

Myotis albescens (Chiroptera: Vespertilionidae)

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Abstract: *Myotis albescens* (É. Geoffroy Saint-Hilaire, 1806) is a vespertilionid bat commonly called the silver-tipped myotis. A small bat with unique frosting of the hair dorsally and ventrally, it is 1 of about 100 species of *Myotis* worldwide and 1 of 12 species of *Myotis* in South America. It is one of the most widely distributed species in the genus occurring from southern Mexico to Argentina in diverse habitats generally at elevations below 500 m. It is not of special conservation status, but is rare or uncommon in many areas. DOI: 10.1644/846.1.

Key words: bat, Central America, Mexico, silver-tipped myotis, South America, Vespertilionidae

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Myotis albescens (É. Geoffroy Saint-Hilaire, 1806) Silver-tipped Myotis

Vesp[ertilio]. albescens É. Geoffroy Saint-Hilaire, 1806:204. Type locality “Paraguay.” Type locality restricted to “Yaguaron, Paraguay” by LaVal (1973:26) based on neotype designation.

Vesp[ertilio]. leucogaster Schinz, 1821:180. Type locality “Östküste von Brasilien,” identified as “Flusse Mucuri,” Bahia, Brazil by Wied-Neuwied (1826:279). Lectotype designation by Ávila-Pires (1965:8).

Vespertilio isidori d’Orbigny and Gervais, 1847:16. Type locality “Corrientes (république Argentine),” Argentina.
Aeorestes albescens: Fitzinger, 1870:430. Name combination.
[*Vespertilio (Vespertilio) albescens*: Trouessart, 1897:132. Name combination.

Myotis albescens: Thomas, 1899:546. First use of current name combination.

Myotis argentatus Dalquest and Hall, 1947:239. Type locality “14 kilometers southwest of Coatzacoalcos, 100 feet elevation, Veracruz, Mexico.”

CONTEXT AND CONTENT. Order Chiroptera, family Vespertilionidae, subfamily Myotinae (Simmons 2005). Previously included in the subgenus *Leuconoe* (Koopman 1993, 1994). Examination of molecular data indicates that the subgenus is not monophyletic (Ruedi and Mayer 2001); dental morphology of fossil and living species suggests that diagnostic characters define the subgenus (Menu et al. 2002). *M. albescens* is monotypic.

NOMENCLATURE NOTES. Following Carter and Dolan (1978) and Simmons (2005), *aenobarbus* is not included in

this species but is recognized as a species of *Nycticeius*. The names *arsinoe*, *mundus*, and *punensis*, which were listed as synonyms by Miller and Allen (1928), Cabrera (1958), and LaVal (*arsinoe* only—1973) are recognized currently as synonyms of *M. nigricans* (Simmons 2005). Although *isidori* is included as a synonym following Koopman (1993) and Simmons (2005), Simmons (2005) noted that the identification of the holotype in the Muséum National d’Histoire Naturelle, Paris, is questionable. Carter and Dolan (1978:78) proposed that the name be placed in *Pipistrellus* based on Carter’s examination of a specimen (probably not the type) in the Paris Museum. *M. albescens* and other New World species of *Myotis* were assigned to the subgenus *Aeorestes* by Hooper and Van Den Bussche (2003); however, this taxon with type species *Aeorestes villosissimus* (= *Lasiurus cinereus villosissimus*) by original designation is unavailable (Wilson 2008:469).



Fig. 1.—An adult male *Myotis albescens* from Brazil. Used with permission of the photographer Maricélio de Medeiros Guimarães (www.naturae.com.br).

Clarification of the type locality and the type specimen is given by Morales Agacino (1938) and Wilson (2008). The species was described by É. Geoffroy Saint-Hilaire (1806) based on the description in Azara (1801) because the specimen described by Azara was not preserved. “Paraguay” was given as the source country by É. Geoffroy Saint-Hilaire (1806) and modified by Miller and Allen (1928:201) to be the type locality (“Paraguay, perhaps near Asunción where Azara resided”). The type locality was described by Azara in his original manuscript as “Entre Una multitud de Morciélagos que Revoleteaban por me Quarto en la Estancia de Sn. Solano junto al Estero Yberá mate Dos identicos ...” (Morales Agacino 1938), which is located “18 km SW of the town of Yegros, about 100 km N of the Río Alto Paraná” (Wilson 2008). The locality designation given by Husson (1978) is a paraphrasing of parts of 2 different paragraphs (Anderson 1997). In designating a neotype, LaVal (1973) fixed the type locality as Yaguaron, Paraguarí, Paraguay.

