

## *Phyllops falcatus* (Chiroptera: Phyllostomidae)

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**Abstract:** *Phyllops falcatus* (Gray, 1839), a medium-sized short-faced bat, is a phyllostomid commonly called the Cuban white-shouldered bat or the Cuban fig-eating bat. This single extant species of *Phyllops* is characterized by distinct patches of white hair on each shoulder and just behind the posterior insertion of the ears, and a transparent dactylopatagium minus. *P. falcatus* is a foliage-roosting bat distributed across the Cuban Archipelago, Cayman Islands, and the Island of Hispaniola where it prefers forested habitats at low elevations (below 680 m). This species is rare in zoological collections and has previously been listed in the lower risk–near threatened category. DOI: 10.1644/811.1.

**Key words:** Antilles, bat, Caribbean, Cuba, Cuban fig-eating bat, Cuban white-shouldered bat, phyllostomid

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### *Phyllops* Peters, 1865

*Phyllops* Peters, 1865:356. Type species *Phyllostoma albomaculatum* Gundlach, 1861 (cited in Peters, 1861:155) (= *Arctibeus falcatus* Gray, 1839:1), by original designation.  
*Philops* Valdés, 1914:10. Incorrect subsequent spelling of *Phyllops* Peters, 1865.

**CONTEXT AND CONTENT.** Order Chiroptera, suborder Microchiroptera, family Phyllostomidae, subfamily Stenodermatinae, tribe Stenodermatini, subtribe Stenodermatina. *Phyllops* shares a shortened rostrum and a white spot on the shoulders (Fig. 1) with 7 other bat genera (*Ametrida*, *Ardops*, *Ariteus*, *Centurio*, *Pygoderma*, *Sphaeronycteris*, and *Stenoderma*), which together form a clade (subtribe Stenodermatina—Wetterer et al. 2000). *Ardops*, *Ariteus*, *Stenoderma*, and *Phyllops* are endemic to the Antilles and *Ametrida*, *Centurio*, *Pygoderma*, and *Sphaeronycteris* are distributed in South and Central American mainlands. Short-faced bat genera that are endemic to the Caribbean are readily distinguished from the mainland short-faced forms by their furred faces and the absence of facial folds and glands (e.g., the facial folds of *Centurio* and *Sphaeronycteris* and the periorbital glands of *Pygoderma*). The 4 extant genera in the Stenodermatinae endemic to the Antilles were previously included in a single genus (*Stenoderma*) by Varona (1974), Simpson (1945), and Silva-Taboada (1979). Most authors since Varona (1974) have considered *Phyllops* as a well-defined and distinct genus (e.g., Koopman 1989, 1993; Simmons 2005), a diagnosis further supported by

recent morphological (Wetterer et al. 2000) and molecular (Baker et al. 2003) evidence.

*Phyllops* may be distinguished from the other Caribbean short-faced bats by several morphological diagnostic characters, including possession of 3 upper molars (instead of 2 as in *Ariteus*), well-developed postorbital processes (poorly developed in *Ariteus*), a small gap between the incisive foramina and the roots of incisors (widely separated in *Stenoderma*), nasals raised above the maxillary bone (located in a deep depression in the rostrum of *Stenoderma*), high and



**Fig. 1.**—Adult male *Phyllops falcatus* from Sierra del Rosario Biosphere Reserve, Pinar del Río Province, Cuba.

rounded braincase without a developed sagittal crest (low and with a developed sagittal crest in *Ardops*), and a well-developed metaconid in m1 (absent in *Ardops*). Three species of the genus *Phyllops* are currently recognized, including the extant form *Phyllops falcatus* (Gray, 1839) and 2 species known to date only as fossils—*P. vetus* Anthony, 1917, and *P. silvai* Suárez and Díaz-Franco, 2003 (see “Remarks”).

***Phyllops falcatus* (Gray, 1839)**  
Cuban White-shouldered Bat

*Arctibeus falcatus* Gray, 1839:1. Type locality “Cuba.”

*Phyllostoma albomaculatum* Gundlach, 1861 (cited in Peters 1861:155). Type locality “Ciudad de Guanabacoa, Provincia de la Habana, Cuba,” by restriction (Silva-Taboada 1976).

*Phyllops albomaculatus*: Peters, 1865:356. Name combination and incorrect subsequent spelling of *albomaculatum* Gundlach, 1861 (cited in Peters 1861:155).

*Stenoderma albomaculatus*: Gundlach, 1867:49. Name combination.

*Phyllops falcatus*: Gundlach, 1872:242. First use of current name combination.

*Stenoderma falcatum*: Dobson, 1878:529. Name combination and incorrect subsequent spelling of *falcatus* Gray, 1839.

*Phyllops falcatum*: Elliot, 1904:708. Incorrect subsequent spelling of *falcatus* Gray, 1839.

