New Genus and Species of Fossil Bat (Chiroptera: Phyllostomidae) from Cuba

CARLOS A. MANCINA AND LAINET GARCÍA-RIVERA

Institute of Ecology and Systematic, Dept. of Vetebrates, km 3 1⁄2 Varona Rd., Capdevila, Boyeros, PO Box 8029, CP 10800, Havana, Cuba. Corresponding author: biokarst@ama.cu

ABSTRACT.—A new genus and species of bat (Stenodermatinae: Stenodermatini) is described based on fossil specimens recovered from a cave deposit in Cueva GEDA, Pinar del Río, western Cuba. Cubanycteris silvai, new genus and species, is allied to the short-faced stenodermatines (subtribe Stenodermatina). This new taxon is the third fossil species of Stenodermatina described from Cuba. Short-faced bats, with only one extant representative per Antillean Island, seem to have occurred as three or maybe even more sympatric species in Cuba, supporting the hypothesis that Cuba was an important center of diversification of Antillean short-faced bats.

KEYWORDS.—Fossil bats, Cubanycteris silvai, Stenodermatina

INTRODUCTION

Eight of the 17 stenodermatine genera are short-faced bats, four of which are West Indian endemics, and the remaining occurs on from Mexico to Argentina (Jones and Carter 1976; Koopman 1993). In a recent phylogenetic analysis of Phyllostomidae, based on morphological, sex chromosomes and restriction sites, Wetterer et al. (2000: 140) proposed recognition of two new subtribal taxa—Ectophyllina and Stenodermatina—for the bats colloquially known as the “long-faced” and the “short-faced” stenodermatines, respectively. Later, based on mitochondrial and nuclear genes Baker et al. (2003) found that ectophyllina is not monophyletic. These authors found strong evidence that the subtribe Stenodermatina forms a natural assemblage, although, unlike in previous studies, the long-faced genera Enchisthenes, Ectophylla, Dermanura, and Artibeus appeared allied with Stenodermatina as basal divergences.

Several authors made contributions to the interspecific relationships within short-faced stenodermatines (e.g., Smith 1976; Owen 1987; Lim 1993; Wetterer et al. 2000; Baker et al. 2003), however, some aspects remain controversial and there is no agreement on intergeneric relationships. Nonetheless, as pointed out by Miller (1907:168) within the short-faced stenodermatines two groups may be distinguished morphologically and biogeographically. One group, comprising the continental short-faced bats (Ametrida, Centurio, Pygoderma, and Sphaeronycteris), is characterized by a stronger hamular divergence and a wider floor of the braincase (between the palate and auditory bullae), and a second group, comprising the West Indian short-faced bats (Ardops, Artieus, Phyllops, and Stenodermata) with a thin hamular process and a narrow floor of the braincase.

Cuba has the greatest richness of short-faced bats in the West Indies, and is the only island with evidence of sympatry among these bat species (Morgan 2001). Two fossil species, Phyllops vetus Anthony 1917 and Phyllops silvai Suárez and Díaz-Franco 2003, were described for Cuba; and
the extant species, *Phyllops falcatus* (Gray 1839), has a wide distribution on the island (Mancina and Garcia 2000). We describe new specimens representing a hitherto an unknown genus of Stenodermatina. The material, exceptionally well preserved, was found in a fossil cave deposit recently discovered in Cueva GEDA, Pinar del Río, western Cuba.

**MATERIAL AND METHODS**

Comparisons with osteological material of all the previously known genera of the tribe Stenodermatini were made at the National Museum of Natural History Smithsonian Institution, Washington and American Museum of Natural History, New York. Specimens of *Phyllops falcatus* (Gray 1839), *Artibeus jamaicensis* Leach 1821, *Artibeus lituratus* (Olfers 1818), *Platyrrhinus helleri* (Peters 1866), *Vampyrodes caraccioli* (Thomas 1889), and *Uroderma bilobatum* Peters 1866 (Instituto de Ecología y Sistemática, La Habana), were also analyzed (Appendix 1). Cranial measurements were taken with a dial caliper (±0.1 mm). For the eight genera of Stenodermatina, the measurements of greatest skull length were obtained from Swanepoel and Genoways (1979).

