MAMMALIAN SPECIES 42(852):41–48

Phyllonycteris poeyi (Chiroptera: Phyllostomidae)

CARLOS A. MANCINA

División de Zoología, Instituto de Ecología y Sistemática, Carretera de Varona Km 3½, Capdevila, Boyeros, A.P. 8029 C.P. 10800, Ciudad de La Habana, Cuba; mancina@ecologia.cu

Abstract: *Phyllonycteris poeyi* Gundlach, 1861, a medium-sized bat, is a phyllostomid commonly called the Cuban flower bat or Poey's flower bat. *Phyllonycteris* is endemic to the Greater Antilles and *P. poeyi* is endemic to Cuba and Hispaniola. *P. poeyi* is characterized by a rudimentary nose leaf, median groove on lower lip ridged with papillae, and ears that are moderately large and separate. *P. poeyi* shows marked sexual dimorphism in size, with males being larger than females in some cranial and body dimensions. It is a gregarious and obligate cave dweller that usually inhabits the innermost parts of blind galleries. *P. poeyi* has been captured in evergreen forest, secondary forest, and ravines. *P. poeyi* is listed as Least Concern by the International Union for Conservation of Nature and Natural Resources. DOI: 10.1644/852.1.

Key words: Antilles, bat, Cuba, Cuban flower bat, Hispaniola, Phyllonycterinae, phyllostomid, Poey's flower bat, West Indies

Synonymies completed 27 January 2009

www.mammalogy.org

Phyllonycteris Gundlach, 1861

Phyllonycteris Gundlach in Peters, 1861:817. Type species *Phyllonycteris poeyi* Gundlach in Peters, 1861:817, by original designation.

Reithronycteris Miller, 1898:333. Type species *Reithronycteris aphylla* Miller, 1898, by original designation.

Rhithronycteris Elliot, 1904: 687. Incorrect subsequent spelling of *Reithronycteris* Miller, 1898.

CONTEXT AND CONTENT. Order Chiroptera, suborder Microchiroptera, family Phyllostomidae. *Phyllonycteris* and *Erophylla* comprise the subfamily Phyllonycterinae (Wetterer et al. 2000); several studies have indicated that the genus *Brachyphylla* could be a sister taxon of this subfamily (e.g., Baker et al. 1981; Silva and Pine 1969). The genus *Phyllonycteris* contains 2 extant species, *P. poeyi* and *P. aphylla* (Jamaican flower bat), and a fossil species, *P. major* (Puerto Rican flower bat), known from skeletal remains from Puerto Rico (Koopman 1993; Simmons 2005). Originally, *P. aphylla* was described as a member of a distinct genus, *Reithronycteris*. Subsequently, Koopman (1952) placed the species in the genus *Phyllonycteris*, but retained *Reithronycteris* as a distinct subgenus. Both *P. major* and *P. poeyi* are in the subgenus *Phyllonycteris*.

Phyllonycteris poeyi Gundlach, 1861
Cuban Flower Bat

Ph[*yllonycteris*]. *poeyi* Gundlach in Peters, 1861:817. Type locality Cuba, Matanzas, Canimar (cafetal "San Antonio el Fundador").

Phyllonycteris obtusa Miller, 1929:10. Type locality "crooked cave" near Atalaye plantation, St. Michel, Haiti.

CONTEXT AND CONTENT. Context as for genus. Miller (1929) described *Phyllonycteris obtusa* from sub-Recent skulls collected on Haiti (Hispaniola); he also differentiated

Fig. 1.—Adult female *Phyllonycteris poeyi* from "Sierra del Rosario" Biosphere Reserve, Pinar del Rio Province, Cuba. Photograph by Carlos A. Mancina.

P. obtusa from *P. poeyi* by the smaller incisive foramina and less narrowly curved anterior border of the premaxillaries in *P. obtusa*. Jones and Carter (1976) placed *P. obtusa* as a subspecies of *P. poeyi*, although these authors did not justify this arrangement. Klingener et al. (1978) were the 1st to report living specimens of *Phyllonycteris* from Hispaniola and presented data to support the taxonomic arrangement of Jones and Carter (1976). However, several authors have considered *P. obtusa* as a separate species from *P. poeyi* (Baker and Genoways 1978; Hall 1981; Rodríguez-Durán and Kunz 2001; Silva 1983). Silva (1983) indicated that to consider both taxa at the subspecific level did not have foundation because of the high structural and metric differences that exist between them. Timm and Genoways (2003) did not find cranial differences when comparing a large series of skulls of Cuban *P. poeyi* with Hispaniolan specimens; based on these observations, these authors followed Jones and Carter (1976) and Klingener et al. (1978) in considering *Phyllonycteris* from Cuba and Hispaniola to be conspecific. Two subspecies are recognized (Simmons 2005)—the nominal from Cuba and *P. p. obtusa* from Hispaniola:

P. p. obtusa Miller, 1929:10. See above.
P. p. poeyi Gundlach in Peters, 1861:817. See above.

NOMENCLATURAL NOTES. The placement by Jones and Carter (1976) of *Phyllonycteris obtusa* from Hispaniola as a subspecies of *P. poeyi* from Cuba has resulted in remarkable disagreement in the literature with respect to this arrangement; molecular systematic studies may be necessary to resolve the taxonomy of this species. The specific name for this species was chosen in honor of the Cuban naturalist Felipe Poey.

DIAGNOSIS

Compared with *Phyllonycteris* (*Reithronycteris*) *aphylla*, *P. poeyi* (Fig. 1) has a slightly developed median longitudinal ridge on the base of the braincase between pterygoids (Fig. 2); in *P. aphylla* the structure of the basicranial region is unique among mammals because the floor of the braincase is elevated out of its normal position forming a deep and longitudinal groove. The rostral portion of the skull in *P. poeyi* is relatively narrower than in *P. aphylla*, and the palate more narrow anteriorly (Genoways et al. 2005; Miller 1907). *P. poeyi* can be distinguished from the extinct *P. major* by its smaller size (in *P. major* the greatest length of skull is up to 28 mm), less widely expanded braincase, and much smaller P2 (Anthony 1917).

