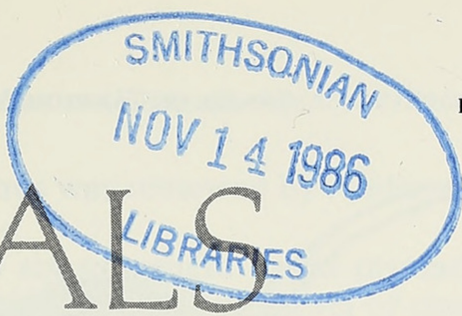


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RESULTS OF THE ALCOA FOUNDATION-SURINAME EXPEDITIONS. XI. BATS OF THE GENUS *MICRONYCTERIS* (MAMMALIA: CHIROPTERA) IN SURINAME

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ABSTRACT

Of the 10 recognized species in the genus *Micronycteris*, seven species (*brachyotis*, *daviesi*, *hirsuta*, *megalotis*, *minuta*, *nicefori*, and *sylvestris*) have been reported to occur in Suriname. *Micronycteris daviesi* is easily distinguished from the other species by its large size (forearm over 50 mm) and massive dentition. The next largest species (forearm over 43 mm)—*M. hirsuta*—is distinguished by having the upper inner incisors separated at the base but in contact at the tip and having lower incisors that are high and wedged between canines so that the canines are in contact behind the incisors.

Micronycteris sylvestris has dorsal pelage that is tricolored. The upper incisors of this species are similar in length to the canines and the first upper premolar possesses accessory cusps.

The other four species form two species pairs. *Micronycteris megalotis* and *minuta* are the smallest members of the genus in Suriname. They can be distinguished from each other by the more deeply notched interauricular band in *minuta* and by the first upper premolar being smaller than the second premolar in *minuta* but of about equal size in *megalotis*.

Micronycteris brachyotis, which was not encountered during our work in Suriname, has short ears (less than 16 mm from notch) and lacks the faint gray line usually present on the lower back of specimens of *M. nicefori*. These species are also distinguished by

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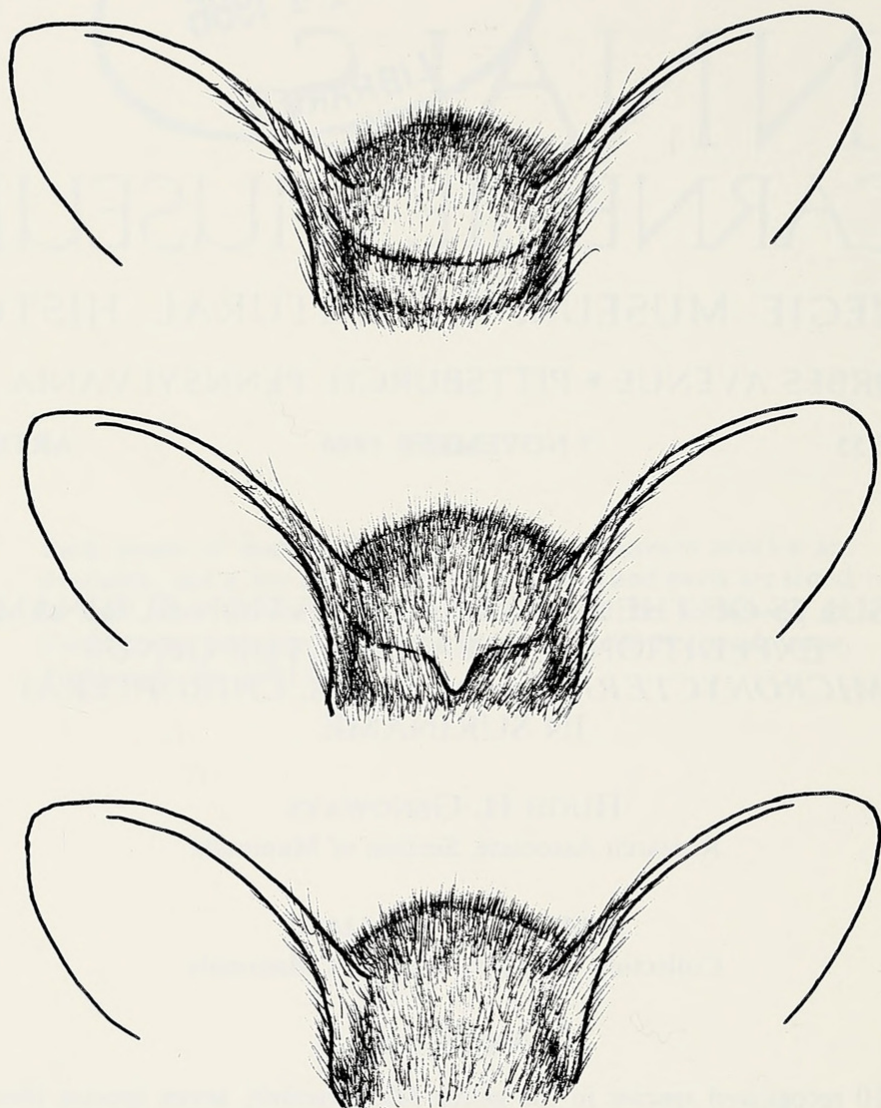


Fig. 1.—Stylistic representation of variation in the interauricular band of members of the genus *Micronycteris*. Upper, interauricular band complete (exemplified by *M. hirsuta*). Middle, interauricular band deeply notched in middle (*M. minuta*). Lower, interauricular band absent (*M. nicefori*). Not to scale.

their upper incisors, which are chisel-shaped and in line with the canines in *brachyotis*, but project forward and, therefore, are out of line with the canines in *nicefori*.

INTRODUCTION

The genus *Micronycteris* is a member of the subfamily Phyllostominae of the New World leaf-nosed bat family Phyllostomidae. *Micronycteris* is currently recognized as containing 10 small- to medium-

sized species of bats. The genus was reviewed by Andersen (1906) and Sanborn (1949).

The genus is divided into six subgenera based primarily upon the work of Sanborn (1949). We suggest that this level of classification be carefully examined in the future because the genus seems oversplit at the subgeneric level. Andersen (1906) recognized seven species divided into two genera (*Micronycteris* and *Glyphonycteris*), whereas Sanborn (1949) recognized 10 species in one genus. Subsequent to Sanborn's work, one species (*platyceps*) was placed as a junior synonym of *brachyotis* (Goodwin and Greenhall, 1961) and another species, *daviesi*, was described in a separate genus (*Barticonycteris*; Hill, 1964), but was later placed into *Micronycteris* (Koopman and Cockrum, 1967).

During our field studies in Suriname, six species of the genus *Micronycteris* (*daviesi*, *hirsuta*, *megalotis*, *minuta*, *nicefori*, and *sylvestris*) were captured. Husson (1978) reported a seventh species (*brachyotis*) from the country. This means that only three of the currently recognized species of *Micronycteris* (*behni*, *pusilla*, and *schmidtorum*) have not been taken in Suriname. With this large number of species from this complex genus present in such a small geographic area, we have taken the opportunity to gain a better insight into the morphological and ecological relationships of species within the genus.

METHODS AND MATERIALS

Specimens were taken with mist nets and preserved as skins and skulls or in fluid. Field weights were taken with Pesola scales, accurate to 1 g. Measurements of forearm and cranial dimensions were taken with dial calipers accurate to 0.1 mm. Only adult specimens (phalangeal epiphyses completely fused) were measured in this study. Measurements were taken as described by Genoways and Williams (1984). Reproductive condition of the skin and skull specimens was determined by gross dissection in the field, whereas fluid preserved specimens were dissected in the laboratory. Specimens listed in each account were deposited in the Section of Mammals, Carnegie Museum of Natural History.

ACKNOWLEDGMENTS

We gratefully acknowledge the logistical support, assistance in acquiring permits, and field assistance of Dr. Joop Schulz, Mr. Henry Reichart, and Mr. Ferdinand Baal. Mr. Kris Mohadin, Ms. Muriel Hand, and other staff members of STINASU contributed to the success of field work in Suriname. We are particularly thankful to Mr. Leo Roberts for accompanying and assisting us with most of the field work. Ms. Marga Werkhoven and Mr. I. Douglas provided housing and lab facilities in Paramaribo. Other individuals who helped collect specimens used in this study include Ms. Jane Casne, Mr. Michael Arnold, Dr. Rodney Honeycutt, Mr. Ben Koop, Ms. Paisley Seyfarth, Mr. Murray de la Fuente, Dr. Carleton Phillips, Dr. Robert Baker, and Mr. Keith Studholme.

