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Brachyphylla nana.

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Brachyphylla nana Miller, 1902

Greater Antillean Fruit-eating Bat

Brachyphylla nana Miller, 1902:409. Type locality El Guamá, Pinar de Rio, Cuba.

Brachyphylla pumila Miller, 1918:39. Type locality Port-de-Paix, Haiti.

CONTEXT AND CONTENT. Order Chiroptera, Family Phyllostomidae, Subfamily Brachyphyllinae (see Baker, 1979, for the usage of the subfamily name). *Brachyphylla nana* is a monotypic species (Swanepoel and Genoways, 1978).

DIAGNOSIS. The two species of *Brachyphylla*, which occur allopatrically, can be readily distinguished, because *Brachyphylla nana* is smaller than *B. cavernarum*, especially in cranial measurements. In length of maxillary toothrow and mandibular length, there is no overlap in measurements between the two species (Fig. 1).

GENERAL CHARACTERS. Silva-Taboada (1979) gave a summary of general characteristics of this species.

Secondary sexual dimorphism is displayed. Males proved to be significantly ($P < 0.05$) larger than females in two measurements (greatest length of skull, zygomatic breadth) in specimens from Habana Province, Cuba; in one measurement (length of hindfoot) in specimens from Las Villas Province, Cuba; and in two measurements (length of hindfoot, postorbital breadth) in specimens from the Dominican Republic. Females were found to be significantly larger than males in one measurement (length of ear) in specimens from Las Villas Province.

The range and sample size of external and cranial measurements (in mm) of males and females are as follows: total length, 65 to 92 (34), 67 to 97 (34); length of hindfoot, 13 to 20 (40), 12 to 23 (34); length of ear, 16 to 22 (47), 17 to 26 (47); length of forearm, 51.5 to 61.4 (76), 54.1 to 61.0 (65); greatest length of skull, 27.2 to 29.4 (74), 27.1 to 29.8 (70); condylobasal length, 23.7 to 26.2 (76), 23.7 to 26.3 (67); palatal length, 8.7 to 10.4 (77), 8.5 to 10.6 (69); depth of braincase, 11.3 to 12.8 (70), 11.3 to 12.6 (67); zygomatic breadth, 14.2 to 16.0 (73), 14.0 to 15.9 (67); breadth of braincase, 11.0 to 12.4 (79), 11.2 to 12.2 (69); mastoid breadth, 12.7 to 14.4 (74), 12.8 to 14.0 (68); postorbital breadth, 5.6 to 7.0 (80), 5.7 to 6.6 (72); length of maxillary toothrow, 9.0 to 9.8 (75), 8.8 to 9.9 (63); rostral width at canines, 5.6 to 6.9 (78), 5.8 to 7.0 (64); breadth across upper molars, 9.5 to 10.6 (76), 9.6 to 10.8 (64); mandibular length, 16.3 to 18.2 (74), 16.4 to 18.2 (60). Silva-Taboada (1979) discussed morphometric variation within Cuban populations of this species.

The majority of the bats from Cuba have the base of the hair white to yellowish white with the tips of the hair in the dorsal V-pattern ranging from grayish brown to dark brown with varying shades of buff. Dark brown specimens have a yellowish tint. About two thirds of those examined from Hispaniola have hair white at the base with blackish gray tips; about a third are grayish-brown colored, sometimes tinted buffish, which corresponds in color to all specimens examined from Middle Caicos and Grand Cayman (Swanepoel and Genoways, 1978).

DISTRIBUTION. *Brachyphylla nana* is known from Cuba, Isle of Pines, Grand Cayman, Middle Caicos, Hispaniola, and as a Pleistocene or sub-Recent fossil from Jamaica (Swanepoel and Genoways, 1978; Fig. 2).

