MAMMALIAN SPECIES No. 643, pp. 1–4, 3 figs.

Peropteryx macrotis.

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Published 12 May 2000 by the American Society of Mammalogists

Peropteryx Peters, 1867

Peropteryx Peters, 1867:472. Type species *Vespertillio caninus* Wied-Neuwied, 1826:179 (preoccupied = *Emballonura macrotis* Wagner, 1843:367).

CONTEXT AND CONTENT. Order Chiroptera, suborder Microchiroptera, family Emballonuridae, subfamily Emballonurinae. The genus *Peropteryx* contains three extant species in two subgenera, *Peronymus* and *Peropteryx* (Koopman, 1993).

1 Distal portions of wings white, ears joined at the bases by a low membrane . . . . . *P. leucoptera*
Distal portions of wings not white, ears entirely separated 2
2 Total length >62 mm, greatest length of skull >16 mm . . . . . *P. kappleri*
Total length <62 mm, greatest length of skull <15.5 mm . . . . . *P. macrotis*

Peropteryx macrotis (Wagner, 1843)

Peters' Sac-winged Bat

Vesp[*ertilio*] *caninus* Wied-Neuwied, 1826:179. Type locality "E. coast Brazil."

Emballonura macrotis Wagner, 1843:367. Type locality "Mato Grosso, Brazil."

Peropteryx macrotis Allen, 1935:227. First use of the current name combination.

CONTEXT AND CONTENT. Context as for genus. Three subspecies are currently recognized (Goodwin and Greenhall, 1961; Hall, 1981):

P. m. macrotis Wagner, 1843:367, see above.

P. m. phaea Allen, 1911:222. Type locality "Point Saline, Grenada, Lesser Antilles."

P. m. trinitatis Sanborn, 1937:341. Type locality "Port-of-Spain, Trinidad, West Indies."

DIAGNOSIS. *Peropteryx macrotis* is distinguished from other members of the subfamily Emballonurinae by an outward-opening, glandular wing sac on upper edge of antebrachial membrane. An absence of white on distal portion of wings and unattached ears distinguish *P. macrotis* from *P. leucoptera*. In general, *P. macrotis* is smaller (total length <62 mm and greatest length of skull <15.5 mm) than *P. kappleri* (total length >62 mm and greatest length of skull >16 mm). A key to the subfamily Emballonurinae is provided by Sanborn (1937). *P. macrotis* is the smallest member of the genus.

GENERAL CHARACTERS. Because of the appearance of an elongated, naked rostrum and chin, *P. macrotis* is sometimes considered doglike in facial form (Fig. 1). Pelage of *P. macrotis* is geographically variable in color, but is usually characterized by brown, gray, or reddish upperparts with equally although sometimes lighter, underparts. Fur is modetately long (6–9 mm—Reid, 1997) and sparse with individual hair scales long and occurring in a circular pattern (Benedict, 1957). Wings have a characteristic emballonurid shape and terminate at an attachment point on each ankle. Tail is ca. one-third of length of body and perforates interfemoral membrane. Skull (Fig. 2) is small with a sharp angle between an inflated rostrum and braincase (Goodwin and Greenhall, 1961). Cranium has a long, slender postorbital process with an undivided basisphenoid pit. Dental formula is i 1/3, c 1/1, p 2/2, m 3/3, total 32 (Goodwin and Greenhall, 1961). Upper and lower incisors are small and simple with lower incisors trifid (Goodwin and Greenhall, 1961). In general, individuals in this genus range between 3 and 9 g (Eisenberg, 1989).