GENERAL CHARACTERS

Phyllonycteris poeyi is a medium-sized bat; length of forearm is 42–51 mm, wingspan is 294–350 mm, and body mass is 15–29 g (Klingener et al. 1978; Silva 1979). The nose leaf is rudimentary; its lower lip has a median groove ridged with papillae. In *P. poeyi* the calcar is absent, and the interfemoral membrane is very narrow, extending to middle of tibia. The tail is quite short (6–18 mm, it is about one-half as long as femur) and it extends between 1 and 7 mm beyond the uropatagium. Ears are moderately large (12–16 mm) and separate (Silva 1979). The fur is grayish white; the bicolored hairs are drab with whitish bases. The hairs have a silky texture that can produce silvery reflections in light (Miller

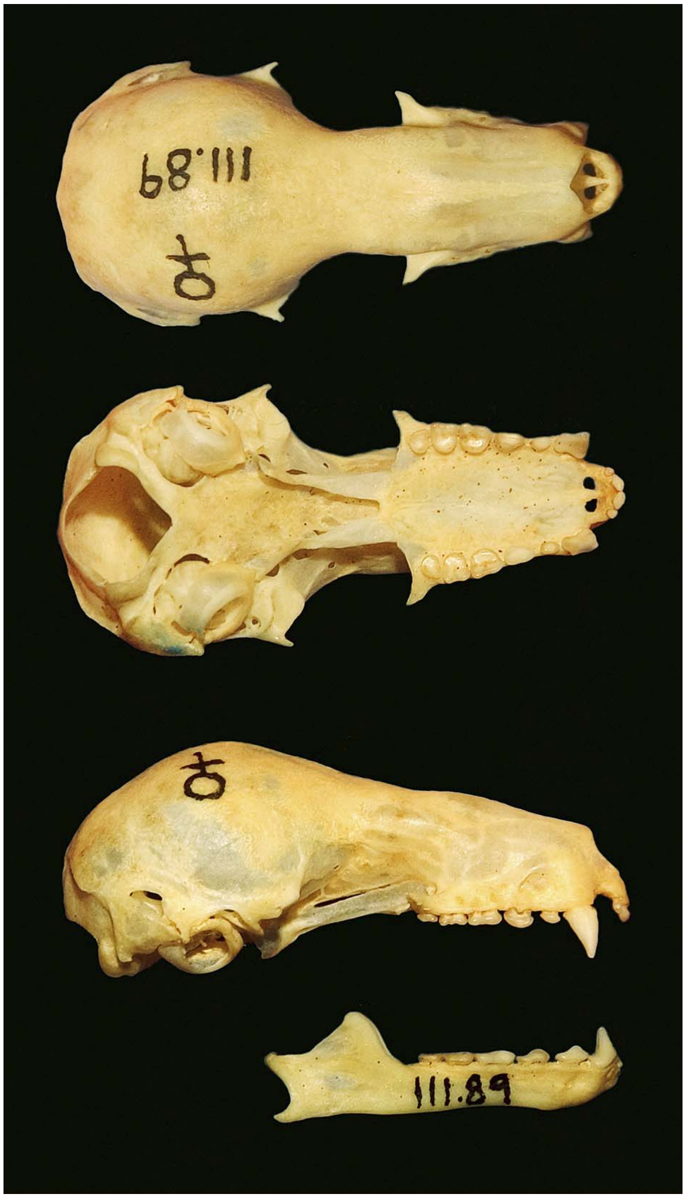

Fig. 2.—Dorsal, ventral, and lateral views of skull and lateral view of mandible of an adult female *Phyllonycteris poeyi poeyi* (Instituto de Ecología y Sistemática mammal collection CZACC 1.2525) from Cueva de los Majaes, Pinar del Río Province, western Cuba. Greatest length of skull is 24.2 mm.

1904). Skull is robust with a deep and elongate rostrum; the zygomatic arches are incomplete (Fig. 2).

Mean measurements (mm, with parenthetical ranges) of 7 males and 11 females respectively, from southern Haiti (Klingener et al. 1978) were: length of forearm, 48.4 (47.5–49.8), 47.9 (42.6–49.8); greatest length of skull, 25.1 (24.5–25.7), 24.2 (23.7–24.7); condylobasal length, 22.6 (21.6–23.4), 22.2 (21.6–23.1); postorbital constriction, 5.5 (5.3–5.7), 5.5 (5.2–5.7); breadth of braincase, 10.5 (10.2–11.0), 10.3 (10.0–10.9); length of maxillary toothrow, 7.4 (7.2–7.6), 7.4 (7.1–7.7), and breadth across upper molars, 7.1 (6.7–7.5), 7.0 (6.8–7.2). Mean measurements (mm, parenthetical ranges, *n*) of males and females, respectively, from Cuba (Silva 1979) were: length of forearm, 47.2 (44.3–49.7, 123), 46.9 (43.6–49.2, 103); length of humerus, 28.4 (26.9–30.0, 70), 27.9 (26.6–29.4, 64); greatest length of skull, 25.2 (24.4–26.3, 112), 24.6 (23.6–25.6, 108); breadth of braincase, 10.3 (9.7–10.8, 112), 10.1 (9.5–10.7, 111); mastoid breadth, 11.6 (11.1–12.0, 111), 11.2 (10.6–11.8, 110); condyloincisive length, 23.2 (22.3–24.4, 104), 22.7 (22.1–23.7, 10.3); palatal length, 10.7 (10.1–11.4, 112), 10.5 (10.0–11.1, 108); frontal length, 5.8 (5.3–6.3, 112), 5.7 (5.3–6.1, 110); length of maxillary toothrow, 7.7 (7.2–8.1, 102), 7.6 (7.2–8.1, 102); breadth across upper canines, 5.7 (5.2–6.0, 103), 5.2 (4.9–5.6, 101); breadth across upper molars, 7.1 (6.5–7.6, 105), 7.0 (6.6–7.4, 101); postorbital breadth, 5.3 (4.9–5.7, 108), 5.3 (4.7–5.7, 111); length of mandibular toothrow, 8.6 (7.4–9.2, 91), 8.4 (8.0–8.8, 83); wing area (cm^2), 150.0 (137.0–160.0, 15), 150.1 (137.8–162.4, 15), and body mass (g), 22.4 (16.0–28.1, 137), 19.2 (16.3–23.4, 96). Other measurements (mm, mean ± *SD*) of 12 males and 18 females, respectively, from western Cuba (Mancina 1998) were: wingspan, 288.8 ± 12.7, 297.2 ± 14.3; length of 3rd digit, 75.5 ± 1.5, 75.9 ± 1.8; length of 5th digit, 60.7 ± 2.2, 61.8 ± 2.9, and length of tibia, 26.8 ± 1.0, 26.3 ± 0.9. Additional measurements may be found in Swanepoel and Genoways (1979) and Timm and Genoways (2003).