*Ardops haitiensis*: Allen, 1908:581. Type locality “Caña Honda,” Dominican Republic.

*Phyllops falcatus*: Valdés, 1914:10. Name combination.

*Stenoderma haitiensis*: Varona, 1974:25. Name combination.

*Phyllops haitiensis*: Jones and Carter, 1976:29. Name combination.

CONTEXT AND CONTENT. Context as for genus. Several authors have considered the populations of *Phyllops* of Cuba and Isla de la Juventud as separate species from Hispaniolan populations (*Phyllops* “*haitiensis*,” e.g., Silva-Taboada 1979; Varona 1974). We follow other authors (Klingener et al. 1978; Koopman 1989, 1993; Morgan 1994) in recognizing 2 subspecies within *P. falcatus*—the nominal from Cuba and *P. f. haitiensis*, from Hispaniola:

*P. f. falcatus* (Gray, 1839:1), see above; *albomaculatum* (Gundlach, 1861 (cited in Peters 1861:155)) is a synonym. *P. f. haitiensis* (Allen, 1908:581), see above.

**DIAGNOSIS**

In the Carribean, the Cuban white-shouldered bat (alternatively called the Cuban fig-eating bat and falcate-winged bat) may be readily distinguished from all the extant

endemic short-faced genera (*Ardops*, *Ariteus*, and *Stenoderma*) by its concave, excavated maxilla and by its developed postorbital process (Fig. 2). *P. falcatus* may be distinguished from the sympatric stenodermatine fossil genus *Cubanycteris* by the limit of its palatal emargination, which reaches M1 (in *Cubanycteris* reaches M3); from its sympatric fossil congener form *P. vetus* by its larger size, and by its posterior braincase high and rounded; and from its other sympatric congener fossil *P. silvai* by its shorter rostrum and by its hidden vomer bone, not exposed ventrally as in the later species (see “Remarks”).

**GENERAL CHARACTERS**

*Phyllops falcatus* is a medium-sized bat (head and body length 55–65 mm,  $n = 7$ ; forearm 40–48 mm, wingspan 315–365 mm, weight 16–23 g—Klingener et al. 1978; Silva-Taboada 1979; Timm and Genoways 2003) from the subfamily Stenodermatinae (Chiroptera: Phyllostomidae), therefore lacking a tail. *P. falcatus* has dense and silky fur, and a medium-length pelage (dorsal fur 7–10 mm) with dorsal hairs longer than ventral hairs. General coloration is grayish brown and ventral pelage is overall paler than dorsal pelage. Each individual hair is mostly tricolored, with dark tips and bases, and a pale median band. A small white patch formed by entirely white fur is present on each shoulder where the antebrachial patagium meets the body at shoulder level, and another small patch of completely white fur is located just behind the posterior insertion of the ear; it is uncertain if the latter is less conspicuous in juveniles (Gundlach 1877), or if it fades away more easily in alcohol-prepared specimens (Silva-Taboada 1979). The nose leaf is broad, with a broad ovate-shaped spear ending in a pointed tip; the spear edges are expanded and the spear is large up to the distal spear where it tapers. Ears are relatively short with rounded tips; the tragus is thick, pinkish in live animals and discolored in fluid-preserved animals, and its relative size is approximately one-fourth of the ear length. The thumb is large (9–12 mm), the metacarpals are all of a similar length, and the calcar is short (3–5 mm—Gray 1839; Silva-Taboada 1979).

Means (in mm) of measurements (with parenthetical ranges, in mm) of 17 males and 25 females, respectively, from southern Haiti (Klingener et al. 1978) are: length of forearm, 40.6 (38.6–42.1), 42.6 (40.5–44.8); greatest length of skull, 19.7 (19.0–20.2), 20.3 (19.6–20.7); condylobasal length, 17.5 (16.8–17.8), 18.1 (17.3–18.5); zygomatic breadth, 13.1 (12.5–13.6), 13.4 (12.6–13.8); postorbital constriction, 5.4 (5.2–5.7), 5.5 (5.3–5.7); braincase breadth, 9.8 (9.6–10.1), 10.0 (9.5–10.3); length of maxillary tooththrow, 5.7 (5.5–5.9), 6.0 (5.7–6.2), and breadth across upper molars, 7.9 (7.8–8.2), 8.2 (7.5–8.5). Means (in mm) of measurements (with parenthetical ranges, in mm, followed by sample size) of males and females, respectively, from Cuba (Mancina and

