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#### ADDITIONAL RECORDS OF BATS FROM NICARAGUA, WITH A REVISED CHECKLIST OF CHIROPTERA

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In the summers of 1971 and 1972, field parties from Texas Tech University collected bats in Nicaragua, principally gathering material for karyotypic investigations and for studies of brain morphology. In the course of this field work, specimens were collected of seven species previously unreported from the country as well as information on several taxa that were poorly known there. This paper places on record the species formerly unrecorded from Nicaragua as well as comments on some of those for which additional material is noteworthy. This and other recent publications have outdated a checklist of Nicaraguan bats prepared by Jones *et al.* (1971), and a revision of this list is, therefore, presented here.

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***Centronycteris maximiliani centralis*** Thomas, 1912.—A female (TTU 13419) of this species was obtained 9 mi. E Rama on 2 August 1971 at a place known locally as "Dos Bocas." A nonpregnant adult, it was netted approximately 6 meters above the ground in a telegraph right-of-way through second growth forest in which logging was underway. Several other individuals, believed to be of this same species, were seen in flight, traveling extremely slowly and in a straight path along the right-of-way.

*C. maximiliani* is known to occur from southern México into central South America, but has not been reported previously from Nicaragua.

**Cyttarops alecto** Thomas, 1913.—A nonpregnant adult female (TTU 13420) of this rare and unique diclidurine, which was taken 4½ km. (by road) NW Rama, Zelaya, on 27 July 1971, provides the first report of this bat from Nicaragua and the northernmost record for the species (see Starrett, 1972). The bat was captured in a mist net set in a large grove of cultivated oil palms some 100 meters from the Río Mico. More than 20 species of bats were taken in this same palm grove on several nights of netting, including *Micronycteris megalotis*, *Lichonycteris obscura*, and *Vampyressa pusilla*.

External measurements of our specimen are: total length, 80; length of tail, 25; length of hind foot, 8; length of ear, 13; length of tragus, 6; length of forearm, 45.8. Unfortunately, it was necessary to break the skull for studies of brain morphology and the remaining parts subsequently were misplaced.

The karyotype, shown in Fig. 1, is the first to be reported from a representative of the subfamily Diclidurinae. The diploid number is 32 and the fundamental number is 60. All chromosomes are biarmed (most elements are submetacentric or subtelocentric); one of the smallest pairs has a secondary constriction on the shortest arm. Karyotypic data available for five New World species of emballonurines reveal a diploid number ranging from 22 to 32 and a fundamental number ranging from 36 to 60 (Baker, 1970; Baker and Jordan, 1970). Two species of *Taphozous*, an Old World emballonurine genus, have a diploid number of 42 and a fundamental number of 58 (see Baker, 1970). Karyotypic characteristics of *Cyttarops* thus fall within the range of variation described for the family.

**Pteronotus personatus personatus** (Wagner, 1843).—Seven specimens (TTU 16814-20) of this small mormoopid were collected 6.9 mi. E San Juan del Sur, Rivas, on 23 July 1972. They were taken in mist nets set in gallery forest adjacent to a small stream in an otherwise highly agriculturized area, and provide the first record for the species from Nicaragua.

When Smith (1972) revised bats of the family Mormoopidae, he conveniently divided the larger subspecies *personatus* (to the south) from the smaller *psilotis* (to the north) through Nicaragua because he had no material from there. The forearms of our specimens, all females in alcohol, average 46.3 (range, 44.5 to 47.8), clearly identifying them as *P. p. personatus*, which Smith (1972:92) reported from adjacent Guanacaste in Costa Rica.



FIG. 1.—Karyotype of a female *Cyttarops alecto* (TTU 13420).

***Micronycteris hirsuta*** (Peters, 1869).—In a recent paper, Baker *et al.* (1973b) reported on the karyotype and morphometrics of Nicaraguan specimens of this species, but gave no details of capture. Eight specimens now are known from the country (see also Valdez and LaVal, 1971:247), six of which are from: 5 mi. N and 1 mi. W San Juan del Sur, Rivas (TTU 13157-59); 9 mi. E Rama, Zelaya (TTU 13155-56); 3 km. NW Rama, Zelaya (TTU 13154). Bats from Rivas, all males, were netted on 15 August 1971 over a small road separating a banana grove from gallery forest; one of two males from 9 mi. E Rama (2 August 1971) was taken as described in the account of *Centronycteris*, whereas the other was netted nearby in second growth forest; a subadult female from 3 km. NW Rama (28 July 1971) was captured in a small stand of mature (possibly virgin) rainforest.