Phyllonycteris poeyi shows a marked sexual dimorphism in size; the males are, on average, larger than females in some cranial and body dimensions (Klingener et al. 1978; Koopman 1952; Mancina 1998; Silva 1979). Silva (1979) found significant differences in 3 measurements (length of forearm, length of humerus, and greatest skull length).

DISTRIBUTION

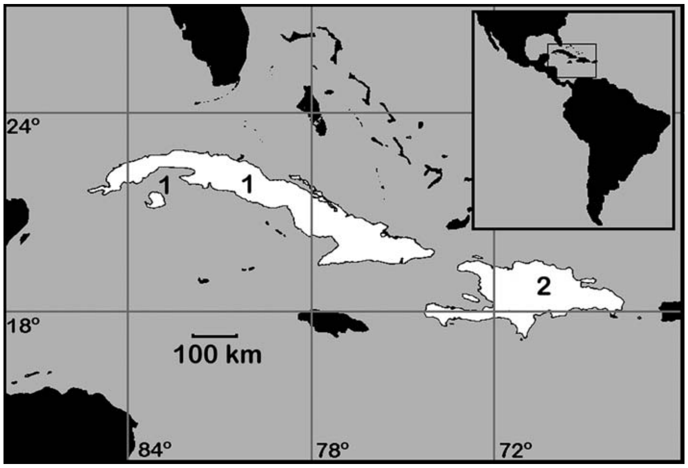

Fig. 3.—Geographic distribution of *Phyllonycteris poeyi*. Subspecies are: 1, *P. p. poeyi* and 2, *P. p. obtusa*.

The genus *Phyllonycteris* is endemic to the Greater Antilles and *P. poeyi* is endemic to Cuba and Hispaniola (Fig. 3). *P. poeyi* is known from more than 50 localities throughout the Cuban Archipelago, including Isla de la Juventud (former Isla de Pinos) and keys in the northern Cuban Archipelago (Mancina et al. 2003; Silva 1988). On the Island of Hispaniola, *P. poeyi* has been recorded in at least 11 localities, including the Dominican Republic and Haiti (Klingener et al. 1978; Timm and Genoways 2003; Woods and Ottenwalder 1992). Two individuals of *P. poeyi* have been captured in the keys of Florida (C. Marks, in litt.), but these may be an incidental occurrence rather than an actual extension in the range of distribution of *P. poeyi*.

FOSSIL RECORD

Phyllonycteris poeyi is known from late Quaternary cave deposits in central Cuba (Anthony 1919; Koopman and Ruibal 1955; Silva 1974). The radiocarbon (^{14}C) date from a sample of *Monophyllus redmani*, associated with fossil remains of *P. poeyi*, gave an age of 7,864 ± 96 radiocarbon years ago (mean ± *SD*); calibration (95% confidential interval) was between 6,504 and 7,044 years ago (middle Holocene—Jiménez et al. 2005). Silva (1974) found chronoclinal variation in this species, consisting of an increase in size throughout the statigraphic sequence; the more superficial samples (M4) had larger mean values and these did not show differences with modern Cuban material (Silva 1974). Late Quaternary fossils of *P. poeyi* have been reported from Abaco and New Providence in the Bahamas, and on Cayman Brac (Morgan 2001).

FORM AND FUNCTION

Form.—The skull is robust with rostrum deep and elongate, the zygomatic arches are incomplete; the braincase high and rounded, not rising abruptly from rostral plane, very low sagittal crest and mastoid process poorly developed; the external nares open slightly upward (Fig. 2). The auditory bullae are rather large, covering more than one-half the cochleae surface. Mandible has a moderately high coronoid process and the condyloid process is located at the level of the lower molar plane. (Miller 1907; Silva 1979). Cranial capacity (mean ± *SD*, cm^3) for 10 individuals was 0.5 ± 0.02, and encephalization quotient was 1.02 ± 0.08 (Mancina et al. 2004).