García-Rivera 2000; Silva-Taboada 1979) are: length of forearm, 42.5 (41.4–44.0, 15), 45.3 (44.1–46.5, 15); length of humerus, 27.2 (26.9–27.5, 5), 28.1 (27.6–28.5, 5); greatest length of skull, 20.3 (19.6–20.8, 14), 21.1 (20.6–21.4, 14); condylobasal length, 18.3 (17.9–18.9, 10), 19.1 (18.8–19.5, 12); length of maxillary tooththrow, 6.5 (6.1–6.8, 10), 6.8 (6.6–7.0, 12); breadth of molar, 8.3 (8.0–8.6, 10), 8.6 (8.4–8.8, 12); postorbital breadth, 5.4 (5.3–5.6, 10), 5.6 (5.3–5.9, 12); zygomatic breadth, 13.4 (13.1–14.1, 10), 14.0 (13.7–14.2, 11); wing area (cm<sup>2</sup>), 167.9 (157.8–174.2, 3), 184.9 (176.4–202.0, 6); wingspan, 320 (307–331, 10), 326.25 (305–347, 11); 3rd digit length, 81.6 (79.1–86.2, 10), 91.62 (86.0–98.2, 11); 5th digit length, 61.7 (59.5–64.6, 10), 66.7 (58.3–68.6, 11); tibial length, 19.11 (16.0–24.5, 10), 18.7 (17.1–20.0, 11), and body mass (g), 19.5 (16.0–24.5, 10), 22.3 (16–25.5, 11). Additional measurements may be found in Sanborn (1941), Swanepoel and Genoways (1979), and Timm and Genoways (2003).

*Phyllops falcatus* is sexually dimorphic in size, both in cranial and body dimensions, with females being larger than males (Klingener et al. 1978; Mancina and García-Rivera 2000; Silva-Taboada 1979). Cuban females were much larger than males in 17 measurements, including skull and external dimensions, with the larger differences being, respectively, the length of maxillary tooththrow followed by forearm, humerus, and condyloincisive length (Silva-Taboada 1979). Mancina and García-Rivera (2000) also found significant values indicating sexual dimorphism in *P. falcatus* in 4 external measurements (3rd and 5th digit lengths, wingspan, and forearm length), and weight.

## DISTRIBUTION

*Phyllops falcatus* has been recorded at 23 localities on the Island of Hispaniola, including 11 in the Dominican Republic (within Caña Honda and eastern Arenosa—Armstrong and Johnson 1969) and 12 in Haiti (at caves near to or within St.-Michel de l'Atalaye, Massif de la Hotte, Massif de la Selle, Paillant, Pétionville, Port-au-Prince, and vicinities of Lebrun—Baker and Genoways 1978; Koopman 1989; Morgan 1994; Timm and Genoways 2003). In the Cuban Archipelago, *P. falcatus* is known from more than 30 localities including points spread across all of Cuba, and the keys in the northern Cuban Archipelago, such as Coco and Paredón Grande (Mancina et al. 2003). *P. falcatus* has been captured in western Cuba at the Sierra del Rosario Biosphere Reserve and at the Bosque de La Habana, in the central region of Cuba at Archipelago Sabana-Camagüey, and in eastern Cuba at National Park Alexander von Humboldt (Fig. 3; Mancina and García-Rivera 2000). Morgan (1994) suggested that *P. falcatus* reached the Cayman Islands only recently because it has not been found in any cave fossil deposits on these islands. One individual of *P. falcatus* was recently captured at the southern keys of Florida (specifically at Key West—C. Mark, pers. comm.), but this may be an incidental occurrence rather