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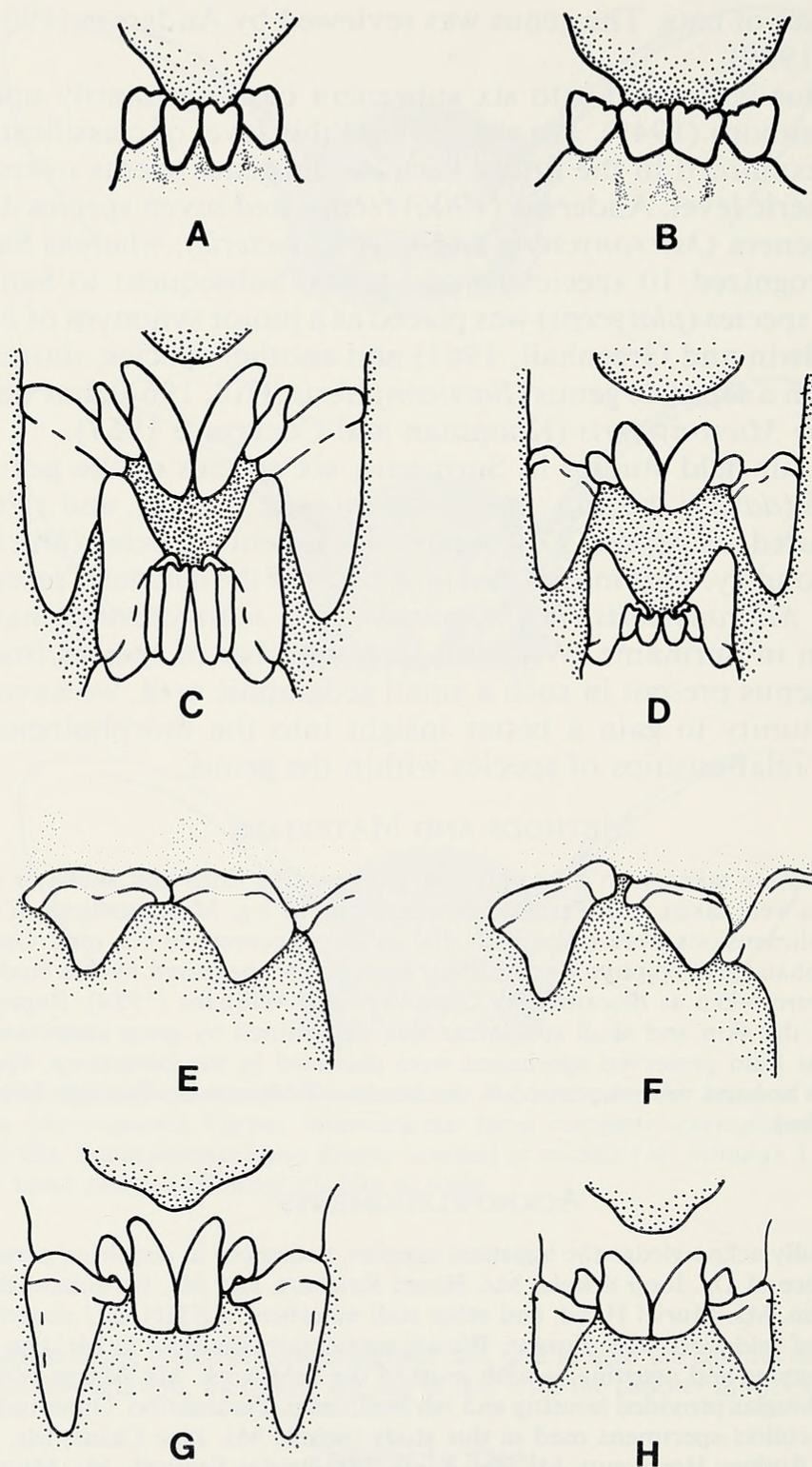


Fig. 2.—Dental characteristics of members of the genus *Micronycteris*. A, lower incisors bifid (exemplified by *M. megalotis*); B, lower incisors trifid (exemplified by *M. sylvestris*). C, upper and lower incisors of *M. hirsuta*, showing long, narrow lower incisors with unexpanded crowns and awl-shaped upper incisors; D, upper and lower incisors of *M. megalotis* showing short lower incisors with expanded crowns. E, upper premolars (P3,

KEY TO THE SPECIES OF *MICRONYCTERIS* IN SURINAME
(see also Medellín et al., 1985)

- 1. Interauricular band present (possibly notched or not as broad in the middle (Fig. 1A, B); lower incisors bifid (Fig. 2A) 2
- 1'. Interauricular band not present (Fig. 1C); lower incisors trifid (Fig. 2B) 4
- 2. Forearm less than 40; greatest length of skull less than 22; lower incisors with expanded crowns (Fig. 2D) 3
- 2'. Forearm greater than 40; skull more than 22; upper incisors awl-shaped; lower incisors long, narrow, and lacking expanded crown (Fig. 2C); $2n = 30$, $FN = 32$ *Micronycteris hirsuta*
- 3. Calcar longer than foot (claws included); length of interfemoral membrane more than twice the length of tail; band of skin between ears with shallow notch in middle; upper premolars (P3, P4) about the same height (Fig. 2E); $2n = 40$, $FN = 68$ *Micronycteris megalotis*
- 3'. Calcar shorter than foot (claws included); length of interfemoral membrane less than twice the length of tail; band of skin between ears deeply notched in middle (Fig. 1B); first upper premolar (P3) distinctly shorter than second upper premolar (P4) (Fig. 2F); $2n = 28$, $FN = 52$ *Micronycteris minuta*
- 4. First upper incisors similar to canines in length; first upper premolar (P3) having accessory cusps on lingual and posterior margins 5
- 4'. First upper incisors distinctly shorter and narrower than canines; first upper premolar (P3) lacking accessory cusps, only the main cusps present 6
- 5. Forearm less than 50; greatest length of skull less than 25; dorsal hair tricolored; two pairs of upper incisors; $2n = 22$, $FN = (40)$ *Micronycteris sylvestris*
- 5'. Forearm greater than 50; greatest length of skull more than 25; dorsal hair brownish throughout; sagittal crest straight; one pair of upper incisors; $2n = 28$, $FN = 52$. . . *Micronycteris daviesi*
- 6. Length of ear (to notch) less than 16; calcar about the same length as foot; first pair of upper incisors chisel-shaped (Fig. 2G) and in line with canines; second pair of upper incisors

←
P4) of *M. megalotis* (anterior is to the right), note that premolars of about equal size; F, upper premolars of *M. minuta* (anterior is to the right), note that P3 is distinctly shorter than P4. G, chisel-shaped upper incisors of *M. brachyotis*; H, upper incisors of *M. nicefori* which are nearly as broad as they are tall.

- bifid with elongated inner cusp; $2n = 32$, $FN = 60$
 *Micronycteris brachyotis*
- 6'. Length of ear (to notch) greater than 16; calcar shorter than length of foot; faint gray line often present on lower back; first pair of upper incisors not chisel-shaped (Fig. 2H); upper incisors projected forward and out of line with canines; $2n = 28$, $FN = 52$ *Micronycteris nicefori*

GENERIC ACCOUNT

Micronycteris Gray, 1866

1866. *Micronycteris* Gray, Proc. Zool. Soc. London, p. 113, May.
 1856. *Schizostoma* Gervais, Mammifères in Castelnau Exped. dans les parties centrales de l'Amer. du Sud . . . pt. 7, p. 38. Type species, *Schizostoma minuta* Gervais. Preoccupied by *Schizostoma* Bronn, 1835, a genus of Mollusca.
 1896. *Glyphonycteris* Thomas, Ann. Mag. Nat. Hist., ser. 6, 18:302, October. Type species, *Glyphonycteris sylvestris* Thomas.
 1907. *Xenotenes* Miller, Bull. U.S. Nat. Mus., 57:124, 29 June. Type species, *Schizostoma hirsutum* Peters.
 1964. *Barticonycteris* Hill, Mammalia, 28:556, December. Type species, *Barticonycteris daviesi* Hill.

Type species. — *Phyllophora megalotis* Gray, 1842.

Diagnosis. — A genus of small- to medium-sized bats with a well-developed noseleaf and a tail extending only to the middle of the interfemoral membrane. In the subfamily Phyllostominae, the dental formula of $i\ 2(1)/2$, $c\ 1/1$, $p\ 2/3$, $m\ 3/3$ is shared only with the genera *Macrotus* and *Vampyrus*. The one species with only one pair of upper incisors is *M. daviesi*. Rostrum not as long as braincase; auditory bullae small; middle lower premolar approximately same size as last lower premolar.