Select morphometric characters (in mm) for *P. m. macrotis* are (n = 79): length of forearm, 38.3–48.2; greatest length of skull, 12.0–15.0; condylobasal length, 10.7–13.7; zygomatic width, 7.6–8.9; mastoid width, 6.7–7.8; width of braincase, 5.9–7.1; width across canines, 3.2–4.1; width across molars, 5.5–6.8 (Sanborn, 1937). Select morphometric characters for *P. m. trinitatis* from Trinidad (one male and three females—Goodwin and Greenhall, 1961) are: length of forearm, 41.0–43.0 mm; greatest length of skull, 13.2–13.9 mm; zygomatic breadth, 7.5–7.7 mm; maxillary tooth row C–M3, 5.3–5.5 mm; mass, 3.7–8.0 g (six males), 8.0–9.2 g (two females). Ranges of select morphometric characters (in mm) for *P. m. phaea* from Grenada (n = 22) are: length of forearm, 39.0–43.5; greatest length of skull, 12.6–13.7; condylobasal length, 11.4–12.3; zygomatic width, 7.6–8.2; mastoid width, 6.8–7.3; width of braincase, 6.0–6.6 (Sanborn, 1937).

Sexual dimorphism occurs in *P. m. macrotis* from Brazil (Willig, 1983). Of 29 characters measured, 5 external (total length, length of tragus, length of forearm, length of digit 3, length of digit 5) and 4 cranial characters (greatest length of skull, condylobasal length, breadth across upper molars, breadth across upper canines) differed significantly between males and females. In all instances,

FIG. 1. Photograph of *Peropteryx macrotis* from Oriente Amazon rainforest, Ecuador. Photograph courtesy of C. Voigt.

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of lower jaw of *Peropteryx macrotis* (U.S. National Museum [USNM] 555695) from Pernambuco Mato de Caniocuir, Sao Loureuco da Mata, Brazil. Greatest length of skull is 15.0 mm. Photographs courtsey of D. E. Wilson.

females were larger than males. Mean and standard deviation (in parentheses) of selected mean morphometric characters for males (n = 15) and females (n = 7), respectively, from Brazil are (in mm—Willig, 1983): length of head and body, 61.3 (2.0), 64.1 (3.8); length of tail, 14.2 (1.6), 14.1 (2.1); length of hind foot, 6.6 (0.5), 6.6 (0.8); length of ear, 14.2 (0.6), 14.4 (1.0); length of tragus, 6.1 (0.5), 6.7 (0.5); mass (g), 4.2 (0.6), 4.6 (0.9); length of forearm, 42.0 (0.9), 43.6 (1.1); length of digit I, 7.5 (0.7), 7.1 (1.1); length of digit III, 64.7 (2.4), 68.0 (4.1); length of digit V, 44.4 (1.4), 46.9 (1.9); greatest length of skull, 13.8 (0.3), 14.0 (0.2); condylobasal length, 12.7 (0.3), 13.0 (0.4); zygomatic breadth, 8.2 (0.2), 8.3 (0.2); mastoid breadth, 7.3 (0.1), 7.3 (0.3); breadth of braincase, 6.5 (0.2), 6.5 (0.1); breadth across upper molars, 6.0 (0.2, n =14), 6.5 (0.4, n = 6); breadth across upper canines, 3.5 (0.1, n = 14), 3.7 (0.2, n = 6). Select morphometric characters (in mm) for each of three female *P. m. macrotis* from Tobago are: length of forearm, 46.2, 46.0, 47.2; greatest length of skull, 14.7, 14.8, 15.0; zygomatic breadth, 7.9, 8.3, 8.4; length of maxillary tooth row C–M3, 5.8, 5.8, 6.0 (Goodwin and Greenhall, 1961).

DISTRIBUTION. *Peropteryx macrotis* ranges from southern Mexico (Villa-R., 1967), including the Yucatan peninsula (Hatt, 1938) throughout Central America southward into South America (Fig. 3). In Central America, this species occurs in Guatemala