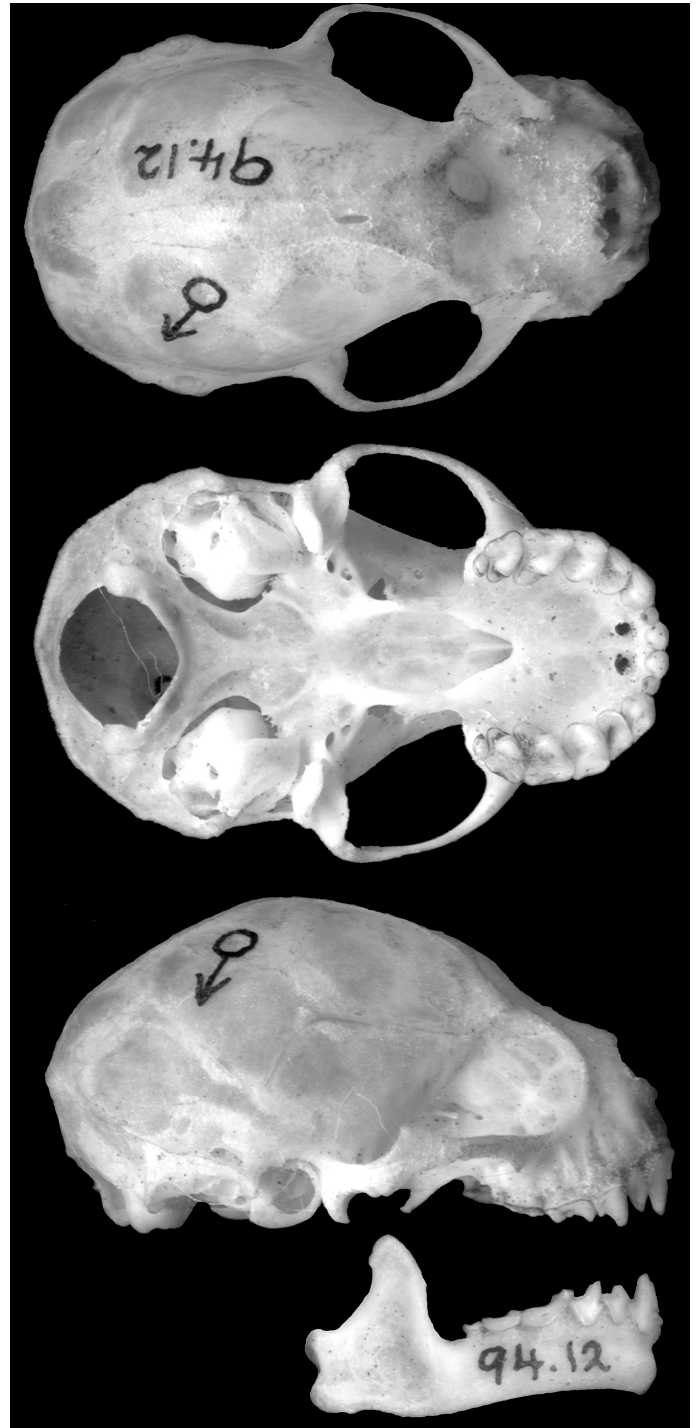
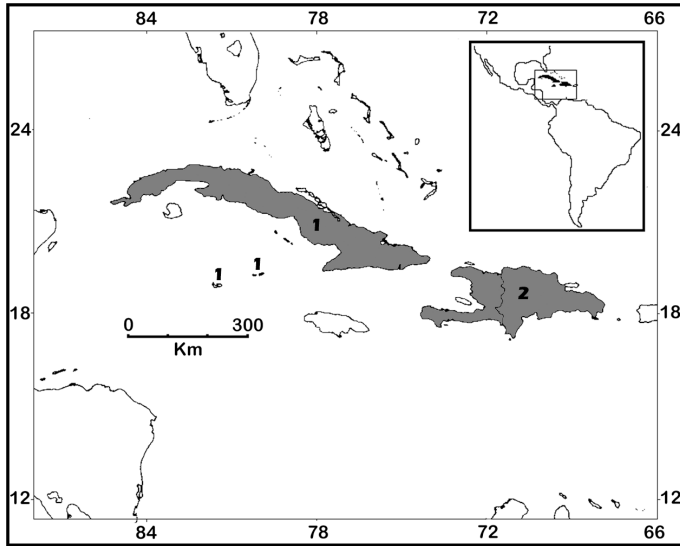


Fig. 2.—Dorsal, ventral, and lateral views of cranium and lateral view of mandible of an adult male *Phyllops falcatus falcatus* (Colección de Mamíferos, Instituto de Ecología y Sistemática CAZCC 1.2416) from Botanical Garden of Cienfuegos. Greatest length of skull is 19.9 mm.



**Fig. 3.**—Geographic distribution of *Phyllops falcatus*. Subspecies are: 1) *P. f. falcatus* and 2) *P. f. haitiensis*.

than meaning an actual extension in the range of distribution of *P. falcatus*.

### FOSSIL RECORD

*Phyllops falcatus* has been found in Quaternary cave deposits throughout Cuba including eastern (Anthony 1919) and central Cuba, in Camagüey (Koopman and Ruibal 1955; Suárez and Díaz-Franco 2003), La Habana (Arredondo 1970; Torres and Rivero 1970), and Isla de la Juventud (= Isla de Pinos—Silva-Taboada and Woloszyn 1975). Within Hispaniola, *P. falcatus* was the most abundant species in a fossil-bearing cave deposit in western Dominican Republic at a locality near the Haitian border (Morgan 2001).

### FORM AND FUNCTION

**Form.**—The skull of *P. falcatus* is robust with a short and broad rostrum, a developed postorbital process, and a high and rounded braincase. The rostrum is shorter than the braincase in length, and the maxilla has an excavated surface located between dorsal facial maxilla and border of alveoli. The ventropalate is emarginated, its border rounded and arched, the incisive foramina are close to incisors, and the interpterygoid space reaches the 1st molar level. The shape of the border of ventropalatal emargination is variable but often tending to V-shape, with sides unparallel throughout. Mandible has a high coronoid process and the condyloid process is located roughly at the level of lower molar crown. A minute, peglike last inferior molar is consistently present in the mandible.