Micronycteris (*Glyphonycteris*) *daviesi* (Hill, 1964)

Specimen examined (1). — SARAMACCA: Raleigh Falls, 1.

The species *M. daviesi* is easily distinguished from other members of the genus *Micronycteris* in Suriname by its large size (Table 1; Figs. 3A, 4A) and massive dentition. This species was originally described as the sole representative of the genus *Barticonycteris* by Hill (1964). Shortly thereafter, Koopman and Cockrum (1967) treated *Barticonycteris* as a synonym of *Micronycteris*. Most recent authors have followed this arrangement (see for example Jones and Carter, 1976), although LaVal (1977) and Hall (1981) are exceptions. Koopman (1978) treated *Barticonycteris* as a subgenus of *Micronycteris*, citing as his reasons that the characteristics of *Barticonycteris* "are simply those of *M. (Glyphonycteris)*, the subgenus including *sylvestris* and *behni* carried one step further." Hill (1964) had earlier recognized that the closest

relatives of *Barticonycteris* were members of *Glyphonycteris*. We agree with these assessments of the relationship of *daviesi* based upon our own studies, but we believe that the relationships of the taxon are represented best by placing it as a member of the subgenus *Glyphonycteris*.

Only one specimen of this rare species was taken during our work in Suriname (Fig. 5). It was an adult male taken on an island in the Coppename River that serves as the headquarters of the Raleigh Falls Nature Reserve. The bat was netted along a trail on the western side of the island, about 200 m northeast of the park headquarters and about 50 m from the river. Vegetation in the area consisted of near-mature lowland rainforest. Our specimen, weighing 18 and with testes measuring 3, was captured on 24 August at about 2000 hours following a short rainstorm. Sixteen other species of bats were taken in this area (Table 2).

Our specimen was found to have a $2n = 28$ and $FN = 52$. The X-chromosome was submetacentric, whereas the Y-chromosome was acrocentric (Honeycutt et al., 1980).

Micronycteris (Glyphonycteris) sylvestris (Thomas, 1896)

Specimens examined (14).—BROKOPONDO: Brownsberg Nature Park, 8 km S, 2 km W Brownsweg, 14.

Our specimens were the first of this species reported from Suriname (Williams and Genoways, 1980). This taxon can be recognized externally by having tricolored dorsal hair and ears that are about as broad as they are high. Cranially this species resembles *M. daviesi* with upper incisors about the same length as the canines (Figs. 3, 4). Currently *M. sylvestris* is considered to be monotypic (Jones and Carter, 1976), although not enough specimens have been available for a proper analysis of infraspecific variation.

Our 14 specimens were collected from a hollow tree in a mature tropical hardwood forest on the Brownsberg highlands (Fig. 5). The opening to the hollow was located about 3 m above the ground. Eight of the specimens were taken on 24 September and the other six on the following day. Four males weighed 6, 6, 7, and 7; each had testes that measured 3. Eight females had weights ranging from 7.5 to 11 with a mean of 9.3. None of these females evinced gross reproductive activity. Only 10 other species of bats were captured in nets set along trails near the hollow tree (Table 2).

The specimens of *M. sylvestris* from Suriname had a diploid number of 22 and a probable fundamental number of 36. The fundamental number could not be determined with certainty because only females were available for chromosomal analysis. It was supposed that the X-chromosome was biarmed (Honeycutt et al., 1980).

Table 1.—Forearm and cranial measurements of six species of *Micronycteris* from Suriname.

Catalog No.	Locality	Sex	Length of forearm	Greatest length of skull	Condylar length	Zygomatic breadth	Mastoid breadth	Postorbital breadth	Length of maxillary toothrow	Breadth across upper molars
<i>Micronycteris daviesi</i>										
CM 63573	Saramacca: Raleigh Falls	M	53.9	25.8	23.4	12.5	10.8	5.7	10.2	9.0
<i>Micronycteris hirsuta</i>										
CM 68388	Para: Zanderij	F	44.4	23.6	20.4	11.2	10.2	4.9	8.9	7.1
<i>Micronycteris megalotis</i>										
CM 63575	Brokopondo: 1½ km W Rudi Kappelvliëgveld	M	32.9	18.3	15.7	8.6	8.3	3.9	6.4	5.1
CM 63574	Brokopondo: 1 km W Rudi Kappelvliëgveld	M	33.5	17.7	15.4	8.8	8.3	4.1	6.6	5.5
CM 63578	Commewijne: Nieuwe Grond Plantation	M	35.9	19.3	16.4	9.1	8.7	4.0	7.1	5.9
CM 77109	Marowijne: Perica	M	35.3	19.6	16.8	9.4	8.8	4.2	7.4	6.3
CM 68390	Nickerie: Kayserberg airstrip	M	33.9	19.0	16.1	9.0	8.4	4.0	6.8	5.8
CM 63577	Brokopondo: 3 km W Rudi Kappelvliëgveld	F	35.5	18.3	16.1	9.1	8.3	3.9	6.6	5.6
<i>Micronycteris minuta</i>										
CM 63581	Brokopondo: 1 km N Rudi Kappelvliëgveld	M	35.5	18.5	15.9	8.5	8.8	4.1	6.6	5.8
CM 63579	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	M	31.3	17.3	15.3	8.5	8.1	4.0	6.5	5.7
CM 76769	Marowijne: 3 km SW Albina	M	33.0	18.4	16.4	8.5	8.8	4.2	6.6	5.7
CM 63584	Saramacca: Voltzberg	M	33.7	18.7	16.6	8.5	8.6	4.1	6.8	5.8
CM 68391	Saramacca: Voltzberg	M	35.4	18.8	16.7	8.8	8.7	4.3	6.6	5.7
CM 63580	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	F	31.8	17.6	—	8.3	8.0	4.1	6.7	5.4
CM 63582	Commewijne: Nieuwe Grond Plantation	F	35.1	18.1	16.1	8.7	8.7	4.2	6.7	5.9
CM 52759	Marowijne: 10 km N, 24 km W Moengo	F	34.3	18.7	16.2	8.8	8.7	4.2	6.8	6.0
CM 63583	Saramacca: Voltzberg	F	34.3	18.5	16.2	8.6	8.8	4.1	6.4	5.8
CM 52760	Suriname: Powaka	F	35.2	18.8	16.2	8.8	8.7	4.2	6.6	5.9
<i>Micronycteris nicefori</i>										
CM 52761	Marowijne: 10 km N, 24 km W Moengo	M	36.1	20.1	18.0	9.5	8.7	4.3	7.3	6.1
CM 76770	Marowijne: 3 km SW Albina	M	36.9	20.6	18.1	9.2	8.8	4.1	7.2	5.8
CM 76771	Marowijne: Perica	M	37.8	20.7	18.5	9.5	8.7	4.5	7.5	6.0
CM 68648	Nickerie: Kabalebo	M	36.8	20.8	18.5	9.2	8.6	4.4	7.4	6.2

Table 1.— Continued.

Catalog No.	Locality	Sex	Length of forearm	Greatest length of skull	Condylar length	Zygomatic breadth	Mastoid breadth	Postorbital breadth	Length of Breadth maxillary toothrow	Breadth across upper molars
CM 68649	Nickerie: Kabalebo	M	35.3	20.2	18.0	9.4	8.6	4.0	7.1	6.0
CM 63585	Brokopondo: 1 km N Rudi Kappelvliedveld	F	37.3	20.3	18.1	9.1	8.5	3.9	7.1	6.1
CM 63586	Commewijne: Nieuwe Grond Plantation	F	38.6	20.3	18.0	9.2	8.5	3.9	7.2	6.2
CM 76772	Saramacca: Tafelberg, SE side of Arrowhead Basin	F	36.5	20.7	18.6	9.4	8.5	4.1	7.4	5.9
CM 52762	Suriname: Powaka	F	38.0	20.3	18.4	—	8.5	4.0	7.5	6.0
<i>Micronycteris sylvestris</i>										
CM 63590	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	M	38.6	19.8	17.1	9.6	8.7	4.5	7.4	6.6
CM 63595	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	M	39.2	20.1	17.6	10.0	8.9	4.8	7.8	7.0
CM 63596	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	M	37.0	19.4	17.2	9.7	8.4	4.5	7.7	6.6
CM 63597	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	M	38.3	20.0	17.4	9.8	8.7	4.6	7.8	6.8
CM 63587	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	F	40.8	20.4	18.5	10.1	8.7	4.6	7.9	7.1
CM 63588	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	F	40.6	20.5	18.1	10.2	8.9	4.7	7.8	6.8
CM 63589	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	F	42.7	19.7	17.7	9.8	9.1	4.6	7.6	7.0
CM 63591	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	F	39.3	19.9	17.8	10.2	9.0	4.7	7.9	6.7
CM 63592	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	F	41.9	20.5	18.0	10.2	8.9	4.6	7.9	6.9
CM 63593	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	F	39.9	19.6	17.0	10.9	9.0	4.6	7.3	6.8
CM 63594	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	F	40.0	20.0	17.9	10.2	9.1	4.7	7.8	6.9
CM 63598	Brokopondo: Brownsberg Nature Park 8 km S, 2 km W Brownsweg	F	39.4	19.7	17.2	10.0	8.8	4.7	7.5	6.7