**SYSTEMATIC PALEONTOLOGY**

**Order Chiroptera**

**Family Phyllostomidae**

**Subfamily Stenodermatinae**

**Tribe Stenodermatini**

**Subtribe Stenodermatina**

*Cubanycteris*, new genus

(Fig. 1)

**Etymology.**—*Cuba*, name of country where the type material was collected; *nycteris*, latinized Greek word for bat.

**Differential diagnosis.**—*Cubanycteris*, new genus, is a member of Stenodermatina and may be separated from other genera of the subtribe Ectophyllina by several cranial characters. In long-faced bats the hard palate is long and extends posteriorly into the interpterygoid space, the zygomatic breadth is less than 63 percent (49.5-62.2%) of the total skull length, and the upper dental arcade is u-shaped. In *Cubanycteris* as the other short-faced bats, the hard palate is short and does not extend posteriorly into the interpterygoid space, the zygomatic

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**Fig. 1.** Schematic representation of partial view of the skulls of the endemic West Indian genera of Stenodermatina, illustrating diagnostic features of *Cubanycteris*, new genus, in comparison with other insular representatives of the subtribe. Above (occlusal view). Palatal emargination ends posterior to last molars in *Cubanycteris*, whereas in the other genera it ends at level with first molars. Below (dorsal view). Point of juncture of supraorbital ridges with sagittal crest extends farther posteriorly in *Cubanycteris* than in the other genera.
breadth is more than 63 percent (63.6–84.4%) of the total skull length, and the upper dental arcade is expanded laterally to form a semicircular (horseshoe-like) arch.

Despite its affinities with Stenodermatina, *Cubanycteris* also differs in cranial characters from all other genera of this subtribe. First, in *Cubanycteris* the posterior border of the hard palate is barely emarginated (the emargination ending posterior to the third molars), while in West Indian genera the emargination ends at the level of the first molars (Fig. 1 above). In *Centurio senex* Gray 1842 and *Sphaeronycteris toxophyllum* Peters 1882 the palatal emargination extends to approximately the middle of M2, and in *Pygoderma bilabiatum* (Wagner 1843) and *Ametrida centurio* Gray 1847 there is no palatal emargination or it is very small. Second, in *Cubanycteris* the rostrum is proportionately longer, with the point where the supraorbital ridges join the sagittal crest ending farther posteriorly (Fig. 1 below). *Cubanycteris* is by far the largest of all Stenodermatina. Its total skull length (27.5–27.8 mm) is very large compared to those of *Ametrida centurio* (14.9–16.7 mm), *Ardops nichollsi* (Thomas 1891) (22.3–24.4 mm), *Ariteus flavescens* (Gray 1831) (18.5–20.6 mm), *Centurio senex* (18.5–19.8 mm), *Phyllops falcatus* (19.4–20.9 mm), *Pygoderma bilabiatum* (19.9–21.0 mm), *Sphaeronycteris toxophyllum* (16.1–17.5 mm), and *Stenoderma rufum* Desmarest 1820 (22.0–23.5 mm).

*Cubanycteris* may be further distinguished from other genera of Stenodermatina by the following diagnostic features: from *Ardops*, by the condition of the upper incisors, forming an arch between canines instead of a straight line; from *Ariteus* and *Centurio*, by the possession of three upper molars instead of two; from *Ametrida* and *Sphaeronycteris*, by the facial processes of the premaxilla and maxilla above teeth, which in *Cubanycteris* lie perpendicular to the palatal processes instead of horizontally above teeth; from *Phyllops*, by the presence of a secondary cusp on the cutting edge of first upper incisor; and from *Stenoderma*, by the much longer pterygoid apophyses. Dental formula: i 2/2, c 1/1, p 2/2, m 3/3.

**Type species.**—*Cubanycteris silvai*.

**Referred species.**—The type species only.

*Cubanycteris silvai*, new species

**Etymology.**—Patronymic to honor Gilberto Silva Taboada for his contribution to the knowledge of Cuban Chiroptera.

**Fig. 2.** Dorsal, ventral, and lateral views of cranium, and lateral view of mandible of the holotype of *Cubanycteris silvai*, new species; No. IES 1.5540 (Instituto de Ecología y Sistemática, La Habana). Estimated greatest length of skull is 27.6 mm (this measure is only used to give an idea of scale, and it is inferred from the paratypes).
Holotype.—No. IES 1.5540 (Instituto de Ecología y Sistemática, La Habana, field number 033), collected by Carlos A. Mancina and Lainet García Rivera on June 24, 2000; partial skull plus articulated mandible and complete humerus. The occipitobasal region of the skull is missing, zygomatic arches intact, upper and lower dentitions complete, apex of right coronoid process partially broken.

Type locality.—Cueva GEDA (ca. 22°39’N, −83°42’W), Sierra de Guasasa, Cordillera de Guaniguanico, Provincia de Pinar del Río, Cuba.

Chronology.—Quaternary.

Paratypes.—Three paratypes from same locality and collectors as the holotype. No. MNHNcu 3787 (Museo Nacional de Historia Natural, La Habana, field number 029), collected on June 23, 2000; partial skull plus articulated mandible and complete humerus, braincase lacking, zygomatic arches intact, upper and lower dentitions complete. No. IES 1.5542 (field number 030), collected on June 23, 2000; almost complete skull and mandible joined together by limestone encrustations. No. IES 1.5542 (field number 034), collected on June 24, 2000; highly corroded and fragile skull and mandible joined together by limestone encrustations.

Distribution.—Known only from the type locality.

Diagnosis.—See genus.