The mean cranial capacity (= volume available for brain tissue) for 5 individuals was  $0.56 \text{ cm}^3 \pm 0.01 \text{ SD}$ , and the quotient of encephalization was  $1.22 \pm 0.07 \text{ SD}$  (Mancina et al. 2004). Dental formula is  $i \ 2/2, c \ 1/1, p \ 2/2, m \ 3/3$ , total 32. The inner upper incisor is triangular, acutely pointed, and has higher than long crowns, about 2 times higher than the outer upper incisor. The outer upper incisor is bifid. C1 is stout and subequal to P2. P2 has a much higher cusp compared to P1, and P1 has a larger basin. The 4 lower incisors are bifid and subequal. The lower canines have a large posteroexternal talon;  $p4$  (= the posterior of 2 premolars) is larger and higher than  $p1$ . The 3rd lower molar is very small, peglike, and less developed than the M3 (Miller 1907; Silva-Taboada 1979).

The uropatagium of *P. falcatus* is narrow and hairy. The thumb is very long (9–2 mm) including the claw (see Gray 1839; Silva-Taboada 1979). The wing is large and broad and blackish in color except for the dactilopatagium minus, which is translucent.

The gland of penis is granular (Gray 1839) and spermatozoa of *P. falcatus* usually have a triangular head with an acrosome that is slightly asymmetrical and shorter than the nucleus. The nucleus is nearly rounded with a broadly rounded apex, and a short neck that connects with the head slightly off center. The midpiece is of moderate length and breadth and makes a distinct connection with the tail (Forman and Genoways 1979).

**Function.**—The index finger of *P. falcatus* is curved and supports a smooth and translucent dactilopatagium minus that remains permanently open and may function as a window allowing the bat to see through its transparency (Vaughan 1970). Wings of *P. falcatus* have aspect ratio values of  $6.57 \pm 0.15 \text{ SD}$  and wing loadings of  $10.88 \pm 0.59 \text{ SD}$  ( $n = 5$ —Mancina et al. 2004). According to these values, *P. falcatus* may have a slow flight with high maneuverability capacities, and might not be able to fly over large distances. Silva-Taboada (1979) reports individuals of *P. falcatus* flying slowly and inside vegetation and also pairs of individuals, generally male and female, taking slow flights together but with enough speed to indicate chasing each other like moths. Body temperatures of *P. falcatus* while in flight ( $36\text{--}38^\circ\text{C}$ ) were higher than those recorded during feeding activities (about  $14^\circ\text{C}$ —Silva-Taboada 1979).

Echolocation calls emitted by *P. falcatus* in laboratory settings and in the field during free flight in a relatively uncluttered space ranged from 4.5 ms up to 5.3 ms long (Macías et al. 2005). Calls had 1st harmonic sweeps from about 73 kHz down to about 23 kHz and a less-intense 2nd harmonic. Intervals between pulses varied between 55 and 170 ms (mean of about 110 ms). During flight in confined and cluttered space in both natural and artificial settings the calls of *P. falcatus* were shortened to about 2 ms and in approaches to fruit, calls further shortened to about 1 ms or less, with call frequencies increasing to about 5 calls/100 ms. The large bandwidth of the 1st harmonic separates *P.*

*falcatus* from all other Cuban bat species, allowing the identification of this species in the field through call recording (Macías et al. 2005).

## ONTOGENY AND REPRODUCTION

Six females collected in southern Haiti in January were pregnant (total length of embryos ranging from 6.5 to 14 mm). Five of 8 females captured in Haiti in May were pregnant and of 54 females caught during August, 27 were not pregnant, 8 had enlarged uteri, 14 had embryos (lengths ranging from 10 to 43 mm), and 5 had enlarged postpartum uteri (Klingener et al. 1978). The mean length of the testes of 10 males captured on August was 4.3 mm (Klingener et al. 1978).

*Phyllops falcatus* appears to be polyestrous in Cuba (Mancina et al. 2007; Silva-Taboada 1979). Reproductively active females (pregnant, lactating, or both) were captured in February, March, April, May, and December (Mancina and García-Rivera 2000; Mancina et al. 2007; Silva-Taboada 1979).

Silva-Taboada (1979) reported approximate 1:1 rates of capture for males and females in various localities within Cuba, whereas Mancina and García-Rivera (2000) reported a predominance of females in sampling from 4 localities in western and eastern Cuba. A predominance of females in relative number of captures also was reported in several localities in southwestern Haiti (Klingener et al. 1978). It has been suggested that the unbalanced sex ratio may be attributed to sexual-related behavior (e.g., males forming harems of females—Mancina and García-Rivera 2000). Silva-Taboada (1979) captured a group of 5 male individuals, which may indicate some level of sexual segregation within roosting groups.

