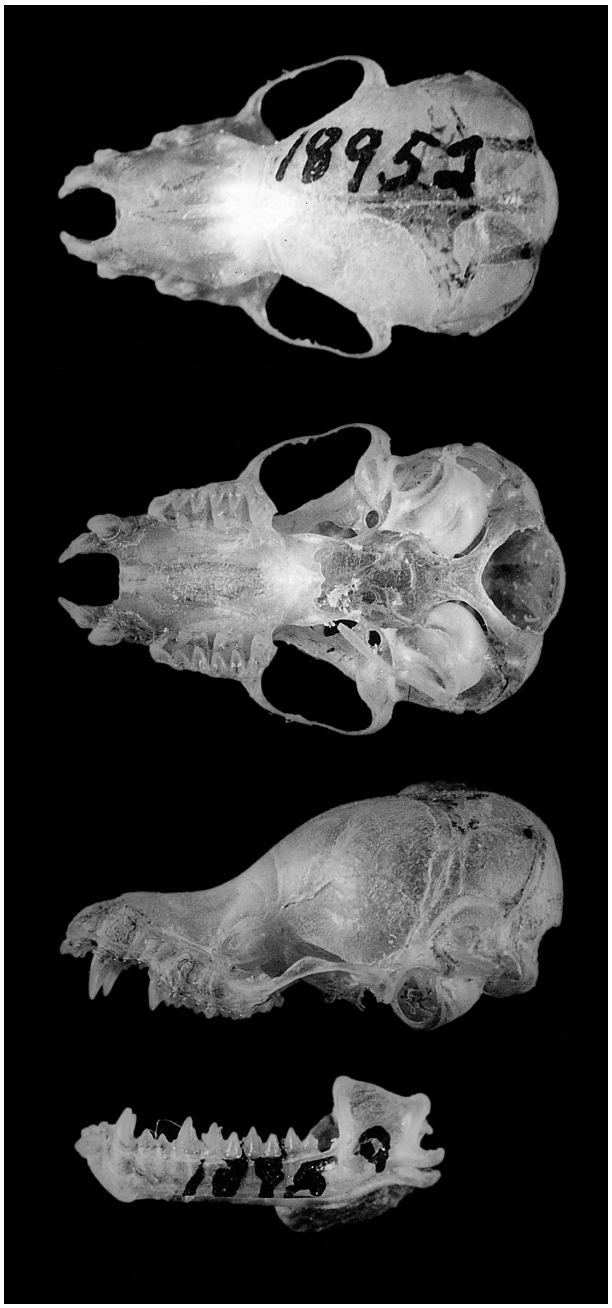

FIG. 2. Dorsal, ventral and lateral views of cranium and lateral view of mandible of a male *Myotis keaysi* (IBUNAM [Instituto de Biología, Universidad National Autónoma de México] 18952). Greatest length of skull is 26.1 mm.

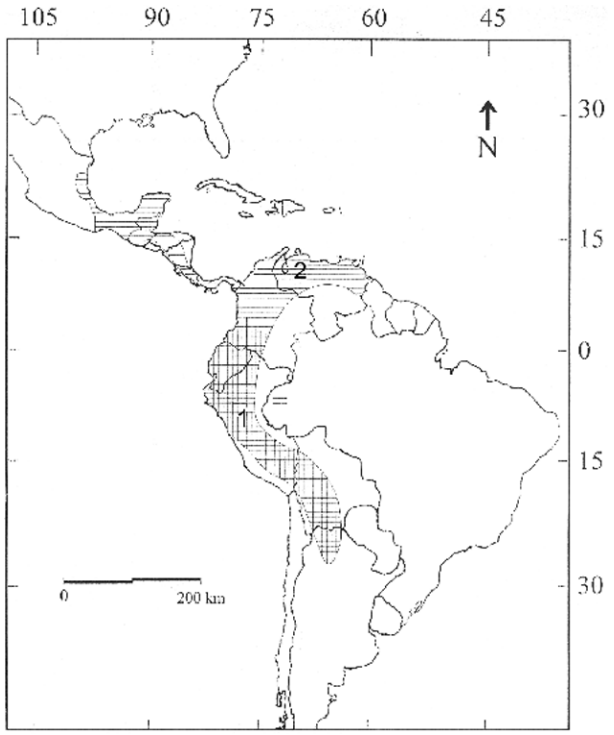

FIG. 3. Geographic distribution of *Myotis keaysi*. Subspecies are 1, *M. k. keaysi*; 2, *M. k. pilosatibialis*. Map redrawn from Eisenberg (1989), Eisenberg and Redford (1999), and Hall (1981).