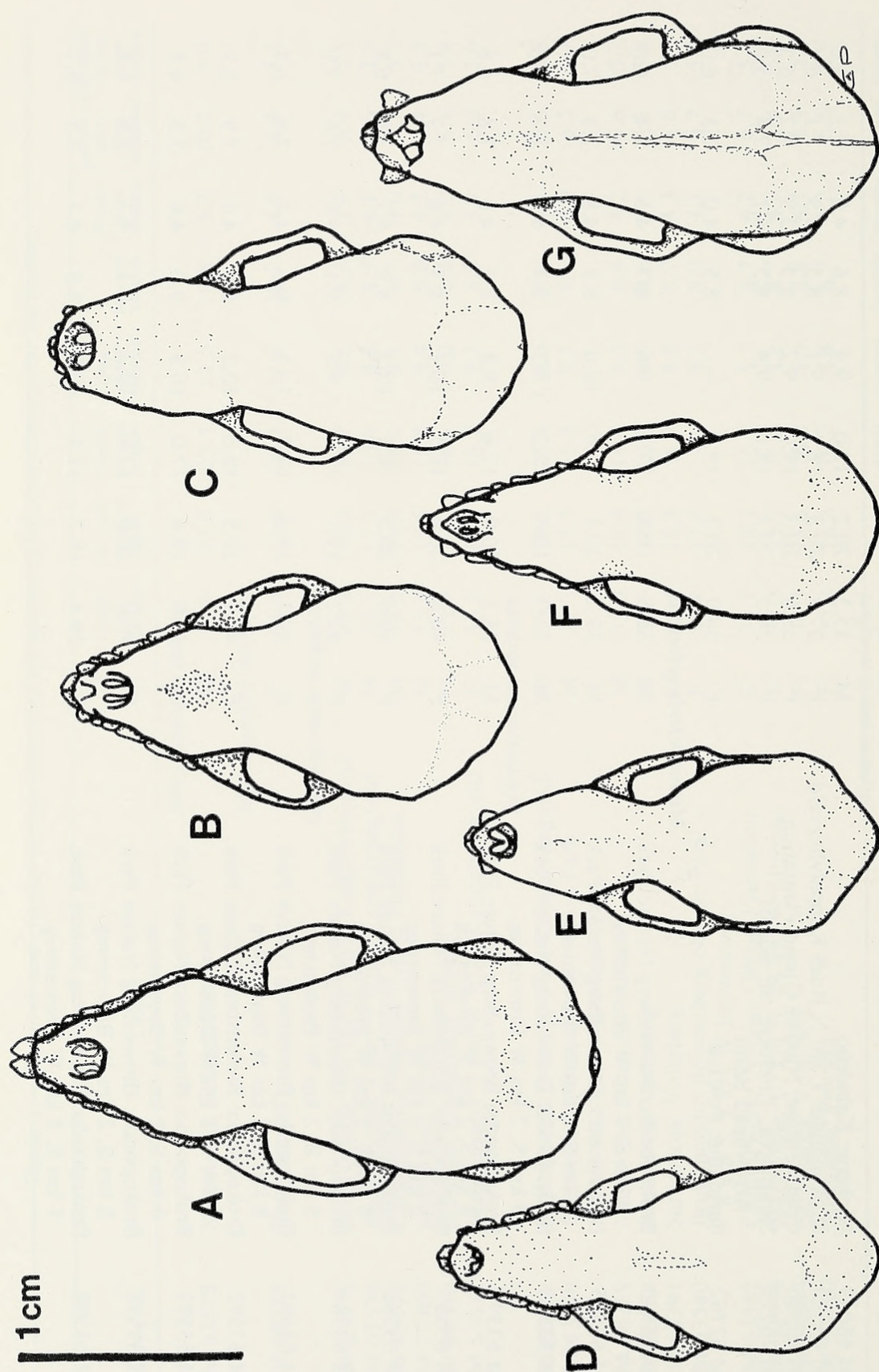


Fig. 3.—Dorsal view of the crania of the seven species of *Micronycteris* occurring in Suriname. A, *M. daviesi* (CM 63573); B, *M. sylvestris* (CM 63597); C, *M. brachyotis* (from Trinidad); D, *M. megalotis* (CM 68390); E, *M. minuta* (CM 63584); F, *M. nicefori* (CM 76771); G, *M. hirsuta* (CM 68388).

***Micronycteris (Lampronnycteris) brachyotis* (Dobson, 1879)**

Previous record.—BROKOPONDO: Gros (about 100 km S Paramaribo on railroad from Paramaribo to the interior) [5°06'N, 55°15'W] (Husson, 1978).

Husson (1978) first reported this species from Suriname based upon six males from Gros (Fig. 5). The specimens were taken from an old goldmine in a savannah area. We did not encounter this species during our work in Suriname.

Most of the characteristics of the specimens listed by Husson—forearm 40.2 to 42.9, no interauricular band, and second phalanx of third digit much longer than first—seem to match *M. brachyotis* closely; however, the Suriname specimens had the fourth metacarpal the shortest, whereas in *brachyotis* the fifth metacarpal is the shortest. The exact meaning of this difference must await further examination of these specimens.

Goodwin and Greenhall (1961) were the first to recognize that *M. platyceps*, described by Sanborn in 1949, was a junior synonym of the long described, but poorly known, *M. brachyotis*.

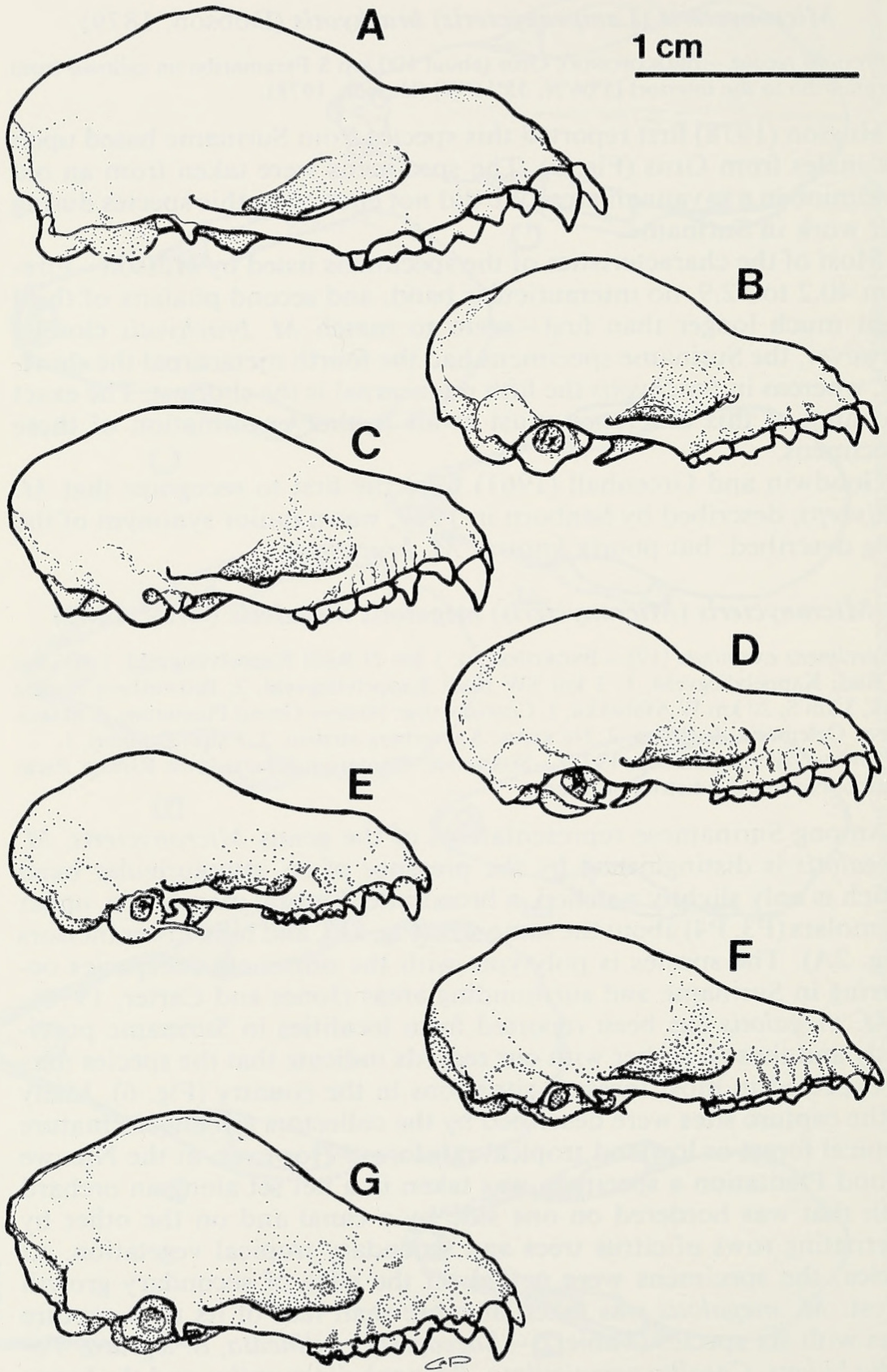
***Micronycteris (Micronycteris) megalotis megalotis* (Gray, 1842)**