FOSSIL RECORD. *Brachyphylla nana* is known from late Pleistocene fossils from Masones and Jagüey Caves, Las Villas Province, Cuba (Silva-Taboada, 1974); late Pleistocene or sub-Recent from Cueva del Indio and a nearby unnamed cave, Camagüey Province, Cuba (Koopman and Ruibal, 1955); Cueva de los Indios, Daiquiri, Oriente Province, Cuba (Anthony, 1919; Woloszyn and Silva-Taboada, 1977); Cueva de Centenario de Lenin and Cueva Grande de Judas, Las Villas Province (Woloszyn and Silva-Taboada, 1977); Cueva de Paredones, Habana Province (Woloszyn and Silva-Taboada, 1977); Cuba (Arredondo, 1970; Mayo, 1970); St. Michel, Haiti (Miller, 1929); Isle of Pines (Peterson, 1917); Dairy Cave, St. Ann Parish, Jamaica (Koopman and Williams, 1951); Portland Cave, Clarendon Parish, Jamaica (Williams, 1952).

Swanepoel and Genoways (1978) re-examined the material collected at Dairy Cave, St. Ann Parish, Jamaica. This Pleistocene or sub-Recent fossil material generally averaged larger than Recent material from Cuba, Middle Caicos, and Dominican Republic, but fell within the range of variation displayed by the Recent material. These authors were of the opinion that the difference noted did not warrant taxonomic recognition and assigned the material to *B. nana*.

FORM AND FUNCTION. Based upon their study of geographic variation, Swanepoel and Genoways (1978) chose to consider *B. nana* as a monotypic species. They found little morphometric variation among their samples of *B. nana*, and the range of variation found was, in many cases, encompassed by the samples from Cuba alone. Other cranial features used to distinguish *B. nana* and *B. pumila* in the past proved to be inconsistent when large samples were examined.

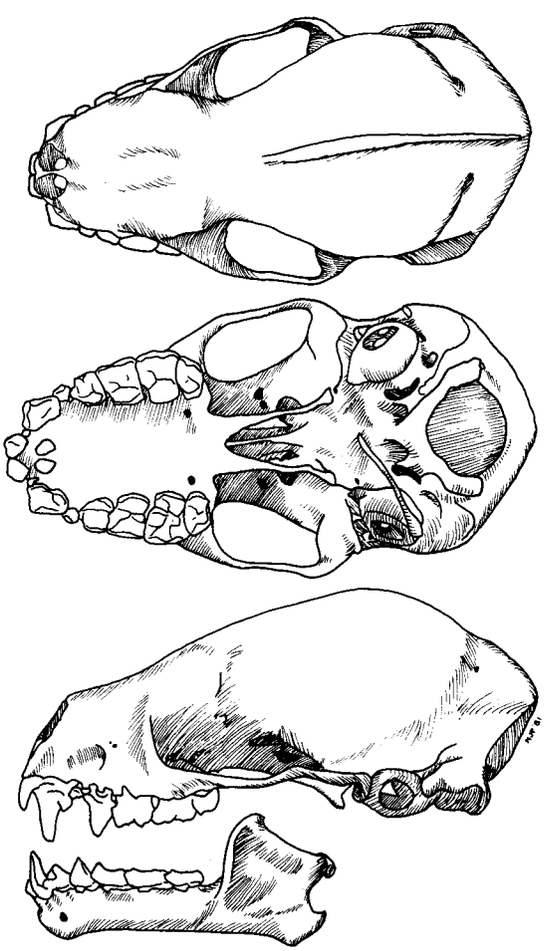

FIGURE 1. Dorsal, ventral, and lateral views of cranium and lateral view of lower jaw of *Brachyphylla nana* (♀, TTU 22764) from Haiti. Greatest length of skull is 28.3 mm. Drawn by Nancy J. Perkins.