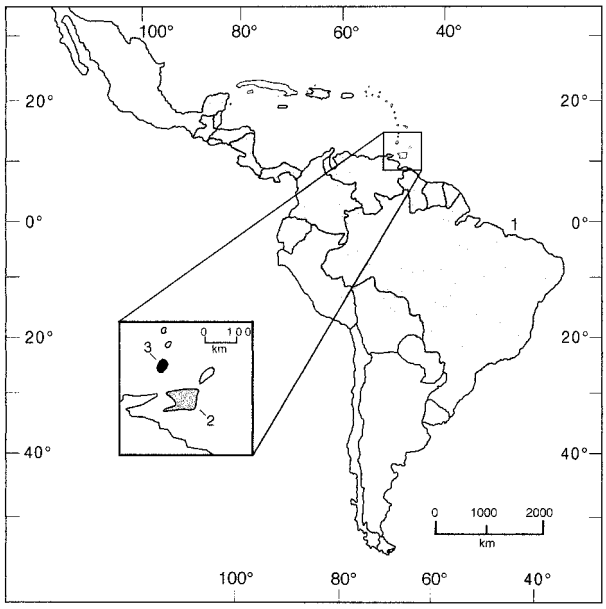

FIG. 3. Distribution of *Peropteryx macrotis* in Central and South America, with Grenada, Trinidad, and Tobago shown in an inset (after Emmons and Freer, 1990). Subspecies ranges are indicated by numbers: 1, *P. m. macrotis*; 2, *P. m. trinitatis*; 3, *P. m. phaea.*

(Jones, 1966; Rick, 1968), Honduras (Goodwin, 1942; Murie, 1935), Nicaragua (Jones et al., 1971), Costa Rica (Goodwin, 1946; Starrett and Casebeer, 1968), El Salvador (Burt and Stirton, 1961; Felten, 1955), and Panama (Allen, 1935). In South America (Fig. 3), *P. macrotis* occurs west from Colombia (Sanborn, 1937) to Venezuela (Handley, 1976) and Brazil (Willig, 1983), and south to northern portions of Ecuador, Peru (Koopman, 1978; Tuttle, 1970), and Bolivia (Anderson et al., 1981). Occurrence south of northern Paraguay (Myers et al., 1983) is unlikely. Although *P. macrotis* occasionally has been collected above 1,000 m (Tuttle, 1970), this may represent an upper limit to its elevational range (Koopman, 1978), consistent with its absence from the Andes. *P. m. trinitatis* is restricted to the island of Trinidad, where it may occur with *P. m. macrotis* (Goodwin and Greenhall, 1961). *P. m. phaea* is confined to Grenada (Sanborn, 1937). Fossils from the late Pleistocene were found in Loutún Cave in Yucatán, Mexico (Arroyo-Cabrales and Alvarez, 1990).

FORM AND FUNCTION. In general, *P. macrotis* is left cornu (i.e., uterine horn) dominant, and this is probably where ovulation and implantation occur (Wimsatt, 1979). Fusion of metacarpal and phalangeal epiphyses and diaphyses occurs at 46–49 mm in total body length (Rick, 1968).

ONTOGENY AND REPRODUCTION. *Peropteryx macrotis* breeds during dry (January–June) and wet seasons (July–December) in Central and South America (Graham, 1987). Pregnant females have been reported from the Caatinga of Brazil in January, September, and October (Willig, 1985); Chinaja', Guatemala, in February (Jones, 1966); Tikal and Uaxactun, Guatemala, in March (Murie, 1935; Rick, 1968); the Yucatan peninsula of Mexico in April (Jones et al., 1973); Colombia in July (Arata and Vaughn, 1970); and Peru in August (Tuttle, 1970). These data suggest that this species exhibits seasonal polyestry, at least within particular localities (Willig, 1985). Gestation requires 4–4.5 months (Lopez-Forment, 1976). Lactating females have been collected from Brazil in January (Willig, 1985) and from the Yucatan peninsula of Mexico in August (Jones et al., 1973). Crown to rump measurements (in mm) of embryos are: 11.1 (mean of 14 embryos) from the Yucatan peninsula of Mexico in April (Jones et al., 1973); 6, 11, and 13 from Peru in April (Tuttle, 1970); 7, 12, 14, and 20 from Guatemala in March (Murie, 1935); and 11 in July also from Guatemala (Rick, 1968). Production of a single pup is most common. Measurements of male testes (in mm) are: 2.5, 2.5, and 3.0 in Guatemala in July (Rick, 1968); 2.5 and 2.0 for the Yucatan peninsula in Mexico in

April (Jones et al., 1973); and 3, 2, and 2 in Peru in April (Tuttle, 1970). Individuals with juvenile pelage have been captured in late July in the Yucatan peninsula (Jones et al., 1973).