Upper incisors are small, in a slightly convex and continuous row. Inner incisor is fully double the bulk of the outer incisor, although they do not differ in form; outer incisor wider relative to its length than inner incisor. Mandibular incisors are very small, with flat and rounded crowns, the outer not as small as inner. The canines are simple, without secondary cusps, the upper slightly less than one-half as long as high, with well-developed cutting edges. Lower canines slender, the posterior basal edge formed into a distinct heel. P1 is small, scarcely equal to inner incisor, its crown very low, longer than broad, with indistinct cutting edge rising to a slight angle anteriorly. Upper molars longer than broad; protocone low and broad, forming the entire shelflike, broadly rounded inner edge of tooth; paracone and metacone low and long, about equal in M1 and M2, the metacone much smaller in M3; between paracone and metacone a distinct though very small elevation. Lower molars long and narrow, m2 somewhat more than one-half as long as m1, and the m3 about one-half as large as the m2. Dental formula is i 2/2, c 1/1, p 2/2, m 3/3, total 32 (Miller 1907; Silva 1979). *Phyllonycteris* is among the nectarivorous bats with lesser values of frontal gap between canines (≤ 0.5 mm^2) and greatest molariform areas; this could be related to its generalist feeding habits (Freeman 1995).

Spermatozoa of *P. poeyi obtusa* have an extremely long and broad head; neck short, junction with head off center. Midpiece of moderate length; unusual tapered thickening of tail just distal to junction of tail and midpiece. The sperm of *P. poeyi* exhibits several unique characteristics; the acrosome has an unusual morphology including having the apex far offset and being the broadest of any species studied. In this species more than one-half of the area of the acrosome occurs anterior to apex of the nucleus (Forman and Genoways 1979).

In *P. poeyi* the tongue is long and extensible, armed with incurved papillae at tip (Miller 1907). This species does not have bifid papillae, but there are hairlike papillae forming a brush tip similar to that of other nectarivorous bats; 4 circumvallate papillae are present, although the medial 2 are always larger (Griffiths 1982; Wetterer et al. 2000).

Function.—The wing indexes (mean ± *SD*) of *P. poeyi* from 10 individuals calculated using the method of Norberg and Rayner (1987) were: aspect ratio 7.52 ± 0.20, tip index 1.75 ± 0.26, and wing loading 13.7 ± 1.3 N/m^2 (Mancina et al. 2004). Wing morphology permits a relatively maneuverable flight although little capacity for hovering, the relatively high wing loading suggests that *P. poeyi* could have a relatively fast flight. However, Silva (1979) suggests that this species has a slow flight and estimates the flight speed as 6.7 km/h. The range of the body temperature of *P. poeyi* while in flight is 31–41°C (Silva 1979). Similar to other phytophagous bats, the renal index of relative medullary thickness from 5 individuals of *P. poeyi* from Cuba was 5.7 ± 1.9 *SD* (Casotti et al. 2006).

Phyllonycteris poeyi, during its foraging behavior, emits single-harmonic echolocation calls with most energy in the 1st harmonic; a weak 2nd harmonic appeared in <5% of the calls. Calls are characterized by relatively low-frequency content (<50 kHz) and long durations (up to 7.2 ms). Flying in enclosed spaces, *P. poeyi* emits short, low-intensity, frequency-modulated, and multiharmonic echolocation calls (Mora and Macías 2006). Values (mean ± *SD*) of some parameters of echolocation calls of *P. poeyi* emitted during its foraging behavior were: duration 4.69 ± 1.04 ms, maximal frequency 45.9 ± 2.2 kHz, minimal frequency 34.4 ± 1.7 kHz, and bandwidth 11.5 ± 1.7 kHz (Mora and Macías 2006).

ONTOGENY AND REPRODUCTION

Phyllonycteris poeyi appears to be monestrous and bear a single young each pregnancy (Silva 1979). Pregnant females have been found between February and June; lactation occurs between June and September (Mancina et al. 2007; Silva 1979). Three females captured in southern Haiti in December were pregnant, with the embryos measuring between 15 and 22 mm; a female collected on 6 January and 22 collected on 21–27 August were not pregnant (Klingener et al. 1978). In 1 population from central Cuba, the testicular development was greatest between November and January, and diameter of right testis ranged from 3.4 to 6.2 mm (*n* = 180—Silva 1979). The length of testes in 7 males collected in Haiti in August averaged 4.1 mm (Klingener et al. 1978). Copula most likely peak in December (inferred by testicular development); the earliest date of parturition known in Cuba occurred on 30 May. At birth, young weigh about 5 g and have a forearm length of about 22 mm; bodies of neonates are hairless; the deciduous dental formula is i 2/2, c 1/1, p 2/2, total 20 (Silva 1979). Sex ratio (percent of females, *n*) of adults was biased toward females (68.3%, *n* = 1,106) and the sex ratio was 49.7% (*n* = 191) in embryos and 56.6% (*n* = 202) in juveniles (Silva 1979).

ECOLOGY

Space use.—*Phyllonycteris poeyi* is among the most common and widespread Cuban bats. *P. poeyi* showed high capture rates in an evergreen forest and several patches of secondary vegetation in "Sierra del Rosario" Biosphere Reserve, western Cuba (Mancina 2004; Mancina et al. 2007). In southern Haiti this species was collected in ravines, although a few were found in drier scrub (Klingener et al. 1978). Woods and Ottenwalder (1992) found this species in mountains up to 1,700 m above sea level in southern Haiti; in Cuba the highest elevation recorded was 1,110 m in La Gran Piedra, eastern Cuba (Silva 1979).

Phyllonycteris poeyi is an obligate cave dweller and the most gregarious bat of Cuba (Silva 1979). This species usually inhabits the innermost parts of the blind galleries of a cave. These galleries have geomorphological traits, such as a narrow and single access, that produce very low levels of air ventilation; inside these galleries *P. poeyi* form colonies in the order of several thousand individuals covering the entire ceiling and walls (Silva 1969). Entrapment of the metabolic heat produced by these colonies generates elevated temperatures (28–40°C) and humidity (>90%) within these cave rooms (Cruz 1992; Silva 1977). In Cuba the most frequent bat species to share daytime roosts with *P. poeyi* include Cuban fruit-eating bat (*Brachyphylla nana*), buffy flower bat (*Erophylla sezekorni*), sooty mustached bat (*Pteronotus quadridens*), MacLeay's mustached bat (*Pteronotus macleayii*), and common mustached bat (*Pteronotus parnellii*—Sampedro et al. 1976; Silva 1979). On Hispaniola, *P. poeyi* always roosts in deep, warm, and humid caves (Woods and Ottenwalder 1992).