## ECOLOGY

**Space use.**—*Phyllops falcatus* inhabits lowlands and low mountains. The highest capture elevation recorded was 680 m, in the Alejandro von Humboldt National Park where the Cuban pine (*Pinus cubensis*) predominates (Mancina and García-Rivera 2000). *P. falcatus* has otherwise been collected in a variety of forested environments in Cuba, including evergreen, submontane, pine, and semideciduous forest, including an urban park of the La Habana City (Bosque de La Habana—Mancina and García-Rivera 2000).

*Phyllops falcatus* is a foliage-roosting bat, according to currently available data. Silva-Taboada (1979) recorded *P. falcatus* roosting in broadleaf trees (*Swietenia macrophylla* and *Garcinia binucao*) in Cuba, in the Botanical Gardens of La Habana and Cienfuegos, respectively. Silva-Taboada (1979) found small groups of 3–5 individuals tightly clustered occupying the shadowy and most protected parts of foliage both in nature and in captivity.

*Phyllops falcatus* appeared to be relatively common in thickly vegetated ravines of southern Haiti in the late 1970s because it was the 2nd most frequent bat species captured at that survey (Klingener et al. 1978). More recently (Mancina 2004), capture frequencies of *P. falcatus* were low in evergreen forests of western Cuba when compared with other phyllostomid species (*Artibeus jamaicensis*, *Phyllonycteris poeyi*, *Monophyllus redmani*, and *Brachyphylla nana*) known to roost in caves.

In Cuba, in the late 1970s, *P. falcatus* seemed to be more active in the early evenings (Silva-Taboada 1979). In contrast, more recent surveys registered peaks of activity of this bat in later hours (Mancina and García-Rivera 2000).

**Diet.**—The only available data on the diet of *P. falcatus* are the findings of seeds of *Cecropia scheberiana* in 2 of 3 fecal samples, and the capture of a single individual carrying a fruit of *Syzygium jambos* in the Sierra del Rosario Biosphere Reserve, western Cuba (Mancina and García-Rivera 2000).

**Diseases and parasites.**—Cruz (1973) described *Paralabidocarpus foxi*, a mite ectoparasite found in the fur of *P. falcatus*, in the axillary region.

**Interspecific interactions.**—Individuals of *P. falcatus* were captured at the same netting sites with *Artibeus jamaicensis*, *Brachyphylla nana*, *Eptesicus fuscus*, *Erophylla bombifrons*, *Lasiurus minor*, *Macrotus waterhousii*, *Molossus molossus*, *Monophyllus redmani*, *Mormoops blainvillei*, *Phyllonycteris poeyi*, *Pteronotus parnellii*, *Pteronotus quadridens*, and *Tadarida brasiliensis* and in southern Haiti and western Cuban forests (Klingener et al. 1978; Mancina 2004).

*Phyllops falcatus* has been intensively preyed upon by the barn owl (*Tyto alba*) in Cuba and its bone remnants are frequently found in pellets of *T. alba* everywhere in the country (Allen 1942; Anthony 1919; Domínguez 1949; Silva-Taboada 1979).

## GENETICS

*Phyllops falcatus* from Dominican Republic has a diploid number of 30 for females and 31 for males and a fundamental number of 56; the autosomal complement is composed of biarmed elements, with 10 pairs of metacentric or submetacentric chromosomes and 4 pairs of subtelocentric chromosomes (Baker 1979; Greenbaum et al. 1975; Nagorsen and Peterson 1975). The sex-determining system is relatively similar to the system of *Artibeus*, with 1 autosome translocated to the X but with its homologue not translocated to the Y. The X is apparently a subtelocentric chromosome (Greenbaum et al. 1975).

## CONSERVATION

Silva-Taboada (1979) commented about the rarity of *P. falcatus* in zoological collections, and Chamizo-Lara and

Rodríguez-Schettino (1998) considered this species endangered in the Cuban Archipelago. On the other hand, Mancina and García-Rivera (2000) discuss the red-listing status of *P. falcatus* because of its wide distribution in Cuba, relative abundance, and tolerance to habitat disturbance. More recently, under a global assessment framework, Hutson et al. (2001) listed *P. falcatus* under the *LR-nt* (lower risk–near threatened) category. The status of this bat is therefore controversial and should be taken with caution. Additionally, *P. falcatus* is endemic to islands under severe environmental threat, and most estimates of its relative abundance are outdated, with the exception of the study of Mancina et al. (2007) that points to a lower relative frequency of *P. falcatus* in relation to other phyllostomids occurring in Cuba. With the data currently at hand, *P. falcatus* is a scarcely captured bat species everywhere either in the past or in recent surveys; it has never been recorded at unnatural roosts and needs natural foliage for shelter. Furthermore, we have observed no present evidence that *P. falcatus* may abdicate of natural or native resources for feeding.