Specimens examined (12).—BROKOPONDO: 1 km N Rudi Kappelvliegveld, 1; 1½ km W Rudi Kappelvliegveld, 1; 3 km SW Rudi Kappelvliegveld, 2; Brownsberg Nature Park, 3 km S, 20 km W Afobakka, 1. COMMEWIJNE: Nieuwe Grond Plantation, 1. MAROWIJNE: Oelemarie, 1; Perica, 2. NICKERIE: Kayserberg airstrip, 2. PARA: Zanderij, 1.

Previous records (Husson, 1978).—SURINAME: Plantation Kwatta, near Rijweg; Paramaribo. No specific district or locality.

Among Surinamese representatives of the genus *Micronycteris*, *M. megalotis* is distinguished by the presence of an interauricular band which is only slightly notched, a broad interfemoral membrane, upper premolars (P3, P4) about the same size (Fig. 2E), and bifid lower incisors (Fig. 2A). The species is polytypic with the nominate subspecies occurring in Suriname and surrounding areas (Jones and Carter, 1976).

M. megalotis has been reported from localities in Suriname previously and these together with our records indicate that the species may be expected in most forested situations in the country (Fig. 6). Many of the capture sites were described by the collectors as being in mature tropical forest or lowland tropical rainforest. However, at the Nieuwe Grond Plantation a specimen was taken in a net set along an orchard path that was bordered on one side by a canal and on the other by alternating rows of citrus trees and secondary tropical vegetation. At Perica, the specimens were netted on the edge of secondary growth forest. *M. megalotis* was taken at more than half of its nine capture sites with six species (Table 2)—*Saccopteryx bilineata*, *S. leptura*, *Tonatia bidens*, *Carollia perspicillata*, *Rhinophylla pumilio*, and the larger



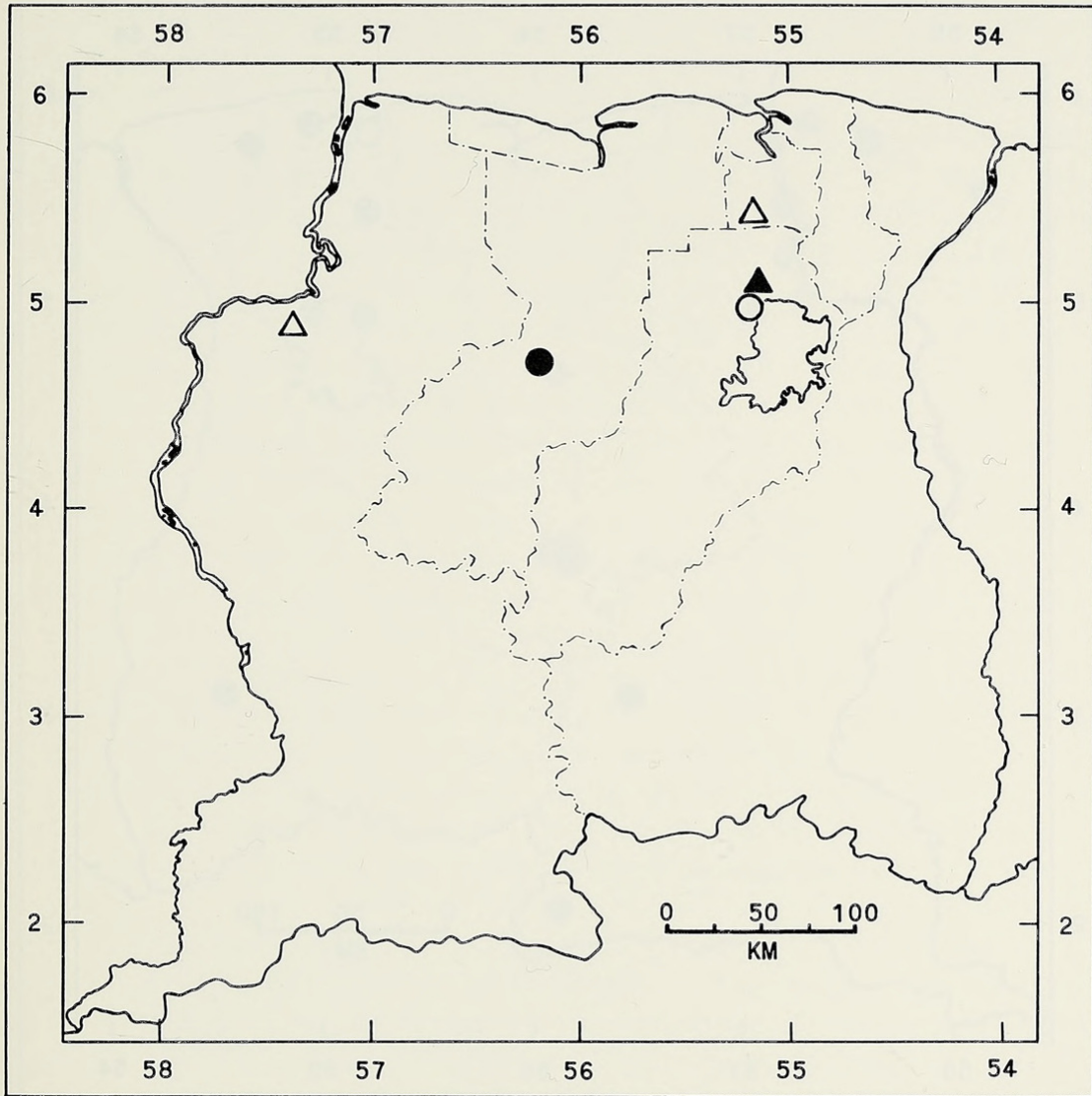


Fig. 5.—Map of the geographic distribution of four species of *Micronycteris* in Suriname. Closed circle, *M. daviesi*; open circle, *M. sylvestris*; closed triangle, *M. brachyotis*; open triangle, *M. hirsuta*.

species of *Artibeus*. It was also taken together with two other species of the genus—*minuta* and *nicefori*—although only at one and two sites, respectively.

Our 12 specimens consist of 10 males and two females. Testes measurements for the males are as follows (date of capture in parentheses):

Fig. 4.—Lateral view of the crania of the seven species of *Micronycteris* occurring in Suriname. A, *M. daviesi* (CM 63573); B, *M. sylvestris* (CM 63597); C, *M. brachyotis* (from Trinidad); D, *M. megalotis* (CM 68380); E, *M. minuta* (CM 63584); F, *M. nicefori* (CM 76771); G, *M. hirsuta* (CM 68388).