Phyllonycteris poeyi has a nocturnal activity pattern; it emerges from caves beginning 32–71 min after sunset (0 lux), and returns 14–95 min before sunrise (Silva 1979). Mancina et al. (2007) found differences in activity between sexes, with males being active later than females. The environmental temperature does not seem to affect the nocturnal activity in light of normal activity occurring at temperatures as low as 8°C; however, moonlight can reduce nocturnal activity (Silva 1979). Mancina (2008) observed lower capture rates of *P. poeyi* on moonlit nights ($\bar{X} = 0.007$ bats $\mathrm{m}^{-1}\ \mathrm{h}^{-1} \pm 0.001$ *SE*) than on dark nights ($\bar{X} = 0.017 \pm 0.003$ bats $\mathrm{m}^{-1}\ \mathrm{h}^{-1}$) in forest patches of western Cuba.

Diet.—*Phyllonycteris poeyi* feeds on pollen, nectar, fruit, and insects (Mancina et al. 2007; Silva 1979; Silva and Pine 1969). An analysis of stomach contents ($n = 205$) revealed the following: pollen (86.6%), fruit remains and seeds (71.1%), and insects (31.2%—Silva 1979). *P. poeyi* feeds on the following plants (plant part coded as fruit [F] or flower [N]—Koch et al. 2004; Mancina et al. 2007; Silva 1979): *Agave grisea* (N), *Caesalpinia bahamensis* (N), *Caesalpinia vesicaria* (N), *Cecropia schreberiana* (F), *Coccothrinax* (N), *Conostegia xalapensis* (F), *Dendrocereus nudiflorus* (N), *Dichrostachys cinerea* (N), *Harrisia* (N), *Hibiscus* (N), *Lantana trifolia* (F), *Leptocereus* (N), *Muntingia calabura* (F), *Piper aduncum* (F), *Roystonea regia* (N), *Selenicereus* (N), *Solanum umbellatum* (F), *Spathodea campanulata* (N), and *Talipariti elatum* (N). *P. poeyi* was able to extract between 49% and 56% of the pollen doses of 3 species of plants (*Agave desmettiana*, *Opuntia cochinelifera*, and *Talipariti elatum*—Herrera and Mancina 2007). A stable-N isotope analysis of blood samples from *P. poeyi* showed that plants were the main source of protein of all analyzed months, but in some individuals insects represented an important contribution to the diet (Herrera and Mancina 2007).

Because of low development of the wing tip (dactylopatagium area ÷ plagiopatagium area—Mancina et al. 2004), *P. poeyi* is unable to hover, but is very agile on foot, with extremely elongated legs, always landing on flowering or fruiting branches to feed (Koch and von Helversen 2007). Capture data and observations I made in the "Sierra del Rosario" Biosphere Reserve suggest that *P. poeyi* often forages in groups, more than 30 individuals have been observed flying around a flowering blue mahogany (*Talipariti elatum*). Silva (1979) observed that individuals released 20 km from their roost returned to it the same night; examination of these data indicates that *P. poeyi* has the capacity to use large home ranges or foraging areas distant from its day roosts.

Diseases and parasites.—Several bacteria were isolated from the skin of *Phyllonycteris poeyi* (*Enterococci*, *Enterobacter cloacae*, and *Staphylococcus intermedius*) and fungi (*Chaetomium globosum*, *Mucor racemosus*, *Penicillium*, and *Trichoderma*) associated with necrotizing dermatitis and arthritis also were detected (Speck et al. 2004).

Platyhelminthes (flatworms) found in *P. poeyi* were: *Mathevotaenia cubana*, *Nudacotyle quartus*, *N. tertia*, *Ochoterenatrema pricei*, *Postorchigenes cubensis*, *Vampirolepis bidentatus*, and *V. chiropterophila*. Round worms (Nematoda) hosted by *P. poeyi* include: *Capillaria viguerasi*, *C. phyllonycteri*, *Histiostrongylus coronatus*, and *Litomosoides chandleri*, and the acantochephalean worm *Prostenorchis novellae* (Coy and Lorenzo 1982; Rutkowska 1980; Silva 1979; Ubelaker et al. 1977). Ectoparasites recorded from *P. poeyi* included the following mites, ticks, and chiggers (Acarina): *Periglischrus cubanus* (Spinturnicidae); *Ornithodoros viguerasi*, *Antricola silvai*, *A. habanensis*, *Parantricola marginatus* (Argasidae); *Eudusbabekia danieli* (Myobiidae); *Macronyssoides kochi* (Macronyssidae); and *Tectumpilosum negreai*, *Beamerella acutascuta*, *Microtrombicula septemsetosa*, *Microtrombicula boneti*, *Whartonia diploctenum*, and *Wagenaaria similis* (Trombiculidae); as well as batflies (Diptera): *Trichobius cernyi*, *T. frequens*, *T. intermedius*, *T. parasiticus*, and *T. truncatus* (Streblidae—Cruz and Daniel 1994; Daniel and Stekol'nikov 2002, 2003a, 2003b; Silva 1979; Webb and Loomis 1977).