The etymology of the genus name is derived from *mys* (Greek), mouse, and *ous, otos* (Greek), ear; the etymology of the specific epithet is derived from *albescens* (Latin), becoming white, a reference to the frosted white hairs on the dorsum and the whitish venter (Braun and Mares 1995). The genus name is masculine in gender based on a ruling by the International Commission on Zoological Nomenclature (1958) contra the suggestion by Woodman (1993) that it be considered feminine. Common names in Spanish for *M. albescens* are murcielaguito de vientre blanco (Barquez et al. 2006; Díaz and Ojeda 2000), murcielaguito plateado (Pacheco et al. 1995), and murciélagos pardo escarchado (Linares 1998).

DIAGNOSIS

Myotis albescens (Fig. 1) is distinguished from other species of Neotropical *Myotis* (*M. keaysi* [hairy-legged myotis], *M. simus* [velvety myotis], *M. riparius* [riparian myotis], and *M. ruber* [red myotis]) by the absence of a sagittal crest, a ratio of width across canines to postorbital constriction <1.0, and frosted, long, silky hair. Compared with *M. aelleni* (southern myotis), *M. chiloensis* (Chilean myotis), *M. elegans* (elegant myotis), *M. nigricans* (black myotis), and *M. oxyotus* (montane myotis), a uropatagial fringe is present, frosting on dorsal hairs is present, and fur is not bicolored or tricolored. For *M. levis* (yellowish myotis), the uropatagial fringe of hairs is rarely present and the border of the uropatagium is not pale.

GENERAL CHARACTERS

Myotis albescens is a medium-sized *Myotis*. Fur is long (>4 mm) and silky. General color of the pelage is dark brown or black; some individuals may have pale brown

coloration. Hairs have conspicuous white or yellowish tips, giving a frosted appearance. Venter paler, appearing almost white on abdomen, sides, perianum, and around legs. Membranes are light brown to black. Dorsal fur of uropatagium is sparse and not reaching knees; slight fringe on posterior edge of uropatagium often present (visible with magnification). Plagiopatagium attaches at toes. Calcar long (ca. 16 mm), extending beyond the free border of the interfemoral membrane, and terminating in a small projecting lobule; keel absent or poorly developed. Hind feet large, the length more than one-half the length of the tibia. Tragus long and slender, tapering slightly at the tip. Skull is medium in size for a *Myotis* (Fig. 2). Sagittal crest is absent and forehead has little slope. Short, narrow rostrum, large interorbital region, and breadth of braincase give skull globose appearance. Width across canines less than postorbital constriction (ratio <1.0). Premolars aligned on toothrow; P2 not displaced to the lingual side; crown area of molars relatively small (Barquez et al. 1999; Husson 1962; Koopman 1994; LaVal 1973; López-González 2005; Miller and Allen 1928).

Means (and ranges) of external measurements (mm, $n = 133$, sexes combined) for *M. albescens* collected in the Chaco Boreal (Myers and Wetzel 1983) were: total length, 86.4 (79–96); length of tail, 36.6 (27–40); length of hind foot, 9.1 (8–11); length of ear, 15.2 (12–18); length of forearm, 34.6 (32.5–37.3); length of 3rd metacarpal, 32.7 (30.5–34.7). Body mass (g) for specimens from Paraguay was 6.1 ± 0.88 *SD* (4–9; $n = 68$ —López-González 1988) and mean cranial measurements (mm, ranges in parentheses, sexes combined—López-González et al. 2001) were: greatest length of skull, 14.0 (13.5–14.6; $n = 66$); condylocanine length, 12.0 (11.4–12.5; $n = 66$); condylobasal length, including incisors, 13.0 (12.5–13.6; $n = 66$); mastoidal breadth, 7.3 (7.0–7.6; $n = 65$); zygomatic breadth, 8.5 (7.9–8.9; $n = 51$); breadth of braincase, 7.1 (6.7–7.5; $n = 66$); interorbital constriction, 4.0 (3.7–4.3; $n = 67$); breadth across upper canines, 3.5 (3.3–3.8; $n = 68$); breadth across upper molars, 5.4 (5.1–5.7; $n = 68$); length of rostrum, 5.8 (5.6–6.2; $n = 68$); length of maxillary tooththrow, 4.9 (4.6–5.3; $n = 68$); length of upper molariform tooththrow, 4.0 (3.7–4.4; $n = 68$); length of mandibular tooththrow, 5.1 (4.8–5.4; $n = 68$); length of lower molariform tooththrow, 4.6 (4.3–4.9; $n = 68$).