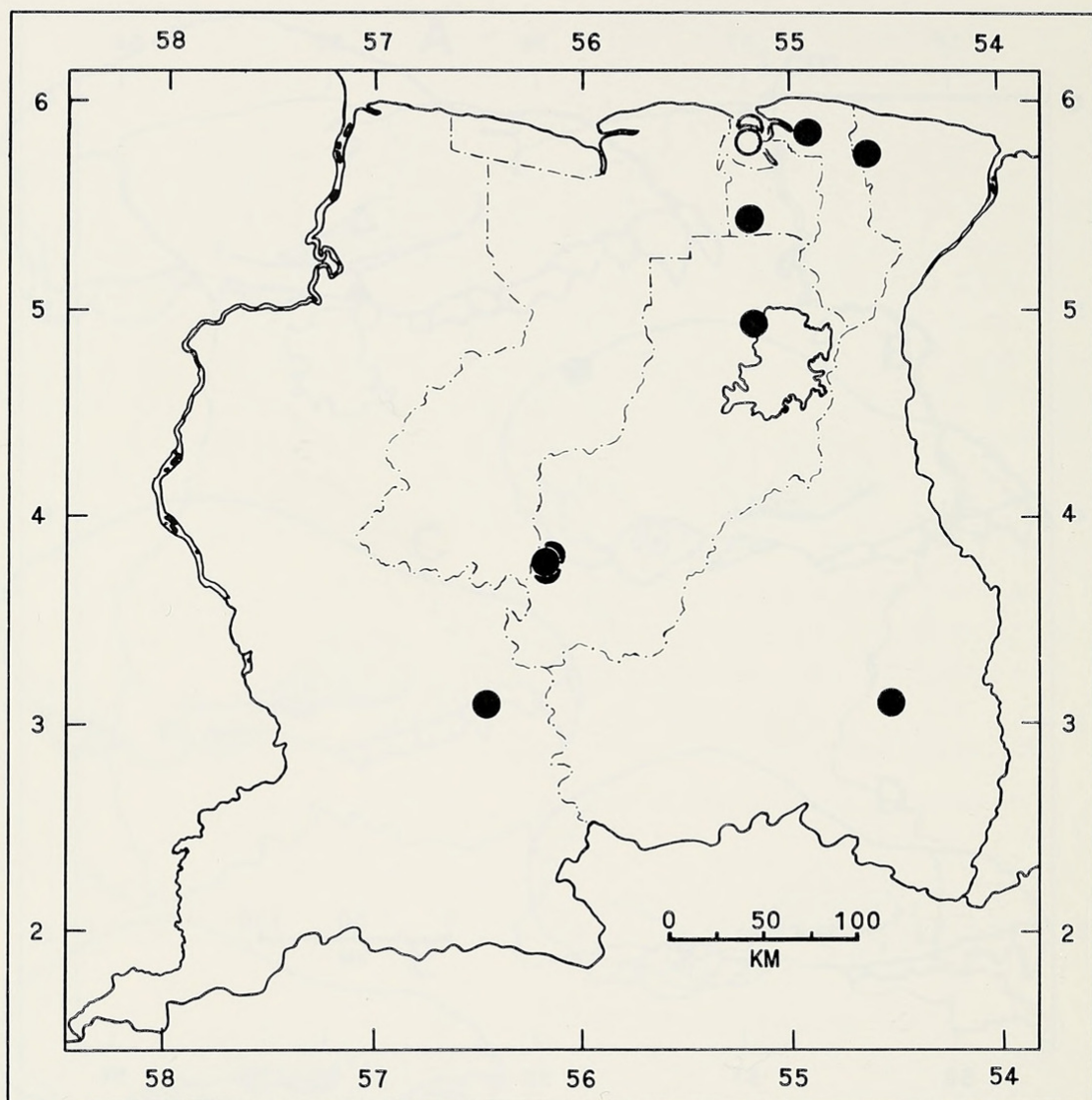


Fig. 6.—Map of the geographic distribution of *Micronycteris megalotis* in Suriname. Closed circles, specimens examined; open circles, previous records.

3, 3 (4 May); 3 (7 July); 2 (13 September); 2 (30 September); 2 (1 October); 2 (3 October); 3, 4.5 (24 October); 2.5 (23 November). A female taken on 1 October evinced no reproductive activity, whereas no data are available for the other female. Seven of the males had an average weight of 5.7 (range, 5–7) and the one female for which data are available weighed 6.

The karyotype of a male from Suriname had a $2n = 40$ and $FN = 68$. The X-chromosome was subtelocentric and the Y-chromosome was acrocentric (Honeycutt et al., 1980).

***Micronycteris (Micronycteris) minuta* (Gervais, 1856)**

Specimens examined (15).—BROKOPONDO: 1 km N Rudi Kappelvlietveld, 1; Brownsberg Nature Park, 8 km S, 2 km W Brownsweg, 2. COMMEWIJNE: Nieuwe Grond Plan-

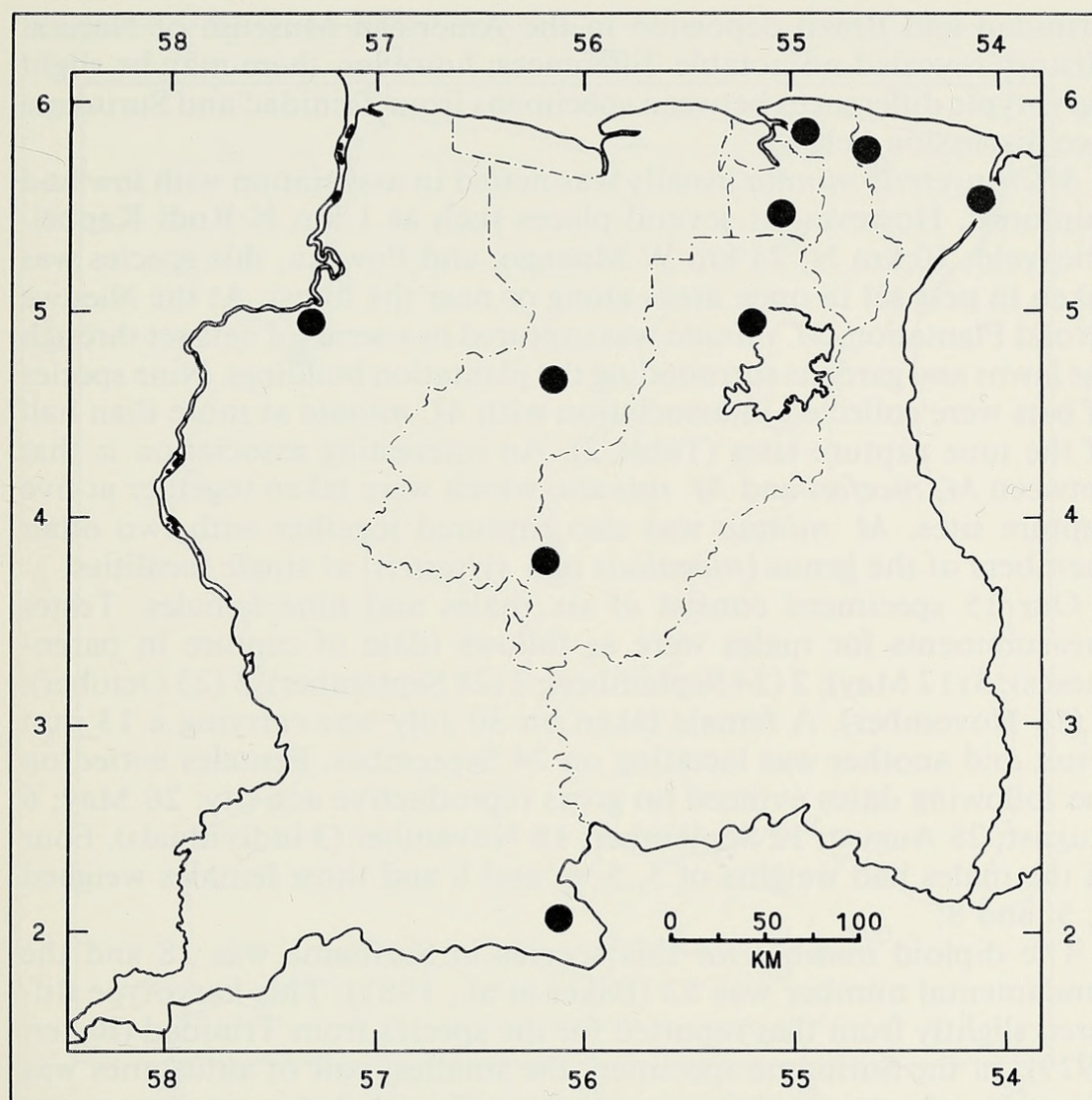


Fig. 7.—Map of the geographic distribution of *Micronycteris minuta* in Suriname.

tation, 1. MAROWIJNE: 3 km SW Albina, 1; 10 km N, 24 km W Moengo, 1. NICKERIE: Avanavero, 1; Sipaliwini airstrip, 4. SARAMACCA: Voltzberg, 3. SURINAME: Powaka, 1.

Prior to our work in Suriname (Genoways and Williams, 1979; Williams and Genoways, 1980) *M. minuta* was unknown from the country; however, we took the species in all major regions of the country (Fig. 7). In Suriname, *M. minuta* would most likely be confused with *M. megalotis*; however, *minuta* can be distinguished by the deeply notched interauricular band (Fig. 1) and a first upper premolar (P3) that is distinctly smaller than the second premolar (P4) (Fig. 2F). *M. minuta* has some individuals smaller than any individuals of *M. megalotis*, but the two species cannot be separated consistently on size alone (Table 1). *M. minuta* currently is considered to be monotypic (Jones and Carter, 1976). A comparison of our material with specimens from

Trinidad and Brazil deposited in the American Museum of Natural History revealed no notable differences; however, there may be slight karyotypic differences between specimens from Trinidad and Suriname (see discussion below).