***Micronycteris nicefori*** Sanborn, 1949.—A lactating female (TTU 13160) of this relatively rare species was netted 3 km. NW Rama at dusk on 28 July 1971 in a patch of mature rainforest. This specimen represents the first report of *M. nicefori* from Nicaragua and also the first to the north of the Caribbean coastal region of Panamá. Available measurements are: total length, 64; length of tail, 11; length of hind foot, 11; length of ear, 19; length of tragus, 9; length of forearm, 37.9; length of maxillary tooththrow, 7.6.

***Micronycteris schmidtorum*** Sanborn, 1935.—A male (TTU 13165) from 5 mi. N and 1 mi. W San Juan del Sur, Rivas, captured on 15 August 1971 (see previous account of *M. hirsuta*), constitutes the

second record from Nicaragua and the first from the Pacific versant in that country. Species taken in the same or nearby nets included *Micronycteris megalotis* and *Tonatia nicaraguae*. External and cranial measurements of our male are: total length, 60; length of tail, 14; length of hind foot, 11; length of ear, 19; length of tragus, 8; length of forearm, 34.0; greatest length of skull, 19.7; zygomatic breadth, 9.2; postorbital constriction, 4.3; mastoid breadth, 8.9; length of maxillary toothrow, 7.8.

***Lonchophylla robusta*** Miller, 1912.—A male (TTU 13139) from 3 km. NW Rama, Zelaya, provides the first record of this bat from Nicaragua. This monotypic species has been reported previously only from Costa Rica, Panamá, Colombia, and Perú. Our specimen was netted in cut-over forest adjacent to a stand of mature rainforest.

***Artibeus inopinatus*** Davis and Carter, 1964.—A series of 10 specimens (TTU 12915-24) from 25 mi. WNW Managua, in León, netted in a banana grove on 17 August 1971, provides the second locality record in Nicaragua for this frugivorous species. In the original description, Davis and Carter (1964:120) recorded a single male from San Francisco, Boaco. Of eight adults in our series, only two are males. Two juveniles had incompletely fused phalangeal epiphyses.

***Diaemus youngii*** (Jentink, 1893).—This relatively rare vampire bat has been recorded from scattered localities from Tamaulipas southward to southern Brazil. A male (TTU 13106), netted on 15 August 1971 near a farm dwelling located 5 mi. N and 1 mi. W San Juan del Sur, Rivas, constitutes the first Nicaraguan record for the species.

***Lasiurus borealis frantzii*** (Peters, 1871).—A female red bat (TTU 13390), captured 3 km. NW Rama, Zelaya, on 29 July 1971, is the second specimen of this species to be recorded from Nicaragua and the first therein from the Caribbean versant. It was netted in an open space beneath the canopy in a stand of mature rainforest. The only previous record is of a female reported by Davis and Carter (1962:73) from southeast of Rivas on the Pacific versant.

***Promops centralis centralis*** Thomas, 1915.—A male in alcohol (TTU 13477) from 5 mi. N and 1 mi. W San Juan del Sur, Rivas, netted on 15 August 1971, provides the first record from Nicaragua of this widely distributed molossid.

#### CHECKLIST OF NICARAGUAN BATS

Following is a checklist of the 77 species of bats currently known to occur in Nicaragua. For each taxon, citations are given to all pub-

lications that are primary sources of information on Nicaraguan material. In some instances, specimens have been reported in the literature under a name different from the one used here and we have listed such names where it seemed appropriate to do so. Taxa preceded by an asterisk are discussed on previous pages of this paper.

Arrangement of genera generally follows Hall and Kelson (1959). Species are listed alphabetically.