Mean measurements of bacula (mm) from Panama and Nicaragua ($n = 5$), South America ($n = 36$), Andes of Ecuador ($n = 8$), and coastal Peru ($n = 3$), respectively (LaVal 1973), were: length, 0.89, 0.85, 0.91, 0.95; depth, 0.30, 0.31, 0.41, 0.31; width, 0.37, 0.39, 0.43, 0.50. Large size and distinctive shape of the baculum distinguish this species from other *Myotis*; individual variation is in depth of bacula, not in shape (LaVal 1973).

Geographic variation in coloration generally is absent, although individual variation may be present. Individuals from the Andes of Ecuador have distinctly darker mem-



Fig. 2.—Dorsal, ventral, and lateral views of skull and lateral view of mandible of an adult male *Myotis albescens* (OMNH [Sam Noble Oklahoma Museum of Natural History] 34543) from Aguas Calientes, Santa Bárbara Department, Jujuy Province, Argentina. Greatest length of skull is 13.67 mm.

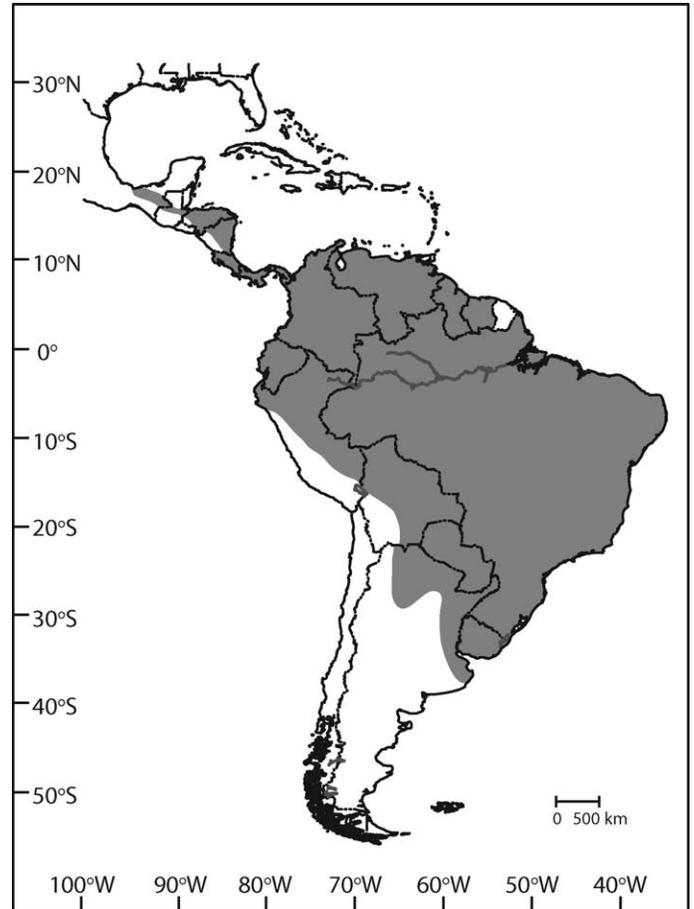


Fig. 3.—Geographic distribution of *Myotis albescens*. Map redrawn from Wilson (2008) with modifications.

branes and fur (LaVal 1973). Sexual dimorphism in wing and cranial measurements with females slightly larger than males may (Myers and Wetzel 1983; Presley 2004; Presley and Willig 2008) or may not be present (López-González et al. 2001). Specimens from northern South America are smallest and size increases with increasing latitude, both to the north and south (LaVal 1973; López-González 2005; López-González et al. 2001).