Interspecific interactions.—In Cuba, individuals of *Phyllonycteris poeyi* were captured at the same netting sites with the Jamaican fruit-eating bat (*Artibeus jamaicensis*), *Brachyphylla nana*, big brown bat (*Eptesicus fuscus*), *Erophylla sezekorni*, Pfeiffer's red bat (*Lasiurus pfeifferi*), Pallas' mastiff bat (*Molossus molossus*), Leach's single-leaf bat (*Monophyllus redmani*), Antillean ghost-faced bat (*Mormoops blainvillei*), Cuban fig-eating bat (*Phyllops falcatus*), *Pteronotus parnellii*, *Pteronotus quadridens*, and Brazilian free-tailed bat (*Tadarida brasiliensis*—Mancina 2004; Mancina et al. 2007). On southern Haiti, *P. poeyi* has been netted with *A. jamaicensis*, *B. nana*, brown flower bat (*Erophylla bombifrons*), minor red bat (*Lasiurus minor*), Waterhouse's leaf-nosed bat (*Macrotus waterhousii*), *M. molossus*, *M. redmani*, *P. falcatus*, and *P. parnellii* (Klingener et al. 1978).

Skulls of *P. poeyi* are very common in barn owl (*Tyto alba*) pellets in Cuba (Arredondo and Chirino 2002; Silva 1979); and this species was the most common prey species found in 34 Stygian owl (*Asio stygius*) pellets on Sierra del Rosario, western Cuba (Kirkconnell et al. 1999). The Cuban boa (*Epicrates angulifer*) can be found commonly foraging on the floor of the caves and at heat traps within the caves, feeding mostly on *P. poeyi* (Hardy 1957b; Silva 1979); the Cuban racer (*Alsophis cantherigerus*) also is a known predator of *P. poeyi* (Hardy 1957a). I have observed feral cats (*Felis catus*) as potential predators of *P. poeyi* during the nocturnal exodus or inside caves.

GENETICS

The karyotype of *Phyllonycteris poeyi obtusa* consists of a diploid number (2n) of 32 chromosomes with a fundamental number (FN) of 60; there are 4 pairs of metacentric autosomes and 11 pairs of submetacentric autosomes. A submetacentric pair of chromosomes with secondary constrictions in the long arm occurs in this species. The sex chromosomes consist of a submetacentric X chromosome and a minute acrocentric Y chromosome (Baker 1979; Nagorsen and Peterson 1975).

CONSERVATION

Phyllonycteris poeyi is listed as Lower Risk/Near Threatened (Hutson et al. 2001) and as Least Concern by the International Union for Conservation of Nature and Natural Resources (Davalos and Mancina 2008). Mancina et al. (2007) include this species in category 3, which includes uncommon or common species but because of their ecological specialization (e.g., roost), changes in habitat conditions could drive some populations to decline severely. *P. poeyi* roosts exclusively in hot caves, where their colonies of several thousand individuals modify the microclimate of the gallery; this reduces energy expenditure and water loss in bats (see Rodríguez-Durán 1995). Therefore, for this species, there should be a critical minimum number of individuals for the colonies to be viable, making these species vulnerable to reductions in population numbers (Silva 1977). Changes in the microclimate could make a cave unsuitable for *P. poeyi*; Cruz (1992), examining 30 hot caves, found that 7 of 9 sites where guano extractions occurred showed a decrease in temperature, and 6 had completely lost their bat fauna.

ACKNOWLEDGMENTS

I am dedicating this account to Gilberto Silva Taboada because of his inestimable contribution to the knowledge of the Cuban bat fauna.

LITERATURE CITED

Anthony, H. E. 1917. Two new fossil bats from Porto Rico. Bulletin of the American Museum of Natural History 37:565–568.

Anthony, H. E. 1919. Mammals collected in eastern Cuba in 1917, with descriptions of two new species. Bulletin American Museum of Natural History 41:625–643.

Arredondo, C. A., and V. N. Chirino. 2002. Consideraciones sobre la alimentación de *Tyto alba furcata* (Aves: Strigiformes) con implicaciones ecológicas en Cuba. El Pitirre 15:16–24.

Baker, R. J. 1979. Karyology. Pp. 107–156 in Biology of the bats of the New World family Phyllostomatidae. Part III (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.). Special Publications, The Museum, Texas Tech University Press 16:1–441.

Baker, R. J., and H. H. Genoways. 1978. Zoogeography of Antillean bats. Pp. 53–97 in Zoogeography in the Caribbean: the 1975 Leidy Medal Symposium (F. B. Gill, ed.). Academy of Natural Sciences of Philadelphia, Special Publication 13:1–128.

Baker, R. J., R. L. Honeycutt, M. L. Arnold, V. M. Sarich, and H. H. Genoways. 1981. Electrophoretic and immunological studies on the relationship of the Brachyphyllinae and the Glossophaginae. Journal of Mammalogy 62:665–672.

Casotti, G., L. G. Herrera, J. J. Flores, C. A. Mancina, and E. J. Braun. 2006. Relationships between renal morphology and diets in 26 species of bats of New World bats (suborder Microchiroptera). Zoology 109:196–207.

Coy, A. O., and N. H. Lorenzo. 1982. Lista de los helmintos parásitos de los vertebrados silvestres cubanos. Poeyana 235:1–57.

Cruz, J. de la. 1992. Bioecología de las grutas de calor. Mundos Subterráneos 3:7–21.

Cruz, J. de la, and M. Daniel. 1994. Chigger mites (Acarina: Leeuwenhoekiidae) from Cuba. Folia Parasitologica 41:71–74.

Daniel, M., and A. A. Stekol'nikov. 2002. New data on chigger mites of the subfamily Leeuwenhoekiinae (Acari: Trombiculidae) parazitizing bats in Cuba. Acarina 10:149–154.

Daniel, M., and A. A. Stekol'nikov. 2003a. Chigger mites (Acari: Trombiculidae) new to the fauna of Cuba, with the description of two new species. Folia Parasitologica 50:143–150.

Daniel, M., and A. A. Stekol'nikov. 2003b. To the fauna of chigger mites (Acari: Trombiculidae) parasitize bats in Cuba. Acarologia XLIII:29–37.