ONTOGENY AND REPRODUCTION. Reproductive cycle is seasonal polyestry without bimodal peaks in births (LaVal and Fitch 1977). In Costa Rica, a peak in births occurs from May to June, but breeding may extend through the wet season (LaVal and Fitch 1977). One pregnant female caught in April in Chiapas, Mexico, had a 15-mm-long embryo (Medellín et al. 1986). No reproductive signs were reported for 47 adult females during July and August in Felipe Carrillo Puerto, Yucatan, Mexico (Jones et al. 1973), and no pregnant females were taken in August on Trinidad Island (Carter et al. 1981). In Peru, females were pregnant in July and were nonreproductive in February, June, August, and December (Graham 1987).

ECOLOGY. *Myotis keaysi* ranges from arid scrub to tropical rain forest. In northern parts of the range (from Honduras to Mexico), they occupy dry forest, pine forest, second growth, and scrub at low elevations (Estrada and Coates-Estrada 2001). In southern parts of the range (from Costa Rica to Argentina), they were common in evergreen, semideciduous forest, moist habitats, and montane tropical humid forest of Andean mountains (Handley 1976; Mares et al. 1995; Reid 1997; Timm et al. 1989). Common roosting sites are limestone caves, natural water wells, hollow trees, bridges, and roofs of buildings (Arita 1997; Birney et al. 1974; Goodwin and Greenhall 1961; Jones et al. 1973; Muñoz 1995; Timm et al. 1989). *M. keaysi* roosts in conical depressions of cave ceilings (Brunet and Medellín 2001). A colony of >500 individuals roosted in Hoctum cave, Yucatan (Arita and Vargas 1995), and specimens from Cinco Esquinas, Costa Rica, were part of a colony of 200 individuals roosting under a bridge (Timm et al. 1989). In caves of Puebla, Mexico, *M. keaysi* roosts with *M. nigricans* in small groups (2–8 individuals) throughout the year (Medellín and López-Forment 1985).

Activity begins at sunset and ends 1 h before sunrise. *M. keaysi* is easily caught with mist nets and is frequently captured with other bat species, including *Lonchorhina aurita*, *Molossus rufus*, *Myotis nigricans*, *Peropteryx macrotis*, *Pteronotus parnellii*, and *Sturnira erythromos* (Jones et al. 1973; Mares et al. 1995). Long distances between recaptures (range, 0–1,450 m; mean, 200 m from the first capture) in Costa Rica suggest large activity ranges for this species (LaVal and Fitch 1977).

Calls of *M. keaysi* are short (ca. 2.5 ms), high in intensity, and repeated at high, variable rates (15–20 s^{-1}). Calls consist of steep down-sweeps that end in a narrow-band tail, which contains most of the energy at 59–63 kHz. Initial frequency is ca. 110 kHz, but can be much lower (ca. 80 kHz—Rydell et al. 2002).

The following ectoparasites occur on *M. keaysi*: *Anatrichobius scorzai* (Diptera: Streblidae—Guerrero 1995; Wenzel 1976), *Basilia anceps* (Diptera: Nycteribiidae—ter Hofstede et al. 2004), and *B. carteri* (Autino et al. 2000).

GENETICS. *Myotis keaysi* has 2n = 44 chromosomes and FN = 50. Y chromosome is small and acrocentric, and similar in size to autosome 24 (Bickham et al. 1986). G banding is identical to that of *M. nigricans* (Bickham 1979).

CONSERVATION STATUS. *Myotis keaysi* is common in some areas of the neotropics, such as Yucatan (Arita 1997; Jones et al. 1973), but rare in Lacandona rainforest in Chiapas, Mexico

(Medellín et al. 2000). Taxonomic confusion with sympatric *M. nigricans* impairs evaluation of conservation status.

REMARKS. *M. keaysi* was named in honor of the collector H. H. Keays (Allen 1914).

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