DISTRIBUTION

Myotis albescens occurs (Fig. 3) from southern Veracruz, Mexico, southward through Central America (Guatemala, Honduras, Nicaragua, Costa Rica, and Panama), and South America (Colombia, Venezuela, Guyana, Suriname, Ecuador, Peru, Brazil, Uruguay, northern Argentina, Paraguay, and Bolivia—Hall 1981; LaVal 1973; Simmons 2005). This species currently is unknown in French Guiana (Simmons and Voss 1998) and has not been reported from Chile (Mann 1978; Osgood 1943), Trinidad and Tobago, or the Netherland Antilles (Wilson 2008). No fossils are known.

FORM AND FUNCTION

Dental formula is $i\ 2/3$, $c\ 1/1$, $p\ 3/3$, $m\ 3/3$, total 38. P1 and P2 smaller than P3; hypocone on anterior and middle upper molars absent or poorly developed (Koopman 1994). The deciduous dental formula is identical to that of most *Myotis*: $di\ 2/3$, $dc\ 1/1$, $dp\ 2/2$, total 22 (Webster 1981). The pattern of tooth replacement was described by Webster (1981). Milk teeth are curved spicules and directed posterolingually. Deciduous teeth erupt before parturition in the following sequence: di_3 , DC1, DI3, dc_1 , di_2 , DI2, di_1 , dp_3 , dp_4 , DP3, DP4. Sequence of shedding of deciduous teeth is di_1 , DP4, di_2 , di_3 , dp_4 , DI2, dc_1 , dp_3 , DC1, DP3, DI3 and is related to the sequence of eruption of the permanent teeth. Sequence of eruption of the permanent teeth is (parentheses indicate teeth simultaneously erupting) i_1 , i_2 , p_4 , i_3 , P4, (m_1 , M1, c_1 , C1, p_2 , m_2 , I2, M2), P2, m_3 , I3, p_3 , P3, M3.

The anatomy of the middle ear was described by Pye (1966). Middle ear ossicles are small; intra-aural muscles are large; Paauw's cartilage is prominent; and the stapedia artery persists in adults. The cochlea is conical with 5 half-turns; mean cochlear height is about 1.8 mm and mass is 7 g. Width of the basilar membrane (from lip of spiral ligament to the inner rod of Corti) at the base of the cochlea is 60–80 μm and increases toward the apex. Basilar membrane thickening consists of hyaline tissue and is most prominent at the basal turn. Cells of Hensen are deflected toward the outer hair cells, leaving a large space; heights of the cells of Claudius are greatest at the base of the cochlea and decrease toward the apex. Height and width of the spiral ligament decrease in a linear fashion toward the apex.

Heart mass averages 0.94% of body mass and ventral thoracic muscle mass averages 7.12% of body mass. Mean wing area is 11.09 cm^2/g , mean glide area is 13.00 cm^2/g , and the buoyancy index is 4.50 (Hartman 1963).

The reproductive anatomy of *Myotis albescens* from Paraguay was described by Myers (1977). The uterine cornua in nulliparous females are about equal in size; in parous females, the right horn is larger than left with average lengths of 1.8 mm and 1.3 mm, respectively, and average width of 1.0 mm. Implantation occurs on the right side. Ovaries are round to oval in cross section and about 1 mm in diameter. During the beginning of the mating period, 4 or 5 small and medium-sized follicles (250- μm diameter) are present. Follicle diameter increases throughout breeding season into July, until the female becomes pregnant; the number and average size increases again late in pregnancy. In November, most females, including lactating females and pregnant females that were lactating, have few follicles > 300 μm . By late February, ovaries of all females (pregnant and nonpregnant) have moderate numbers of small and medium-sized follicles (<240 μm). In preimplantation females, the diameters of the corpora lutea range from 380 to 660 μm , the lumen is small or absent, corpora are

moderately to extensively vascularized by capillaries, nuclei of luteal cells are spherical with moderately distinct nucleoli, and a narrow, irregular zone of paraluteal cells surrounds the corpus luteum. By the time the placenta has formed, nuclei of luteal cells have swollen, the nucleoli are prominent, and vascularization has increased and larger vessels are present. When the embryo has reached about 10 mm (crown–rump length), diameter of the corpus decreases, nuclei of luteal cells begin to shrink, and nucleoli decrease in prominence; vascularization of corpus decreases and proportionately fewer capillaries and more large vessels are present. At late pregnancy, the corpus luteum is small and indistinct, the nuclei shriveled, and the nucleoli nearly absent. The corpus disappears soon after parturition.