#### Family EMBALLONURIDAE

- Rhynchonycteris naso* (Wied-Neuwied, 1820).—J. A. Allen (1908:669, 1910:110), Sanborn (1937:327), Davis *et al.* (1964:375, 379).
- Saccopteryx bilineata* (Temminck, 1838-1839).—J. A. Allen (1910:110), Sanborn (1937:331), Jones (1964:506).
- Saccopteryx leptura* (Schreber, 1774).—Davis *et al.* (1964:375), Jones (1964:506), Jones *et al.* (1971:3).
- Cormura brevirostris* (Wagner, 1843).—J. A. Allen (1910:110—specimens listed as *Peropteryx canina* from Peña Blanca, see Sanborn, 1937:348), Miller (1924:38), Sanborn (1937:349), Goodwin (1942c:119).
- Peropteryx kappleri kappleri* Peters, 1867.—J. A. Allen (1908:669, 1910:110—as *P. canina*), Sanborn (1937:344).
- Peropteryx macrotis macrotis* (Wagner, 1843).—Jones *et al.* (1971:3).
- \**Centronycteris maximiliani centralis* Thomas, 1912.
- Balantiopteryx plicata plicata* Peters, 1867.—Jones *et al.* (1962:152), Davis *et al.* (1964:375), Jones (1964:506).
- Diclidurus virgo* Thomas, 1903.—Alston (1879-82:30).
- \**Cyttarops alecto* Thomas, 1913.

#### Family NOCTILIONIDAE

- Noctilio albiventris minor* Osgood, 1910.—Goodwin (1942c:121, 1946:297), Davis *et al.* (1964:376), Kohls *et al.* (1965:344), Wenzel *et al.* (1966:578), McDaniel (1970:818), Jones *et al.* (1971:3).
- Noctilio leporinus mastivus* (Vahl, 1797).—Davis *et al.* (1964:376), Jones *et al.* (1971:4), Davis (1973:871).

#### Family MORMOOPIDAE

- Pteronotus davyi davyi* Gray, 1838.—Jones *et al.* (1971:4), Smith (1972:100).
- Pteronotus parnellii mesoamericanus* Smith, 1972.—Jones *et al.* (1971:5), Smith (1972:74).

- Pteronotus parnellii rubiginosus* (Wagner, 1843).—Miller (1902:402), Rehn (1904:203), Jones *et al.* (1971:5), Smith (1972:76).  
\**Pteronotus personatus personatus* (Wagner, 1843).  
*Pteronotus suapurensis* (J. A. Allen, 1904).—Goodwin (1942a:88, 1946:299, 1953:246), Jones *et al.* (1971:5), Smith (1972:106).

## Family PHYLLOSTOMATIDAE

- Micronycteris brachyotis* (Dobson, 1879).—Goodwin (1946:302—*as M. sylvestris*), Sanborn (1949:224—*as M. platyceps*), Goodwin and Greenhall (1961:231).  
\**Micronycteris hirsuta* (Peters, 1869).—Valdez and LaVal (1971:247), Baker *et al.* (1973b:9).  
*Micronycteris megalotis mexicana* Miller, 1898.—G. M. Allen (1929:130), Jones *et al.* (1971:5).  
*Micronycteris megalotis microtis* Miller, 1898.—Miller (1898:328, 1900:154), Lyon (1906:371), Lyon and Osgood (1909:263), J. A. Allen (1910:110), Poole and Schantz (1942:133), Jones *et al.* (1971:6).  
*Micronycteris minuta* (Gervais, 1856).—Valdez and LaVal (1971:248).  
\**Micronycteris nicefori* Sanborn, 1949.  
\**Micronycteris schmidtorum* Sanborn, 1935.—Davis *et al.* (1964:378).  
*Macrophyllum macrophyllum* (Schinz, 1821).—Davis *et al.* (1964:378), Jones (1964:506).  
*Tonatia nicaraguae* Goodwin, 1942.—Goodwin (1942b:205, 1946:305, 1953:246), Davis and Carter (1962:67), Valdez and LaVal (1971:248), Jones *et al.* (1971:7).  
*Phyllostomus discolor verrucosus* Elliot, 1905.—Jones (1964:507), Wenzel *et al.* (1966:598).  
*Phyllostomus hastatus panamensis* J. A. Allen, 1904.—Goodwin (1942c:126), Wenzel *et al.* (1966:597), Jones *et al.* (1971:8).  
*Trachops cirrhosus coffini* Goldman, 1925.—Carter *et al.* (1966:491), Jones *et al.* (1971:8).  
*Chrotopterus auritus auritus* (Peters, 1856).—Jones *et al.* (1971:9).  
*Vampyrum spectrum nelsoni* (Goldman, 1917).—Gray (1844:18), Dobson (1878:471), Alston (1879-82:39), J. A. Allen (1910:111), Goldman (1917:116), Goodwin (1946:310).  
*Glossophaga commissarisi* Gardner, 1962.—Davis *et al.* (1964:380), Jones (1964:507).  
*Glossophaga soricina leachii* (Gray, 1844).—Gray (1844:18), Dobson (1878:501), Alston (1879-82:44), J. A. Allen (1910:111), Miller