### REMARKS

Silva-Taboada (1976) had subsequently assigned the type locality of *P. falcatus* to “Ciudad de Guanabacoa” based on his studies of the notes of William S. MacLey, who collected the original type material.

Because *P. falcatus* is frequently found in barn owl pellets (*T. alba*) inside caves and in cave surroundings and may be confounded with subfossil and fossil material, we herein provide a key to separate the extant *P. falcatus* from the currently known fossil forms *P. silvai* and *P. vetus*. Characters are based on those described by Suárez and Díaz-Franco (2003) and 1 of us (V. Tavares).

#### *Key to distinguish among known fossil and extant forms of Phyllops.*—

1. Rostrum relatively long (more than one-fourth of braincase length) and upturned, nares directed toward dorsal plane of maxilla and openings higher than wider; braincase flattened between the top head and the posteriormost end of parietals; basisphenoid pits deep, separated by a narrow basisphenoid plate ..... *Phyllops silvai*  
Rostrum relatively short (less than one-fourth of braincase length); nares directed toward rostral plane and openings wider than higher; maxillary toothrow converges posteriorly at the level of M3; basisphenoid pits shallow, separated by a relatively wide basisphenoid plate ..... 2
2. Size smallest within the genus *Phyllops* in most cranial measurements (see Suárez and Díaz-Franco 2003), palatal emargination consistently arched, U-shaped

at the anteriormost part; palatal emargination constricted at level of M3; posterior braincase subovate ..... *Phyllops vetus*  
Ventral hard palate with inflations; palatal emargination with convergent sides tending to a V-shaped form, vomer bone poorly visible ventrally (much less than in fossil forms); posterior braincase rounded; currently known alive and as fossil in Cuba and some associated smaller islands of the Cuban Archipelago and from Hispaniola, and (only as a fossil) at Isla de la Juventud (= Isla de Pinos) ..... *Phyllops falcatus*