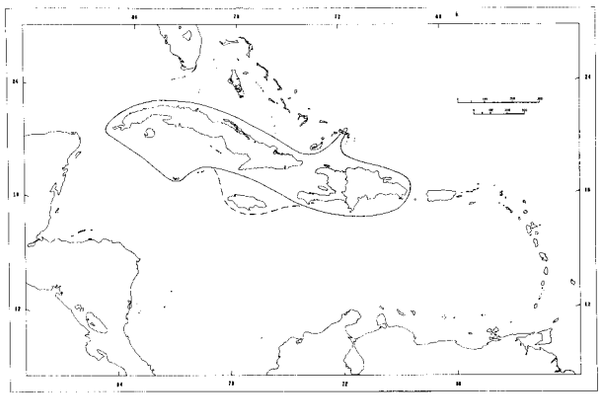

FIGURE 2. Geographic distribution of *Brachyphylla nana*. The species is represented on Jamaica only by fossil remains. The upper scale is in km and the lower in mi.

According to Silva-Taboada and Pine (1969) the portion of the extended tongue which is free from the frenum is relatively longer in the brachyphyllines from Cuba than in the stenodermines from there. In *B. nana* the frenum is attached to the tongue throughout 53% of its total length. Silva-Taboada and Pine (1969) surmised that this longer free portion might be correlated with the habit of feeding with the tongue rather than with the teeth.

The Paneth cells of bats have been examined in relation to food habits by Schaaf (1970). The animals studied included three insectivorous species as well as *Brachyphylla nana*, *Artibeus jamaicensis*, *Phyllonycteris poeyi*, and *Monophyllus redmani*. The results of selected histochemical tests proved to be uniform for prosecretion granules and mucopolysaccharides in all species. The probable presence of lysosomes in the cells was indicated by the presence of strong acidophilia. Secretion granules contained a mixture of protein and carbohydrates. The results agreed well with those for other species of mammals. Silva-Taboada (1979) found that the body temperature of both sexes in flight varied with the season—December to April, 37.4°C (34.5–40.5), and May to October, 38.6 (36.0–41.0).

ONTOGENY AND REPRODUCTION. On Middle Caicos, all of 12 females collected in March were pregnant, and crown rump length of 11 fetuses averaged 28.6 mm (24 to 34) (Buden, 1977). On southern Haiti a female netted on 21 December and four females netted between 21 and 25 August were not pregnant, but one of the August females was lactating. A male caught on 14 August had testes 3-mm long (Klingener et al., 1978). On Cuba, *B. nana* was found to be carrying embryos from December through May, with lactation occurring from May to August (Silva-Taboada, 1979). The diameter of the testes of males varied from 5 to 9 mm in specimens taken in December (Silva-Taboada, 1979).

Silva-Taboada (1979) listed and compared the characteristics of juvenile and subadult specimens of *B. nana*. The most developed embryo that he examined weighed 9.9 g and had a length of forearm of 28.6 mm. The youngest juveniles examined weighed 15.1 g and had a length of forearm of 44.3 mm. The development of the young is documented until an average weight of 32.3 g and length of forearm of 59.1 mm is reached.

ECOLOGY. *Brachyphylla nana* is among the most common and widespread bats of Cuba and the Isle of Pines. They are highly gregarious and large colonies are found in caves (to which they are restricted, Silva-Taboada, 1979) throughout Cuba and the Isle of Pines. On Cuba these bats are restricted to a hot, humid, less variable cave environment. All three brachyphylline genera, *Brachyphylla*, *Erophylla*, and *Phyllonycteris*, may be found together in the inner, more stable parts of a cave. Individuals of *Brachyphylla nana* and *Phyllonycteris poeyi* are often found mixed on the ceiling and walls of a cave, and may also spend several hours resting together at temporary night roosts. These may be other caves or parts of their home caves where they would not otherwise be found. Other bats that share these hot, climatically stable cave conditions are Mormoopidae (three species of *Pteronotus* and *Mormoops blainvillii* (Silva-Taboada and Pine, 1969).

In contrast to the conditions in which *B. nana* has been found on Cuba, Buden (1977) found this species in a group of 30 to 40 individuals in relatively cool, not too humid, and climatically less stable cave systems on Middle Caicos. Other species there were *Erophylla sezekorni*, *Monophyllus redmani*, and *Macrotus waterhousii*. Buden (1977) concluded that deep and extensive caves may be absent or scarce on the Caicos Islands and that the *B. nana* population found there might be "an expression of opportunism in habitat selection."