- (1913b:419), Alvarez (1963:400), Davis *et al.* (1964:380), Starrett and de la Torre (1964:57), McDaniel (1970:805).
- \**Lonchophylla robusta* Miller, 1912.
- Anoura geoffroyi lasiopyga* (Peters, 1868).—McDaniel (1970:805), Jones *et al.* (1971:9).
- Choeroniscus godmani* (Thomas, 1903).—Handley (1966:86), Jones *et al.* (1971:9).
- Lichonycteris obscura* Thomas, 1895.—Thomas (1895:57), Davis *et al.* (1964:380), Jones *et al.* (1971:10).
- Carollia brevicauda* (Schinz, 1821).—Davis and Carter (1962:71—as *C. subrufa*), Davis *et al.* (1964:379—as *C. subrufa*), Pine (1972:43).
- Carollia castanea* H. Allen, 1890.—Davis *et al.* (1964:379), Jones *et al.* (1971:10), Pine (1972:21).
- Carollia perspicillata azteca* Saussure, 1860.—Hahn (1907:112), J. A. Allen (1908:669, 1910:111), Davis *et al.* (1964:379), Starrett and de la Torre (1964:58), Pine (1972:71).
- Carollia subrufa* (Hahn, 1905).—Pine (1972:29).
- Sturnira lilium parvidens* Goldman, 1917.—Davis *et al.* (1964:379), Starrett and de la Torre (1964:59), Jones (1964:507), McDaniel (1970:819).
- Sturnira ludovici ludovici* Anthony, 1924.—Jones *et al.* (1971:11).
- Uroderma bilobatum convexum* Lyon, 1902.—Davis *et al.* (1964:382), Jones (1964:507), Davis (1968:695), Baker and McDaniel (1972:4), Baker *et al.* (1973a:428).
- Uroderma bilobatum molaris* Davis, 1968.—Davis *et al.* (1964:382), Davis (1968:697), McDaniel (1970:813), Baker and McDaniel (1972:4), Baker *et al.* (1973a:428).
- Uroderma magnirostrum* Davis, 1968.—Davis (1968:680), Jones *et al.* (1971:11).
- Vampyrops helleri* Peters, 1866.—Davis *et al.* (1964:383), Jones (1964:507), McDaniel (1970:809), Valdez and LaVal (1971:248), Jones *et al.* (1971:11).
- Vampyrodes major* G. M. Allen, 1908.—J. A. Allen (1910:112), Goodwin (1946:320), Jones *et al.* (1971:12).
- Vampyressa nymphaea* Thomas, 1909.—Jones *et al.* (1971:13), Baker *et al.* (1973b:9).
- Vampyressa pusilla thyone* Thomas, 1909.—Starrett and de la Torre (1964:60), Jones *et al.* (1971:13), Baker *et al.* (1973b:9).
- Chiroderma villosum jesupi* J. A. Allen, 1900.—Jones *et al.* (1971:14).
- Ectophylla alba* H. Allen, 1892.—H. Allen (1892:441, 1898:267), Lyon and Osgood (1909:266), Poole and Schantz (1942:129),