Testes mass (0.18 g) is 6.69% of male body mass (Wilkinson and McCracken 2003) and brain mass is 3.2% of body mass (Pitnick et al. 2006). The negative covariation between testes and brain mass may be correlated with sexual selection (Pitnick et al. 2006).

Morphology of the evolution of the brain in the Chiroptera is discussed in Baron et al. (1996a, 1996b, 1996c). Measurements of the brain (mean, mm) were: length of brain, 8.3; length of hemisphere, 4.7; width of hemisphere, 6.1; height of hemisphere, 4.3; length of corpus callosum, 0.51. Brain mass is 126 mg and volume (mass of brain/1.036) is 121. Volumes of brain parts (mm^3) were: medulla oblongata, 18.1; mesencephalon, 12.9; cerebellum, 24.3; diencephalon, 10.0; and telencephalon, 54.3. Although taxa in the subfamily Vespertilioninae were found to have the smallest average brain of the vespertilionid subfamilies, the members of the genus *Myotis* had the 3rd largest brains of the subfamily. Brain size of *M. albescens* is average, 3 structures are larger than in other species of *Myotis* (nucleus fascicularis cuneatus externus, nucleus cochlearis dorsalis, and nucleus reticularis lateralis), and 2 are smaller (nucleus fascicularis cuneatus medialis and nucleus vestibularis superior).

The maximum bite force is 2.18 ± 0.43 newtons (Aguirre et al. 2002) and scales positively allometric to body mass.

ONTOGENY AND REPRODUCTION

Myotis albescens is monotocous, bearing a single young at a time (Myers 1977). Although Mares et al. (1995) reported collecting a female with 4 embryos, crown–rump length = 6–10 mm in Argentina in November, we (JKB and MAM) have observed that this information is in error because of a mix-up in field numbers for voucher specimens.

Females breed 2 or 3 times annually (Myers 1977; Wilkinson and McCracken 2003). Myers (1977) described the pattern of reproduction of *M. albescens* in Paraguay. Mating was observed and spermatozoa were present in female reproductive tracts at the beginning of the breeding season in May. Ovulation, fertilization, and implantation occurred in

July, about 1–3 months after copulation, indicating possible storage of sperm and delayed fertilization. The 1st parturition peak occurred in October, followed by copulation and a 2nd pregnancy, and a possible 3rd pregnancy in January, February, and March. The gestation period is about 3 months; periods for 2nd and 3rd pregnancies may be shorter in duration. Following the 3rd peak reproductive activity declined until the beginning of a new annual cycle.

Pregnant females also have been reported in January in Mexico (Alvarez-Castañeda and Alvarez 1991; Medellín 2005), Costa Rica (LaVal 1977), and Uruguay (Barlow 1965); June in Peru (10% of females—Graham 1987); July in Honduras (Dolan and Carter 1979); August in Peru (35% of females—Graham 1987; 58% of females—Tuttle 1970); and September in Peru (Ascorra et al. 1996). In Peru, parturition occurred during both dry and wet seasons in the eastern lowlands and only during the dry season on the Pacific slope (Graham 1987). Crown-rump lengths for embryos range from 8 to 23 mm (Barlow 1965; Dolan and Carter 1979; Tuttle 1970).

Nursing individuals were collected in November in Argentina (Mares et al. 1995). Young (with unfused phalanges) have been captured in November in Argentina (Mares et al. 1995); in April, June, July, August, and September in Peru (Graham 1987); and in April in Chiapas, Mexico (Medellín et al. 1986).