Description.—Skull with well marked supraorbital ridges and sagittal crest; near middle, each supraorbital ridge forms a distinct swelling at point where it bends to continue across forehead to join sagittal crest; anterior nares directed almost dorsally, their posterior border located half-way between anteriormost point of premaxillaries and point of juncture of supraorbital ridges with sagittal crest; pterygoid apophyses long; postgenoid processes well developed. (For other skull features see Differential diagnosis).

Upper incisors closely crowded in a moderately arched row between canines. First incisor is about twice as large as second and its cutting edge on the inner side rising to a main cusp and a low second cusp on outer side. Second incisor has a concave cutting edge and rises barely to level of cingulum of canine. Canine is stout, not much higher than second premolar. First premolar is much lower than canine, but with better developed postero-external cingulum cusp. Second premolar is about twice as large as first, with an ample concave internal base; its posterior cutting edge with secondary cusp. First molar noticeably broader than long, much longer externally than internally, and with well-developed hypocone and minute protocone; paracone and metacone well developed, forming with their commissure the trenchant outer edge of tooth. Second molar slightly more than half as large as first, its greatest length found at middle instead of along outer edge; and with cusps much reduced, except for hypocone. Third molar is smaller than first incisor.

Mandible is robust, similar to that of other West Indian Stenodermatina. Lower incisors smaller than upper and closely crowded between canines, their crowns broader than long and strongly converging posteriorly (in front view). Canine with base of crown widely expanded internally. First lower premolar is similar to first upper premolar. Second lower premolar resembles canine, but length of crown greater in proportion to its height, and the shaft thicker basally. First lower molar larger than second, its greatest width located posteriorly while that of the second located anteriorly; protoconid large and high, its inner side with a high ridge obliterating metaconid and extending posteriorly to beyond middle of crown; entoconid low but distinct. Second lower molar with protoconid, metaconid, and entoconid well developed; hypoconid represented by a slight elevation in ridge at edge of crown. Third lower molar is slightly larger than upper.

Measurements (in millimeters). Maximum length of skull (including teeth): 27.5, 27.8; zygomatic breadth: 17.5, 18.0; upper tooth-row: 9.1, 9.5; breadth of braincase: 10.9, 11.3; postorbital constriction: 7.0, 7.5; breadth across molars: 11.9, 12.0; breadth across canines: 6.7, 6.9; length of mandible (from anteriormost point of symphysis to end of emargination between condyle
Remarks.—EDA Cave opens in a karstic hill, of the Guasasa mountain range, some 70 m from the base of the hill. It has two superposed gallery levels with a linear extension of more than 5,000 m. At present, bats do not inhabit the cave. The fossils were found scattered loosely on the floor and along the walls of the upper (and older) level of the cave, at approximately 700 m from the nearest cave entrance. In general, fossils were exceptionally well preserved, and skeletal elements were still articulated in some specimens. In addition to sloths (Megalocnus sp., Mesocnus sp.), insectivores (Solenodon sp.), and rodents (Capromyidae), the following bats (in order of abundance) were recovered from the fossil deposit: Macrotus waterhousii Gray 1843, Artibeus anthonyi Woloszyn and Silva 1977, Artibeus jamaicensis Leach 1821, Eptesicus fuscus (Beauvois 1796), Brachyphylla nana Miller 1902, Antrozous pallidus (Le Conte 1856), Pteronotus sp., Lasiusus borealis (Müller 1776), and Lasiusus intermedius H. Allen 1862. Because of its location within the cave, type of deposition, faunal composition, and degree of preservation of the specimens recovered, the GEDA deposit does not fit in the typification of Cuban bat-bearing fossil deposits proposed by Woloszyn and Silva (1974). A thorough taphonomic study of the deposit is needed for a better understanding of its origin.

Because of the lack of radiocarbon date for the GEDA deposit it is difficult to estimate the age of Cubanycteris silvai. The age of bone samples of the extinct owl Tyto noeli Arredondo, associated with the type material of Phyllops silvai, yielded an approximate date of 20,000 ybp. We consider that our fossil materials, by the characteristics of the deposit, could be older than the holotype of P. silvai; nonetheless, the composition of the bat fauna of the deposit studied by us is very similar to the layer where P. silvai was discovered. The latter included the extinct species Artibeus anthonyi, from which we concluded that both taxa may have coexisted during the Pleistocene. Suárez and Díaz-Franco (2003) hypothesized that more than two invasions of Cuba by short-faced bats had occurred through geologic history. We concur with these authors, and hypothesize that Cubanycteris silvai may evolve of an early Antillean colonizer stenodermatine. Cubanycteris silvai is the third fossil species of Stenodermatina described from Cuba, supporting Suárez and Díaz-Franco (2003) hypothesis that the Cuban archipelago has been an important center of speciation of Antillean short-faced bats.

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LITERATURE CITED


APPENDIX 1. SPECIMENS EXAMINED.