Dávalos, L., and C. A. Mancina. 2008. *Phyllonycteris poeyi*. In International Union for Conservation of Nature and Natural Resources 2008. 2008 IUCN Red list of threatened species. www.iucnredlist.org, accessed 30 December 2009.

Elliot, D. G. 1904. The land and sea mammals of Middle America and the West Indies. Field Columbian Museum, Publication 95, Zoological Series 4:1–850.

Forman, G. L., and H. H. Genoways. 1979. Sperm morphology. Pp. 177–204 in Biology of bats of the New World family Phyllostomatidae. Part III (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.). Special Publications, The Museum, Texas Tech University 16:1–441.

Freeman, P. W. 1995. Nectarivorous feeding mechanisms in bats. Biological Journal of the Linnean Society 56:439–463.

Genoways, H. H., R. J. Baker, J. W. Bickham, and C. J. Phillips. 2005. Bats of Jamaica. Special Publications, The Museum, Texas Tech University 48:1–155.

Griffiths, T. A. 1982. Systematics of the New World nectar-feeding bats (Mammalia, Phyllostomidae), based on the morphology of the hyoid and lingual regions. American Museum Novitates 2742: 1–45.

Hall, E. R. 1981. The mammals of North America. 2nd ed. John Wiley & Sons, Inc. New York.

Hardy, J. D. 1957a. A note on the feeding habits of the Cuban racer, *Alsophis angulifer* (Bibron). Copeia 1:49–50.

Hardy, J. D. 1957b. Bat predation by the Cuban boa, *Epicrates angulifer* Bibron. Copeia 2:151–152.

Herrera, L. G., and C. A. Mancina. 2007. Nectar and pollen use by Antillean nectarivorous bats. Bat Research News 48:230–231.

Hutson, A. M., S. P. Mickleburgh, and P. A. Racey (comps). 2001. Microchiropteran bats: global status survey and conservation action plan. IUCN/SSC Chiroptera Specialist Group, International Union for the Conservation of Nature and Natural Resources, Gland, Switzerland.

Jiménez Vázquez, O., M. M. Condis, and E. García Cancio. 2005. Vertebrados post-glaciales en un residuario fósil de *Tyto alba* Scopoli (Aves: Tytonidae) en el occidente de Cuba. Revista Mexicana de Mastozoología 9:85–112.

Jones, J. K., Jr., and D. C. Carter. 1976. Annotated checklist, with keys to subfamilies and genera. Pp. 7–38 in Biology of bats of the New World family Phyllostomatidae. Part I (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.). Special Publications, The Museum, Texas Tech University 10:1–218.

Kirkconnell, A., D. Wechsler, and C. Bush. 1999. Notes on the Stygian owl (*Asio stygius siguapa*) in Cuba. El Pitirre 12:1–3.

Klingener, D., H. H. Genoways, and R. J. Baker. 1978. Bats from southern Haiti. Annals of Carnegie Museum 47:81–99.

Koch, C. U., J. E. Gutiérrez, A. Rodríguez, and O. von Helversen. 2004. Bat pollination in a Cuban ultramafic endemic: *Caesalpinia bahamensis* Lam. subsp. *orientensis* Borhidi. Pp. 243–253 in Ultramafic rocks: their soils, vegetation and fauna (R. S. Boyd, A. J. M. Barker, and J. Proctor, eds.). Science Reviews 2000 Ltd., St Albans, United Kingdom.

Koch, C. U., and O. von Helversen. 2007. Resource use and foraging strategy in Cuban flower-visiting bats: *Phyllonycteris* and *Monophyllus*. Bat Research News 48:245.

Koopman, K. F. 1952. The status of the bat genus *Reithronycteris*. Journal of Mammalogy 33:255–258.

Koopman, K. F. 1993. Order Chiroptera. Pp. 137–241 in Mammal species of the world: a taxonomic and geographic reference (D. E. Wilson and D. M. Reeder, eds.), 2nd ed. Smithsonian Institution Press, Washington, D.C.

Koopman, K. F., and R. Ruibal. 1955. Cave-fossil vertebrates from Camagüey, Cuba. Breviora 46:1–8.

Mancina, C. A. 1998. Adiciones a la ecología y morfología de *Phyllonycteris poeyi* y *Monophyllus redmani clinedaphus* (Mammalia: Chiroptera: Phyllostomidae). Poeyana 466:1–10.

Mancina, C. A. 2004. Bat community structure in an evergreen forest in western Cuba. Poeyana 491:8–12.

Mancina, C. A. 2008. Effect of moonlight on nocturnal activity of two Cuban nectarivores: the Greater Antillean long-tongued bat (*Monophyllus redmani*) and Poey's flower bat (*Phyllonycteris poeyi*). Bat Research News 49:71–74.

Mancina, C. A., R. Borroto-Páez, and L. García-Rivera. 2004. Tamaño relativo del cerebro en murciélagos cubanos. Orsis 19: 7–19.

Mancina, C. A., L. M. Echenique-Díaz, A. Tejedor, L. García, A Daniel-Álvarez, and M. Ortega-Huerta. 2007. Endemics under threat: an assessment of the conservation status of Cuban bats. Hystrix, The Italian Journal of Mammalogy (New Series) 18:3–15.

Mancina, C. A., L. García-Rivera, and R. T. Capote. 2007. Habitat use by phyllostomid bat assemblages in secondary forests of the 'Sierra del Rosario' Biosphere Reserve, Cuba. Acta Chiropterologica 9:203–218.

Mancina, C. A., A. Hernández, and A. Hernández-Marrero. 2003. Murciélagos del Archipiélago de Sabana-Camagüey, Cuba. Revista Mexicana de Mastozoología 7:41–47.

Miller, G. S., Jr. 1898. Descriptions of five new phyllostome bats. Proceedings of Academy National of Sciences of Philadelphia 50: 326–337.