ECOLOGY AND BEHAVIOR. *Peropteryx macrotis* typically occurs in tropical deciduous forest, but individuals have been collected from semi-arid thorn scrub (Willig, 1983) and evergreen forests (Handley, 1976). Roosting sites include a variety of natural and manmade structures such as limestone (Jones, 1966; Myers et al., 1983; Starrett and Casebeer, 1968), coral (Goodwin and Greenhall, 1961), and granite caves (Jones et al., 1971); natural bridges (Goodwin, 1946); rockpiles or culverts (Willig, 1983); hollow trees (Marinkelle, 1967); bell towers (Jones et al., 1973); churches (Goodwin and Greenhall, 1961); and pre-Columbian ruins (Hatt, 1938; Murie, 1935; Rick, 1968). *P. macrotis* primarly occurs in short, simple caves (Arita, 1996).

Diet of *P. macrotis* comprises small beetles and flies (Bradbury and Vehrencamp, 1976; Emmons and Freer, 1990). In areas of human settlement, *P. macrotis* forages for insects above roads and near street lights (Davis et al., 1964; Starrett and Casebeer, 1968). Although interspecific competition may occur with *P. kappleri* and other congeners, species of this genus have not been captured in the same foraging areas (Starrett and Casebeer, 1968).

Peropteryx macrotis roosts with a number of other bat species including *P. kappleri* (Myers et al., 1983; Starrett and Casebeer, 1968), *Saccopteryx bilineata* (Goodwin, 1946), *Glossophaga soricina* (Jones et al., 1971), *G. longirostris* and *Carollia perspicillata* (Goodwin and Greenhall, 1961), *Diphylla ecaudata* (Goodwin, 1946), *Myotis nigricans* (Jones, 1966), and *M. keaysi* (Jones et al., 1973). *P. macrotis* also has been reported roosting with a nursery colony of *Desmodus rotundus* (Jones et al., 1971).

Colonies of *P. macrotis* are usually small (<15 individuals). Groups of <10 individuals from Brazil each contained a single adult male, which suggests harem formation (Willig, 1983). Scent emitted from the wing sac of males may be used in courtship displays (Goodwin and Greenhall, 1961).

Predators on Peters' sac-winged bat include owls (Arroyo-Cabrales and Alvarez, 1990) and *Chrotopterus auritus* (Arita and Vargus, 1995). *P. macrotis* has both external and internal parasites. Nematodes were taken from specimens in Trinidad (Goodwin and Greenhall, 1961) and human bed-bugs (*Cimex hemipterus*), engorged with blood, were collected from the base of the tail along the posterior surface of individuals in Colombia (Marinkelle, 1967).

GENETICS. *Peropteryx macrotis* has a diploid chromosome number of 26 with a fundamental number of 48 (Eisenberg, 1989).

CONSERVATION STATUS. Although few data exist concerning demographics of *P. macrotis*, populations currently are thought to be stable (Wilson, 1996). This species occurs abundantly in some localities (Reid, 1997), but may be less abundant but widespread in others (Arita, 1993).

REMARKS. The generic name *Peropteryx* is derived from two Latin roots meaning 'along the wing' and may refer to location of the glandular wing sac. The specific name, *macrotis,* also Latin, means 'long ears.' The common name is for Peters (1867), who first described the species. Vernacular names for this species include lesser doglike bat (Hall and Kelson, 1959) and Neotropical sac-winged bat (Goodwin, 1946).

I thank H. T. Arita, S. J. Presley, R. D. Stevens, and M. R. Willig for helpful comments on this manuscript. C. Jones provided information regarding the synonymy. I also thank D. E. Wilson for providing photographs of skull.

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