The period of lactation is about 1 month (Myers 1977). Lactating females were collected in Paraguay in October, November, and December, but also in May and June during the 2nd and 3rd breeding period (Myers 1977). A lactating female was reported in September in Bolivia (Anderson 1997), and 2 lactating females were caught in November in Argentina (Mares et al. 1995). In Peru, lactating females were captured in February and March (Ascorra et al. 1996), April (Graham 1987), and November (Baud 1986).

Milk was the main food item in neonates (<22 deciduous teeth, permanent teeth absent); the proportion of milk in the diet decreased and the proportion of insect parts increased with the eruption of the permanent teeth. Stomachs of juveniles with no deciduous teeth (only permanent teeth) contained only insect remains (Webster 1981).

In Paraguay, testes size was smallest (50–75 mm³) in late summer (January–March) and spermatids or spermatozoa were absent. Spermatogenesis began in autumn (April and May) and continued during winter and spring. Testes reached maximum size in spring (September) with volumes >250 mm³ and remained large through December. Accessory glands were largest in May–December when the interstitial tissue was most active (Myers 1977).

Male *M. albescens* captured in January (Panama) and June (Peru) had testes that exhibited all stages of spermatogenesis in the tubules, and large, swollen epididymides that contained large numbers of spermatozoa. Presence of sperm storage may indicate periodic sexual segregation during the

part of the year when spermatogenesis occurs (Wilson and Findley 1971).

Males with abdominal testes were collected in January in Uruguay (Barlow 1965), and in April and July (by one of us [JKB]) and August (Barquez and Díaz 2001) in Argentina. Males with scrotal testes were captured in April (Barquez 1988), June (Barquez and Díaz 2001), October (JKB), and November (Mares et al. 1995).

Individuals breed at <1 year of age; females can mate at 2 months and males develop sperm at <1 year (Myers 1977). In Paraguay, ovaries of young females (with unfused phalanges) contained follicles <120 µm. Individuals born in October or November had follicles >300 µm by mid-December and sperm were present (Myers 1977). Testes of young males (with unfused phalanges) captured in January, February, and June in Paraguay had few cells in meiosis, and spermatids and spermatozoa were absent. Meiotic activity was recorded in April and June (Myers 1977).

ECOLOGY

Myotis albescens inhabits a variety of habitats, including lowland areas (Gardner et al. 1970; LaVal 1973); lowland thorn-scrub associations (Dolan and Carter 1979); lowland humid tropical forest (Medellín 2005); Chacoan thorn scrub (Barquez and Lougheed 1990; Mares et al. 1995); and evergreen forests, openings such as yards, pastures, and croplands, and wetlands (Handley 1976). In Paraguay, *M. albescens* is more abundant in areas that are flooded at least part of the year (López-González 1998; Aguirre et al. (2003c) found *M. albescens* present in seasonally flooded savanna in Bolivia and Bernard et al. (2001) reported the majority of individuals of this species in flooded forest in the Brazilian Amazon. Elevational range is from sea level to about 1,500 m, but more commonly below 500 m.

Myotis albescens roosts frequently in buildings and other structures constructed by humans (Acosta y Lara 1950; Aguirre 1994 [not seen, cited in Anderson 1997:273], 1996 [not seen, cited in Aguirre et al. 2003b:439]; Kalko et al. 1996; LaVal 1977; Sanborn 1949), including attics (Mares et al. 1995), under roofs (Barquez 1988; Barquez and Ojeda 1992), under palm logs and roofs of palm-thatched huts (Myers 1977; Sanborn 1949; Tuttle 1970), and in locations with some natural light and exposure, such as outer walls of buildings or open-sided attics (Reid 1997). In natural habitats, individuals have been found under the bark of trees (Acosta y Lara 1950); in tree holes, trunks, or in hollow trees (Barquez and Lougheed 1990; Dalquest and Hall 1947; Handley 1976; Kalko et al. 1996); and in cracks and crevices in rocks and rocky cliffs (Acosta y Lara 1950; Handley 1976). Roost and capture sites are commonly associated with areas near or around waterways (Acosta y Lara 1950; Ascorra et al. 1996; Dalquest and Hall 1947; Gardner et al. 1970; Handley 1976; Kalko et al. 1996; Whitaker and Findley 1980).