Micronycteris minuta usually was netted in association with lowland rainforest. However, at several places such as 1 km N Rudi Kappelvlietveld, 10 km N, 24 km W Moengo, and Powaka, this species was taken in nets set in open areas along or near the forest. At the Nieuwe Grond Plantation, *M. minuta* was captured in a series of nets set through the lawns and gardens surrounding the plantation buildings. Nine species of bats were collected in association with *M. minuta* at more than half of the nine capture sites (Table 2). An interesting association is that between *M. nicefori* and *M. minuta*, which were taken together at five capture sites. *M. minuta* was also captured together with two other members of the genus (*megalotis* and *sylvestris*) at single localities.

Our 15 specimens consist of six males and nine females. Testes measurements for males were as follows (date of capture in parentheses): 3 (12 May); 2 (24 September); 2 (28 September); 3 (23 October); 2 (16 November). A female taken on 30 July was carrying a 13 mm fetus, and another was lactating on 24 September. Females netted on the following dates evinced no gross reproductive activity: 26 May; 6 August; 28 August; 12 September; 16 November (3 individuals). Four of the males had weights of 5, 5, 6, and 6 and three females weighed 5, 5, and 8.

The diploid number for this species in Suriname was 28 and the fundamental number was 52 (Baker et al., 1981). This karyotype differed slightly from that reported for the species from Trinidad (Baker, 1979). In the Suriname specimen, the smallest pair of autosomes was biarmed, whereas in the material from Trinidad this pair was acrocentric.

Micronycteris (Trinycteris) nicefori Sanborn, 1949

Specimens examined (31).—BROKOPONDO: 1 km N Rudi Kappelvlietveld, 1. COMMEWIJNE: Nieuwe Grond Plantation, 1. MAROWIJNE: 3 km SW Albina, 1; 10 km N, 24 km W Moengo, 1; Perica, 2. NICKERIE: Avanavero, 3; Kabalebo, 20. SARAMACCA: Tafelberg, SE side of Arrowhead Basin (3°54'N, 56°10'W), 600 m, 1. SURINAME: Powaka, 1.

This species had not been reported in Suriname before our work (Genoways and Williams, 1979; Williams and Genoways, 1980), but we found it to be widespread in the country (Fig. 8). *Micronycteris nicefori* is a medium-sized member of the genus (Table 1) that is most likely to be confused with *M. brachyotis*. *M. nicefori* can be distinguished by its upper incisors, which are shorter and narrower than the canines and project forward out of line with the canines (Fig. 2H), long

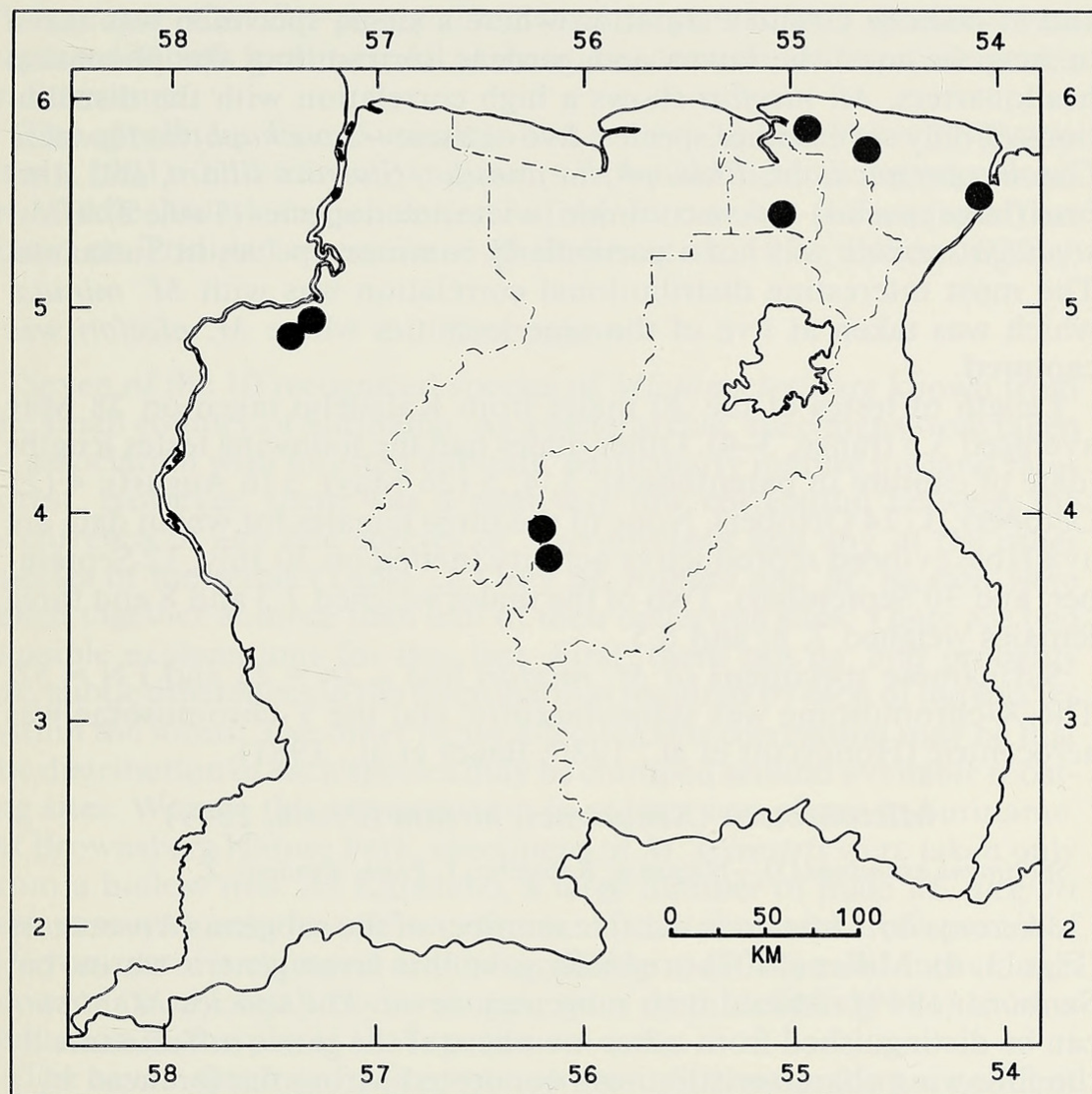


Fig. 8.—Map of the geographic distribution of *Micronycteris nicefori* in Suriname.

ears, and a faint gray line often present on the lower back. We compared our specimens with material from Trinidad and Colombia deposited in the American Museum of Natural History. We could detect no consistent differences in size or morphology, which supports the idea that this species is monotypic (Jones and Carter, 1976).

The large sample from Kabalebo is composed of all males. These individuals were captured in nets set along a newly cut trail, which passed through the moderate undergrowth of a secondary forest along a road, which eventually led into the larger trees of a mature rainforest. Elsewhere the species usually was collected in either secondary or primary lowland rainforest. The exceptions to this were in the highlands of Tafelberg where the typical vegetation was lower montane forest

and at Nieuwe Grond Plantation where a single specimen was taken in nets set over the lawns and gardens surrounding the plantation headquarters. *M. nicefori* shows a high correlation with the distributions of only seven other species; five of these—*Lonchophylla thomasi*, *Carollia perspicillata*, *Rhinophylla pumilio*, *Sturnira lilium*, and *Artibeus* (large species)—were common, widespread species (Table 2). *Glossophaga soricina* was not a particularly common species in Suriname. The most interesting distributional correlation was with *M. minuta*, which was taken at five of the nine localities where *M. nicefori* was captured.

Length of testes of the 20 males from Kabalebo taken on 28 May averaged 3.5 (range, 3–4). Other males had the following testes lengths (date of capture in parentheses): 3, 4, 5 (26 May); 5 (6 August); 4 (23 October); 3 (24 October). None of the three females for which data are available evinced reproductive activity (netted on 30 July, 12 September, and 30 September). Two of the males weighed 7.3 and 8 and three females weighed 7, 8, and 8.5.

Surinamese specimens of *M. nicefori* had a $2n = 28$ and $FN = 52$. The X-chromosome was submetacentric and the Y-chromosome was acrocentric (Honeycutt et al., 1980; Baker et al., 1981).