- Goodwin (1942c:134, 1946:323), Goodwin and Greenhall (1962:4). Type locality (Río Segovia) placed in Comarca de El Cabo, Nicaragua, by Miller and Kellogg (1955:77).
- \**Artibeus inopinatus* Davis and Carter, 1964.—Davis and Carter (1964:120).
- Artibeus jamaicensis paulus* Davis, 1970.—Andersen (1908:266), Davis (1970b:121).
- Artibeus jamaicensis richardsoni* J. A. Allen, 1908.—Andersen (1908:267), J. A. Allen (1908:669), Elliot (1917:168), Goodwin (1953:249), Davis and Carter (1964:120), Davis *et al.* (1964:379), Starrett and de la Torre (1964:60), Davis (1970b:116).
- Artibeus lituratus palmarum* J. A. Allen and Chapman, 1897.—Andersen (1908:279), Davis and Carter (1964:120), Davis *et al.* (1964:379), Starrett and de la Torre (1964:61).
- Artibeus phaeotis palatinus* Davis, 1970.—Davis (1970a:401).
- Artibeus phaeotis phaeotis* (Miller, 1902).—Davis *et al.* (1964:379), Davis (1970a:399).
- Artibeus toltecus hesperus* Davis, 1969.—Jones *et al.* (1971:14).
- Artibeus toltecus toltecus* (Saussure, 1860).—Andersen (1908:300), Davis (1969:28), Jones *et al.* (1971:15).
- Artibeus watsoni* Thomas, 1901.—Andersen (1908:290), Davis and Carter (1962:71), Davis (1970a:393), Jones *et al.* (1971:15).
- Centurio senex senex* Gray, 1842.—Goodwin (1946:327, restricted type locality to El Realejo, Nicaragua), Jones *et al.* (1971:16), Watkins *et al.* (1972:22).
- Desmodus rotundus murinus* Wagner, 1840.—J. A. Allen (1908:670, 1910:113).
- \**Diaemus youngii* Jentink, 1893.
- Diphylla ecaudata centralis* Thomas, 1903.—Jones *et al.* (1971:17).

#### Family NATALIDAE

- Natalus stramineus saturatus* Dalquest and Hall, 1949.—Jones *et al.* (1971:17).

#### Family THYROPTERIDAE

- Thyroptera discifera discifera* (Lichtenstein and Peters, 1854).—Miller (1896:111, 1931:411), Goodwin (1946:330).

#### Family VESPERTILIONIDAE

- Myotis albescens* (É. Geoffroy St.-Hilaire, 1806).—Miller and G. M. Allen (1928:203), Jones *et al.* (1971:18), LaVal (1973a:29).



- Myotis elegans* Hall, 1962.—Jones *et al.* (1971:18, 19—as *M. nigricans* in part), LaVal (1973a:15).
- Myotis keaysi pilosatibialis* LaVal, 1973.—Jones *et al.* (1971:19—as *M. nigricans* in part), LaVal (1973a:25).
- Myotis nigricans nigricans* (Schinz, 1821).—Davis *et al.* (1964:379), McDaniel and Coffman (1970:223), Jones *et al.* (1971:19 in part), LaVal (1973a:10).
- Myotis riparius* Handley, 1960.—McDaniel (1970:804 — as *M. nigricans*), Jones *et al.* (1971:19—also as *M. nigricans* in part, same page), LaVal (1973a:34).
- Eptesicus furninalis gaumeri* (J. A. Allen, 1897).—Miller (1897:100), Davis (1965:234), Jones *et al.* (1971:20).
- \**Lasiurus borealis frantzii* (Peters, 1871).—Davis and Carter (1962:73).
- Rhogeessa tumida* H. Allen, 1866.—J. A. Allen (1910:113), Goodwin (1958:3), Jones *et al.* (1971:20), LaVal (1973b:44).

## Family MOLOSSIDAE

- Tadarida laticaudata yucatanica* (Miller, 1902).—Jones *et al.* (1971:21).
- Eumops auripendulus auripendulus* (Shaw, 1800).—Jones *et al.* (1971:22), Eger (1974:7).
- \**Promops centralis centralis* Thomas, 1915.
- Molossus ater nigricans* Miller, 1902.—J. A. Allen (1908:670), Jones *et al.* (1971:22).
- Molossus bondae* J. A. Allen, 1904.—Miller (1913a:89).
- Molossus molossus aztecus* Saussure, 1860.—Felten (1957:14), McDaniel (1970:818), Jones *et al.* (1971:23).
- Molossus pretiosus pretiosus* Miller, 1902.—McDaniel (1970:814, 818, 819), Jones *et al.* (1971:25).
- Molossus sinaloae sinaloae* J. A. Allen, 1906.—Miller (1913a:89), Goodwin and Greenhall (1964:13), Jones *et al.* (1971:27).

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