Myotis albescens exhibited low relative abundance in seasonally flooded savannas in Bolivia (Aguirre 2002), although it was the most captured bat in seasonally inundated habitats of the Matogrosense and the 2nd most abundant species in similar habitats in the Bajo Chaco of Paraguay (Willig et al. 2000). Relative abundance was low in 2nd-growth forest in Peru, but was higher in primary or undisturbed forest (Wilson et al. 1996); abundance was low in primary forest in Brazil (Bernard and Fenton 2002). At 2 of the most intensively surveyed localities (La Selva, Costa Rica, and Barro Colorado Island, Panama), *M. albescens* has been found roosting in buildings but has not been captured in mist nets (Reid 1997).

Myotis albescens feeds on insects, such as Coleoptera, Diptera, and Lepidoptera; fish scales also have been reported in stomach contents (Whitaker and Findley 1980). Stomach contents of an individual from Bolivia contained remains of Lepidoptera and Arachnida (Aguirre et al. 2003a).

The fungus species *Wangiella dermatitidis* is parasitic on *M. albescens* (Reiss and Mok 1979). Endoparasites include the nematode *Allintoshius parallintoshius* (Rossi and Vaucher 2002). Ectoparasites include 7 species of bat flies, *Basilina andersoni*, *B. carteri*, *B. costaricensis*, *B. dunni*, *B. ferrisi*, and *B. speiseri* (Diptera: Nycteribiidae—Autino and Claps 2000; Autino et al. 1999, 2004; Bertola et al. 2005; Claps et al. 1992, 2004; Gracioli et al. 2006; Guimarães 1966, 1972; Theodor 1967; Timm et al. 1989) and *Anatrichobius passosi* (Diptera: Streblidae—Bertola et al. 2005); no bat flies were reported on specimens collected in Venezuela (Patterson et al. 2008) and 5 species of bat flies collected in Paraguay are not identified to species (Presley 2004). Three species of fleas, *Myodopsylla isidori* (Siphonaptera: Ischnopsyllidae—Autino and Claps 2000; Autino et al. 1999, 2004; Claps et al. 1999), *Myodopsylla wolffsohni* (Siphonaptera: Ischnopsyllidae—Autino and Claps 2000; Presley 2004), and *Sternopsylla distincta* (Siphonaptera: Ceratophyllidae—Autino and Claps 2000; Autino et al. 1999, 2004), have been reported. Two species of ticks, *Ornithodoros hasei* (Acari: Argasidae—Díaz et al. 2007; Nava et al. 2007; Presley 2004) and *Amblyomma triste* (Acari: Ixodidae—Venzal et al. 2003) have been found. The mites (Acari) *Chiroptonyssus haematophagus*, *Macronyssus crosbyi*, *Olabidocarpus myoticola*, *Parichoronyssus euthysterium*, *Spinturnix americanus*, *S. banksi*, *Steatonyssus joaquimi*, *Steatonyssus* species 2, and 1 unknown mite occur on *M. albescens* (Fain 1970; Presley 2004; Presley and Willig 2008). Rabies was not found in *M. albescens* examined in Paraguay (Sheeler-Gordon and Smith 2001).

The total number of individual ectoparasites and the number of individuals of each ectoparasite species (*M. crosbyi* and *S. joaquimi*) were significantly greater on larger individuals than on smaller individuals (Presley 2004; Presley and Willig 2008). In Paraguay, *M. albescens* was host to 2 monoxenous (requiring 1 host to complete the life cycle)

ectoparasite species, *Spinturnix banksi* and *Myodopsylla wolffsohni* (Presley 2004).

BEHAVIOR

Myotis albescens is nocturnal, emerging soon after sunset (Ascorra et al. 1996; Reid 1997). Activity peaks occur immediately after dusk and just before dawn, periods that correspond to periods of greatest abundance of flying diurnal and nocturnal insects (Ascorra et al. 1996).

Myotis albescens has been classified as a slow-flying insectivore (Aguirre 2002), forest and clearing aerial insectivore (Findley 1993), background cluttered-space aerial insectivore (Kalko et al. 1996), and edge-space forager (Surlykke and Kalko 2008). It has a trawler foraging style, flying a few centimeters above water or flat surface, using high-intensity echolocation calls to detect, track, and assess targets, and capturing prey with its feet (Fenton and Bogdanowicz 2002). In Peru, it has only been captured in the forest understory, 0–5 m above the ground (Ascorra et al. 1996), although Reid (1997) suggested that it feeds on insects high in the canopy, and Kalko et al. (1996) noted that it foraged over water.