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### LITERATURE CITED

- ALLEN, G. M. 1942. Extinct and vanishing mammals of the Western Hemisphere. American Committee on International Wildlife Protection, Special Publication 11:1–620.
- ALLEN, J. A. 1908. Mammalogical notes. II. Bats from the island of San Domingo. Bulletin of the American Museum of Natural History 24:580–582.
- ANTHONY, H. E. 1917. A new rabbit and a new bat from Neotropical regions. Bulletin of the American Museum of Natural History 37: 335–337.
- 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.
- ARMSTRONG, F. H., AND M. L. JOHNSON. 1969. *Noctilio leporinus* in Hispaniola. Journal of Mammalogy 50:133.
- ARRONDONO, O. 1970. Dos nuevas especies subfósiles de mamíferos (Insectívora: Nesophontidae) del Holoceno Precolombino de Cuba. Memorias de la Sociedad de Ciencias Naturales La Salle 86(30):122–152.
- BAKER, R. J. 1979. Karyology. Pp. 107–156 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.
- 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., S. R. HOOVER, C. A. PORTER, AND R. A. VAN DEN BUSSCHE. 2003. Diversification among New World leaf-nosed bats: an evolutionary hypothesis and classification inferred from digenomic congruence of DNA sequence. *Occasional Papers, Museum of Texas Tech University* 230:1–32.
- CHAMIZO-LARA, A., AND L. RODRÍGUEZ-SCHETTINO. 1998. Fauna Amenazada. Pp. 252–260 in *Estudio nacional sobre la diversidad biológica de la República de Cuba* (M. Vales, A. Alvarez, L. Montes, and A. Avila, eds.). Cecyta, Madrid, Spain.
- CRUZ, J. DE LA. 1973. Nuevos géneros y especies de ácaros de la superfamilia Listrophoroidea (Acarina: Chirodiscidae y Labidocarpidae) parásitos de mamíferos cubanos. *Poeyana* 115:1–10.
- DOBSON, G. E. 1878. *Catalogue of the Chiroptera in the collection of the British Museum*. Taylor and Francis, London, United Kingdom.
- DOMÍNGUEZ, N. 1949. Sobre el pico occidental del Pan de Guajaibón. *Revista Sociedad Malacología* 7(1):25–35.
- ELLIOT, D. G. 1904. The land and sea mammals of Middle America and the West Indies. *Field Columbian Museum Zoological Series* 4(95):441–850.
- 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.
- GRAY, J. E. 1839. Descriptions of some Mammalia discovered in Cuba by W. S. MacLeay, Esq. *Annals of Natural History* 4(21):1–7.
- GREENBAUM, I. F., R. J. BAKER, AND D. E. WILSON. 1975. Evolutionary implications of the karyotypes of the stenodermine genera *Ardops*, *Ariteus*, *Phyllops*, and *Ectophylla*. *Bulletin of Southern California Academy of Sciences* 74:156–159.
- GUNDLACH, J. 1867. *Revista y catálogo de los mamíferos cubanos*. Pp. 40–56 in *Repertorio físico-natural de la Isla de Cuba* (F. Poey, ed.). Editora Montiel, La Habana, Cuba.
- GUNDLACH, J. 1872. *Catálogo de los mamíferos cubanos*. *Annales de la Sociedad Española de Historia Natural* 1:231–258.
- GUNDLACH, J. 1877. *Contribución a la mamología cubana*. Imprenta G. Montiel, La Habana, Cuba.
- 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, Gland, Switzerland.
- 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 Publication, The Museum, Texas Tech University 10:1–218.
- KLINGENER, D., H. H. GENOWAYS, AND R. J. BAKER. 1978. Bats from southern Haiti. *Annals of Carnegie Museum* 47:81–99.
- KOOPMAN, K. F. 1989. A review and analysis of the bats of the West Indies. Pp. 635–644 in *Biogeography of the West Indies: past, present and future* (C. A. Woods, ed.). Sandhill Crane Press, Gainesville, Florida.
- 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.
- MACÍAS, S., E. C. MORA, C. KOCH, AND O. VON HELVERSEN. 2005. Echolocation behavior of *Phyllops falcatus* (Chiroptera: Phyllostomidae): unusual frequency range of the first harmonic. *Acta Chiropterologica* 7:275–283.
- MANCINA, C. A. 2004. Bat community structure in an evergreen forest in western Cuba. *Poeyana* 491:8–12.
- 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., AND L. GARCÍA-RIVERA. 2000. Notes on the natural history of *Phyllops falcatus* (Gray, 1839) (Phyllostomidae: Sterodermatinae) in Cuba. *Chiroptera Neotropical* 6(1–2): 123–125.
- 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. 1907. The families and genera of bats. *United States National Museum Bulletin* 57:1–282.
- MORGAN, G. S. 1994. Mammals of the Cayman Islands. Pp. 435–463 in *The Cayman Islands: natural history and biogeography* (M. A. Brunt and J. E. Davis, eds.). Kluwer Academic Publishers, The Hague, Netherlands.
- 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.). CRC Press, Boca Raton, Florida.
- NAGORSEN, D. W., 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.
- PETERS, W. 1861. Übersicht der von Hrn. Dr. Gundlach beobachteten Flederthiere auf Cuba. *Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin* 1861:149–156.
- PETERS, W. 1865. Über flederthiere (*Vespertilio soricinus* Pallas, *Choeronycteris* Lichtenst., *Rhinophyllina pumilio* nov. gen., *Artibeus fallax* nov. sp., *A. concolor* nov. sp., *Dermanura quadrivittatum* nov. sp., *Nycteris grandis* nov. sp.). *Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin* 1866:351–359.
- SANBORN, C. C. 1941. Descriptions and records of Neotropical bats. *Field Museum of Natural History, Zoology Series* 27:371–395.
- SILVA-TABOADA, G. 1976. La localidad tipo de algunos murciélagos cubanos descritos en el siglo XIX. *Miscelánea Zoológica* 5:2–3.
- SILVA-TABOADA, G. 1979. Los murciélagos de Cuba. Editorial Academia, La Habana, Cuba.
- SILVA-TABOADA, G., AND B. W. WOLOSZYN. 1975. *Phyllops vetus* (Mammalia: Chiroptera) en Isla de Pinos. *Miscelanea Zoologica (Cuba)* 1:3.
- 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.
- SIMPSON, G. G. 1945. The principles of classification and a classification of mammals. *Bulletin of the American Museum of Natural History* 85:1–350.
- SUÁREZ, W., AND S. DÍAZ-FRANCO. 2003. A new fossil bat (Chiroptera: Phyllostomidae) from a Quaternary cave deposit in Cuba. *Caribbean Journal of Science* 39:371–377.
- 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 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.
- TORRES, P. V., AND M. RIVERO DE LA CALLE. 1970. La Cueva de la Santa. *Academia de Ciencias de Cuba, Serie Espeleología* 13:1–42.
- VALDÉS, P. R. 1914. *Catálogo general Museo “Gundlach.”* Cuba Intelectual, La Habana, Cuba.
- VARONA, L. S. 1974. *Catálogo de los mamíferos vivientes y extinguidos de las Antillas*. Academia de Ciencias de Cuba, La Habana, Cuba.
- VAUGHAN, T. A. 1970. The transparent dactylopatagium minus in phyllostomatid bats. *Journal of Mammalogy* 51:142–145.
- 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.

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