Miller, G. S., Jr. 1904. Notes on the bats collected by William Palmer in Cuba. Proceedings of the United States National Museum XXVII:337–348.

Miller, G. S., Jr. 1907. The families and genera of bats. United States National Museum Bulletin 57:1–282.

Miller, G. S., Jr. 1929. A second collection of mammals from caves near St. Michel, Haiti. Smithsonian Miscellaneous Collections 81: 1–30.

Mora, E. C., and S Macías. 2006. Echolocation calls of Poey's flower bat (*Phyllonycteris poeyi*) unlike those of other phyllostomids. Naturwissenschaften 94:380–383.

Morgan, G. S. 2001. Patterns of extinction in West Indian bats. Pp. 369–407 in Biogeography of the West Indies: patterns and perspectives (C. A. Woods and F. E. Sergile, eds.), 2nd ed. CRC Press, Boca Raton, Florida..

Nagorsen, D. N., and R. L. Peterson. 1975. Karyotypes of six species of bats (Chiroptera) from the Dominican Republic. Life Sciences, Occasional Papers, Royal Ontario Museum 28:1–8.

Norberg, U. M., and J. M. V. Rayner. 1987. Ecological morphology and flight in bats (Mammalia; Chiroptera): wing adaptations, flight performance, foraging strategy and echolocation. Philosophical Transactions of the Royal Society London, B. Biological Sciences 316:335–427.

Peters, W. 1861. Eine neue von Hrn. Dr. Gundlach beschriebene Gattung von Flederthieren aus Cuba. Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin 1861:817–818.

Rodríguez-Durán, A. 1995. Metabolic rates and thermal conductance in four species of Neotropical bats roosting in hot caves. Comparative Biochemistry Physiology, A. Comparative Physiology 110:347–355.

Rodríguez-Durán, A., and T. H. Kunz. 2001. Biogeography of West Indian bats: an ecological perspective. Pp. 355–368 in Biogeography of the West Indies: patterns and perspectives (C. A. Woods and F. E. Sergile, eds.), 2nd ed. CRC Press, Boca Raton, Florida.

Rutkowska, M. A. 1980. The helminthofauna of bats (Chiroptera) from Cuba. I. A review of nematodes and acanthocephalans. Acta Parasitologica Polonica 26:153–186.

Sampedro Marín, A., O. Torres Fundora, and A. Valdés de la Osa. 1976. Observaciones ecológicas y etológicas sobre dos especies de murciélagos dominantes en las "cuevas calientes" de Cuba. Poeyana 160:1–18.

Silva Taboada, G. 1974. Fossil Chiroptera from cave deposits in central Cuba, with description of two new species (genera *Pteronotus* and *Mormoops*) and the first West Indian record of *Mormoops megalophylla*. Acta Zoologica Cracoviensia 19:33–74.

Silva Taboada, G. 1977. Algunos aspectos de la selección de hábitat en el murciélago *Phyllonycteris poeyi* Gundlach *in* Peters, 1861 (Mammalia: Chiroptera). Poeyana 168:1–10.

Silva Taboada, G. 1979. Los Murciélagos de Cuba. Editorial Academia, La Habana, Cuba.

Silva Taboada, G. 1983. Interrelaciones en el subgénero *Phyllonycteris* (Mammalia: Chiroptera: Phyllostomidae). Ciencias Biológicas 10: 117–121.

Silva Taboada, G. 1988. Sinopsis de la espeleofauna cubana. Editorial Científico-Técnica, Ciudad de La Habana, Cuba.

Silva Taboada, G., and R. H. Pine. 1969. Morphological and behavioral evidence for the relationship between the genus *Brachyphylla* and the Phyllonycterinae. Biotropica 1:10–19.

Simmons, N. B. 2005. Order Chiroptera. Pp. 312–529 in Mammal species of the world: a taxonomic and geographic reference (D. E. Wilson and D. M. Reeder, eds.), 3rd ed. Johns Hopkins University Press, Baltimore, Maryland.

Speck, S., D. Kelm, O. von Helversen, and G. Wibbelt. 2004. Mycotic infection of the skin of *Phyllonycteris poeyi* associated with necrotizing dermatitis and non-suppurative arthritis. Bat Research News 45:157–158.

Swanepoel, P., and H. H. Genoways. 1979. Morphometrics. Pp. 13–106 in Biology of the bats of the New World family Phyllostomatidae. Part III (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.). Special Publications, The Museum, Texas Tech University Press 16:1–441.

Timm, R. M., and H. H. Genoways. 2003. West Indian mammals from the Albert Schwartz collection: biological and historical information. Scientific Papers, Natural History Museum, University of Kansas 29:1–47.

Ubelaker, J. E., R. D. Specian, and D. W. Duzynski. 1977. Endoparasites. Pp. 7–56 in Biology of the bats of the New World family Phyllostomatidae. Part II (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.). Special Publications, The Museum, Texas Tech University Press 13:1–364.

Webb, J. P., Jr., and R. B. Loomis. 1977. Ectoparasites. Pp. 57–120 in Biology of the bats of the New World family Phyllostomatidae. Part II (R. J. Baker, J. K. Jones, Jr., and D. C. Carter, eds.). Special Publications, The Museum, Texas Tech University Press 13:1–364.

Wetterer, A. L., M. V. Rockman, and N. B. Simmons. 2000. Phylogeny of phyllostomid bats (Mammalia: Chiroptera): data from diverse morphological systems, sex chromosomes, and restriction sites. Bulletin of the American Museum of Natural History 248:1–200.

Woods, C. A., and J. A. Ottenwalder. 1992. The natural history of southern Haiti. Florida Museum of Natural History, Gainesville.

Associate editors of this account were Pamela R. Owen and Eric Rickart. Synonymies reviewed by Ryan Norris. Editor was Meredith J. Hamilton.