In Central America and Mexico, small groups roost together (Reid 1997). Solitary individuals are uncommon and large groups are common in Paraguay (Myers 1977). Multiple males roost with multiple females (Myers 1977; Wilkinson and McCracken 2003); in 2 groups in Paraguay, the ratio of males to females was 6:1 and 3.3:1, and included lactating females and young (Myers 1977). Females are promiscuous and have greater opportunities for multiple matings in multiple-male roosting groups; males in multiple-male roosting groups have larger testes than those in single-male roosting assemblages (Wilkinson and McCracken 2003).

Calls of *M. albescens* are similar to those of *M. nigricans* but at a lower sound frequency: foraging calls are of short duration (about 2–5 ms) with maximum energy at the end of the call, and sound frequency sweeps downward from about 75 kHz to about 43–46 kHz (Guillén-Servent and Ibáñez 2007; Pye 1966; Surlykke and Kalko 2008). Sound intensity measured in a foraging bat and median intensity at the source (i.e., 10 cm from the mouth of the bat) was determined to be 106 dB with maximum levels of 111 dB (Surlykke and Kalko 2008). However, because of the small sample and the distance at which calls were measured, the authors consider that *M. albescens* probably emits calls 10–15 dB more intense (Surlykke and Kalko 2008).

Myotis albescens is known to roost with other bats, including the *Eptesicus furinalis* (Argentinian brown bat, Argentina—Barquez 1988), *M. nigricans* (Bolivia—Aguirre 1994 [not seen, cited in Anderson 1997:273]; Paraguay—Myers 1977), *Molossus sinaloae* (Sinaloan mastiff bat, Costa Rica—LaVal 1977), *Molossops* (Paraguay—Myers 1977), *Eumops* (Paraguay—Myers 1977; Uruguay—Acosta y Lara

1950; Argentina—Barquez and Ojeda 1992), and *Tadarida* (Uruguay—Acosta y Lara 1950; Argentina—Barquez 1988).

Myotis albescens does not hibernate. In Paraguay, individuals do not exhibit an annual pattern of fat accumulation and do not use hibernacula. Animals were captured during most months of the year (Myers 1977). Diurnal torpor occurs in cool seasons when temperatures range from to 5°C to 25°C or when social groupings are small in size; bats are active at higher temperatures or when social groupings are large (Myers 1977).

GENETICS

The diploid number (2n) is 44, with a fundamental number (FN) of 50. Four autosomal pairs are biarmed (metacentric) and 17 pairs are acrocentric. X and Y chromosomes are submetacentric (Bickham et al. 1986). G-banded karyotypes of *M. albescens* and *M. nigricans* are indistinguishable (Bickham et al. 1986). Based on mitochondrial (cytochrome-*b* [*Cytb*], nicotinamide adenine dinucleotide dehydrogenase subunit 1 [*NDI*], 12S ribosomal RNA [*12S rRNA*], transfer RNA [*tRNA*], and 16S ribosomal RNA [*16S rRNA*]) and nuclear (recombination activating gene 2 [*Rag 2*]) genes, *M. albescens* is part of a clade of species distributed primarily in the New World (Bickham et al. 2004; Hooper and Van Den Bussche 2003; Ruedi and Mayer 2001; Stadelmann et al. 2007). The subclade of *M. chiloensis* (*M. albescens* (*M. oxyotus* (*M. levis* + *M. nigricans*))), with *M. chiloensis* the basal member of the subclade (Bickham et al. 2004; Ruedi and Mayer 2001; Stadelmann et al. 2007), is estimated to have diverged during the late Miocene or early Pliocene (Stadelmann et al. 2007).

CONSERVATION

The species is rated as “least concern, population trend stable” on the 2008 *International Union for Conservation of Nature and Natural Resources Red List of Threatened Species* (International Union for Conservation of Nature and Natural Resources 2008).

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