Klingener et al. (1978) reported *B. nana* to be rare in southern Haiti. In mist nets set in ravines near Paillant and along a stream near a banana plantation at Charlier, they found *Artibeus jamaicensis* outnumbering *B. nana* approximately 50 to 1. For earlier observations on *B. nana* see Barbour (1945), Gundlach (1877), and Miller (1902).

The diet of *B. nana* includes fruit, pollen, nectar, and insects (Gardner, 1977; Silva-Taboada, 1979; Silva-Taboada and Pine, 1969). In 43 stomachs of *B. nana* from Cuba, Silva-Taboada and Pine (1969) found that all contained pollen, one scales of Lepidoptera, and one fragments of a dipteran. Individuals dusted with pollen were observed frequently.

The owl *Tyto alba* has been identified as a predator of *B. nana* on Cuba and the Isle of Pines (Silva-Taboada, 1979).

Three species of mites from the families Myobiidae, Macronyssidae, and Spinturnicidae, respectively, two species of ticks (Argasidae), and one species of a batfly (Streblidae) are known from *Brachyphylla nana* (Dusbabek, 1968, 1969; Webb and Loomis, 1977); *Eudusbabekia cernyi* (Cuba); *Macronyssoides kochi* (Cuba); *Periglischrus cubanus* (Cuba); *Ornithodoros azteci* (Cuba); *O. viguerasi* (Cuba); *Trichobius frequens* (Cuba, Dominican Republic).

BEHAVIOR. Among the cave bats on Cuba, the brachyphyllines leave the caves last after sunset (Silva-Taboada and Pine, 1969).

The behavior of *B. nana* in captivity while feeding on banana was reported by Silva-Taboada and Pine (1969). The bats started lapping the surface of the fruit with rapid movements of their tongues, and only made short stops to swallow. Lapping was done over the whole banana, with sudden changes of direction and place. They seldom bit the fruit and limited the biting to tearing or crushing of the harder parts, which was immediately followed by a period of lapping. After 10 to 15 minutes of feeding they retired to the top of their cage. These authors reported an "absolute similarity" of feeding behavior between *Phyllonycteris poeyi* and *B. nana* in captivity. Buden (1977) described the vocalization of *B. nana* as "strident, rasping squeaks" readily distinguishable from those of *Erophylla sezekorni*, *Monophyllus redmani*, and *Macrotus waterhousii*, which also inhabited the same cave.

GENETICS. The chromosomal complement of *Brachyphylla nana* is identical to that of *B. cavernarum*. The standard karyotype of *B. nana* reveals a diploid number of 32 and 60 autosomal arms. Autosomes consist of four pairs of metacentrics and 11 pairs of submetacentrics. Secondary constrictions are present in the long arm of the smallest pair of submetacentrics. The X chromosome is submetacentric and the Y is a minute acrocentric (Baker, 1979; Nagorsen and Peterson, 1975).

Analysis of the chromosomes of *Glossophaga soricina*, *Monophyllus redmani* (Glossophaginae), *Phyllonycteris aphylla*, *Erophylla sezekorni*, and *B. nana* (Brachyphyllinae) showed no detectable differences in the G- and C-band patterns of the karyotypes of these species (Baker and Bass, 1979).

REMARKS. Hall and Kelson (1959) recognized four species (*cavernarum*, *minor*, *nana*, and *pumila*) in this genus. Koopman (1968) placed *minor* as a subspecies of *cavernarum*. Buden (1977), Hall (1981), and Varona (1974), considered the genus to be monotypic. However, Silva-Taboada (1976) and Swanepoel and Genoways (1978) recognized two species—*cavernarum* and *nana*. Silva-Taboada (1976) considered each species to contain two subspecies, whereas the latter authors considered *B. nana* to be monotypic.

Brachyphylla is from Greek, with *brachys* meaning short and *phyllo* meaning leaf. This refers to the greatly reduced noseleaf characteristic of this genus. The species name, *nana*, is from the Greek meaning dwarf, which refers to the relatively small size of this species within the genus.

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