Micronycteris (Xenotenes) hirsuta (Peters, 1869)

Specimens examined (3).—NICKERIE: Kabalebo, 1. PARA: Zanderij, 2.

Micronycteris hirsuta is the sole member of the subgenus *Xenotenes* (Figs. 3, 4). Miller (1907) originally gave this taxon generic status, but Sanborn (1949) reduced it to subgeneric level. The species *M. hirsuta* can be distinguished from other members of the genus in Suriname by the following characteristics: ears connected across the forehead by a low unnotched band (Fig. 1); upper inner incisors separated at base, but in contact near tip (Fig. 2C); upper outer incisors small; lower incisors high and wedged tightly between canines (Fig. 2C); lower canines in contact, or nearly so, behind incisors; and lower incisors bifid (Fig. 2C). The species is considered to be monotypic (Jones and Carter, 1976).

Our specimens were the first members of the species (Fig. 5) to be reported from Suriname (Genoways et al., 1981). The specimens from Zanderij, a reproductively inactive adult female and an immature female, were netted on 18 May. The specimen from Kabalebo was a reproductively inactive adult female. The area at Kabalebo was covered by mixed primary and secondary lowland rainforest, whereas the vicinity of Zanderij was secondary lowland forest associated with a rubber plantation. *M. hirsuta* was taken in association with 24 other species of bats (Table 2); however, only four species—*Phyllostomus elongatus*,

P. hastatus, *Carollia perspicillata*, and large *Artibeus* species—were captured at both localities. All of these are common, widespread species in Suriname.

The specimens from Suriname had a $2n = 30$ and $FN = 32$ (Baker et al., 1981). This karyotype appears to be identical to the one found in Middle American populations of *M. hirsuta* but differs from that found on Trinidad where $2n = 28$ (Baker et al., 1973; Baker, 1979).

DISCUSSION

Seven of the 10 recognized species of *Micronycteris* are known from the small country of Suriname. As a general rule, specimens were taken in association with forested habitats, particularly mature lowland rain-forest. However, there was a relatively low correlation between the occurrence of any one species of *Micronycteris* and any of the other species of the genus (Table 2). Only *M. minuta* and *M. nicefori* were taken together at more than half of their collecting sites. There are two possible explanations for this fact. First, there can be, and probably are, subtle differences in the microhabitat required by each of the species within the forest. The other factor affecting this correlation may be that the distribution of each species may be clumped around available roosting sites. We saw this phenomenon in at least two places in Suriname. At Brownsberg Nature Park, specimens of *M. sylvestris* were taken only from a hollow tree. At Kabalebo, a large number of male *M. nicefori* was captured only in one set of nets. If the occurrence of species of *Micronycteris* is clumped around available roost sites and individuals have relatively small home ranges, then there definitely should be a reduction in the places that species co-occur.

The seven species of *Micronycteris* from Suriname form a gradient in size starting with the small *M. minuta* and *M. megalotis* and progressing through the large *M. daviesi* at the opposite end of the scale. The small species really form a species pair based upon size, although *M. minuta* probably averages slightly smaller than *M. megalotis* for most characters. Between these extremes fall (beginning with the smallest) *M. nicefori*, *M. sylvestris*, and *M. brachyotis*, and finally *M. hirsuta*. *Micronycteris sylvestris* and *M. brachyotis* cannot be distinguished on size alone but there are numerous other useful characters to separate them. Size is not the only character needed to separate several of the species of *Micronycteris* in Suriname, but it is useful in narrowing the number of comparisons that need to be made.

We stated earlier that the genus *Micronycteris* seemed to be oversplit at the subgeneric level. The current arrangement was proposed by Sanborn (1949) based primarily upon characters of the wings and ears. Deviations from this arrangement have been suggested by Arnold et

Table 2.—Species of bats taken in association with specimens of *Micronycteris* in Suriname. The numbers in each column represent numbers of localities.

Species of bats	<i>M.</i> <i>daviesi</i>	<i>M.</i> <i>hirsuta</i>	<i>M.</i> <i>megalotis</i>	<i>M.</i> <i>minuta</i>	<i>M.</i> <i>nicefori</i>	<i>M.</i> <i>sylvestris</i>
No. of localities for which data are available	1	2	9	9	9	1
<i>Saccopteryx bilineata</i>	0	1	5	1	1	0
<i>Saccopteryx canescens</i>	0	0	2	0	0	0
<i>Saccopteryx leptura</i>	1	1	5	0	1	0
<i>Cormura brevirostris</i>	0	1	0	1	1	0
<i>Pteronotus parnellii</i>	1	1	3	4	3	1
<i>Noctilio leporinus</i>	0	0	0	1	1	0
<i>Chrotopterus auritus</i>	1	0	2	0	0	0
<i>Micronycteris megalotis</i>	0	0	—	1	2	0
<i>Micronycteris minuta</i>	0	0	1	—	5	1
<i>Micronycteris nicefori</i>	0	0	2	5	—	0
<i>Micronycteris sylvestris</i>	0	0	0	1	0	—
<i>Tonatia bidens</i>	0	0	5	1	2	0
<i>Tonatia brasiliense</i>	0	0	1	1	0	0
<i>Tonatia carrikeri</i>	0	1	0	2	0	0
<i>Tonatia schulzi</i>	0	0	2	0	1	0
<i>Tonatia silvicola</i>	0	1	1	3	2	1
<i>Mimon crenulatum</i>	0	0	1	1	1	0
<i>Lonchorhina aurita</i>	0	0	0	1	1	0
<i>Phyllostomus discolor</i>	1	1	2	1	0	1
<i>Phyllostomus elongatus</i>	1	2	4	6	3	1
<i>Phyllostomus hastatus</i>	1	2	3	5	3	0
<i>Phyllostomus latifolius</i>	0	0	1	2	0	1
<i>Trachops cirrhosus</i>	1	1	2	0	0	0
<i>Anoura caudifer</i>	0	0	3	0	2	0
<i>Lonchophylla thomasi</i>	1	1	4	7	6	1
<i>Glossophaga soricina</i>	0	0	2	4	5	0
<i>Carollia brevicauda</i>	1	0	0	1	0	0
<i>Carollia perspicillata</i>	1	2	7	5	6	0
<i>Rhinophylla pumilio</i>	1	1	5	6	5	1
<i>Ametrida centurio</i>	0	0	0	1	0	0
<i>Sturnira lilium</i>	1	1	4	6	6	0
<i>Sturnira tildae</i>	0	0	1	2	2	1
<i>Artibeus cinereus</i>	1	0	1	5	4	0
<i>Artibeus concolor</i>	0	0	1	1	1	0
<i>Artibeus</i> (large species)	1	2	7	9	8	1
<i>Uroderma bilobatum</i>	1	1	1	3	3	0
<i>Chiroderma trinitatum</i>	0	1	0	1	1	0
<i>Vampyressa bidens</i>	0	0	2	0	0	0
<i>Vampyressa brocki</i>	0	0	0	1	1	0
<i>Vampyrops aurarius</i>	0	0	0	0	1	0
<i>Vampyrops brachycephalus</i>	0	0	2	1	2	0
<i>Vampyrops helleri</i>	1	1	2	4	3	0
<i>Vampyrodes caraccioli</i>	0	0	0	1	1	0
<i>Mesophylla macconnelli</i>	0	1	1	2	3	0
<i>Desmodus rotundus</i>	0	1	0	1	0	0

Table 2.—Continued.

Species of bats	<i>M.</i> <i>daviesi</i>	<i>M.</i> <i>hirsuta</i>	<i>M.</i> <i>megalotis</i>	<i>M.</i> <i>minuta</i>	<i>M.</i> <i>nicefori</i>	<i>M.</i> <i>sylvestris</i>
<i>Thyroptera tricolor</i>	0	0	1	2	1	0
<i>Natalus tumidirostris</i>	0	0	0	1	0	0
<i>Myotis nigricans</i>	0	1	1	3	3	0
<i>Eptesicus brasiliensis</i>	0	1	4	1	3	0
<i>Molossus ater</i>	0	1	0	0	0	0
<i>Molossus molossus</i>	0	1	1	1	1	0
Total species (51)	16	24	36	41	35	10

al. (1983) based on electrophoretic studies. For phenotypic criteria a useful classification might be devised by using characters of the ears and the teeth at the front part of the dental arcade (canines and incisors). The genus can be split into two major groups—in the first the ears are connected by an interauricular band and the lower incisors are bifid, and in the second the ears are not connected by an interauricular band and the lower incisors are trifid. We suggest that future investigation of subgeneric classifications of this genus examine these groupings and any subgroupings within them.

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