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#### **ANNOTATED CHECKLIST OF MAMMALS OF THE YUCATAN PENINSULA, MEXICO. I. CHIROPTERA**

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The Yucatán Peninsula of México, comprising the states of Campeche and Yucatán, and the Federal Territory of Quintana Roo, is a low-lying plain or tableland, which rises gently in elevation inland from north to south. Bordered on three sides by water, the Gulf of Campeche to the west, the Gulf of Mexico to the north, and the Caribbean Sea proper to the east, the peninsula, geographically defined, actually occupies an area of approximately 143,500 square kilometers, including parts of British Honduras and northern Petén, Guatemala.

The Yucatán Peninsula is underlain by a thick sheet of eroded limestone, which lacks major physiographic features and is covered by a thin layer of soil; the soil is a product of erosion of the underlying limestone. A salient characteristic of the karst topography is the presence of many natural holes and sinks. Termed "cenotes" in the northern part of the peninsula, some are dry and others partly filled with water. In the south, most or all are water-filled and are termed "aguadas." The state of Yucatán and northern parts of Quintana Roo and Campeche lack permanent surface drainage, but in the south there are a few rivers, the largest of which are the Río Hondo, Río Champotón, and Río Candelaria. Along the coast line, which is approximately 1100 kilometers in length, are numerous cayos and islands, particularly to the east. Islands visited during the course of this study included Isla del Carmen, at the mouth of Laguna de Términos in southwestern Campeche, and Isla Mujeres and Isla Cozumel off the northeastern coast of Quintana Roo.

There is relatively good evidence that the northern third of the peninsula, as well as coastal areas elsewhere and off-shore islands,

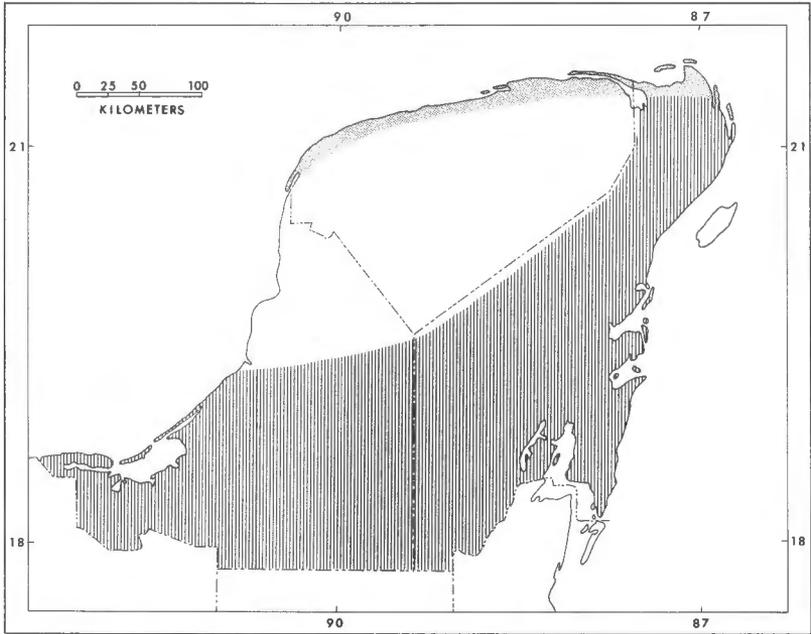


FIG. 1. — Vegetational zones of the Yucatán Peninsula (after Paynter, 1955): stipple, scrub; white, deciduous forest; vertical lines, quasi-rainforest.

were submerged during the Pleistocene. Other parts of the peninsula probably were inundated in Eocene times, but there is no evidence that it was completely submerged during any later period (Paynter, 1955).

The climate of the Yucatán region is tropical, with moderately pronounced dry and wet seasons. The wet season begins in May and ends in October; the driest months of the year are February, March, and April. The amount of rainfall increases from north to south and from coastal areas inland; for example, in the vicinity of Progreso the annual precipitation totals 450 millimeters, whereas in the south (near borders of Campeche and Quintana Roo with Guatemala) it may total as much as 2000 millimeters. Temperature varies only slightly at any given time on the peninsula. At Mérida, the mean monthly temperature ranges from 22.7°C (January) to 28.1°C (June). The lowest mean monthly minimum is in January (14.5°C), and the highest mean monthly maximum is in April and May (36.2°C).

The vegetation of the Yucatán Peninsula is diverse, ranging from xerophilic scrub to high forest. Generally, the vegetation increases in height from north to south and from coastal areas toward the center

of the peninsula, the same pattern as for rainfall, which undoubtedly has a profound effect upon the vegetation. There have been several attempts to classify the modern vegetation of the peninsula, but those of Paynter (1955) and Duellman (1965) are the most useful from a zoogeographic point of view. Paynter proposed three vegetational zones—scrub, deciduous forest, and rainforest. However, as pointed out by Duellman (1965), the latter zone probably is best termed quasi rainforest. Scrub vegetation covers coastal areas of northern Yucatán and extreme northern Quintana Roo, including Isla Mujeres (Fig. 1). Trees in this zone seldom attain a height of more than eight meters. Deciduous forest, much of it secondary in nature, occupies most of the remainder of the state of Yucatán, northern Campeche, and Isla Cozumel. The other areas of the peninsula are covered with quasi rainforest. This lush evergreen forest, which is characterized by a dense undergrowth, contains some trees more than 30 meters in height. In the southwestern part of the peninsula, small, isolated savannas possibly result from local soil conditions. Small clumps of large evergreen trees are found around the larger cenotes in the north.

As pointed out by Paynter (1955), much of the original vegetation of the peninsula has been altered by human influence. The deciduous zone, originally tropical evergreen forest, now is a vast area of secondary forest. Tropical evergreen forest is thought to have been lower and somewhat less luxuriant than the quasi rainforest to the south. Leopold (1950) attempted to reconstruct the original climax vegetation of the peninsula. The above summary is based in large measure on information provided by Duellman (1965, 1966), Klaas (1968), Paynter (1955), and Stuart (1966).

Despite the fact that the mammals of the Yucatán Peninsula have received the attention of scientists for more than a century, much remains to be learned concerning their biology. In particular, the distribution of bats on the peninsula has not been well documented; accounts of 44 species of seven families are here included. Many species have been recorded previously from only one or a few localities, and citation is made in individual accounts, where appropriate, to earlier publications. We have not attempted to interpret Gaumer's (1917: 270-303) records of 29 species of bats except where specifically indicated in text. Some of Gaumer's names are identifiable with currently recognized taxa, but others are not, and in several instances more than one of his accounts seemingly relate to the same species. Clearly, although Gaumer correctly identified most of the nonvolant mammals in the Yucatán region, his knowledge of bats was less adequate. Species listed by Gaumer, in the same order and under the

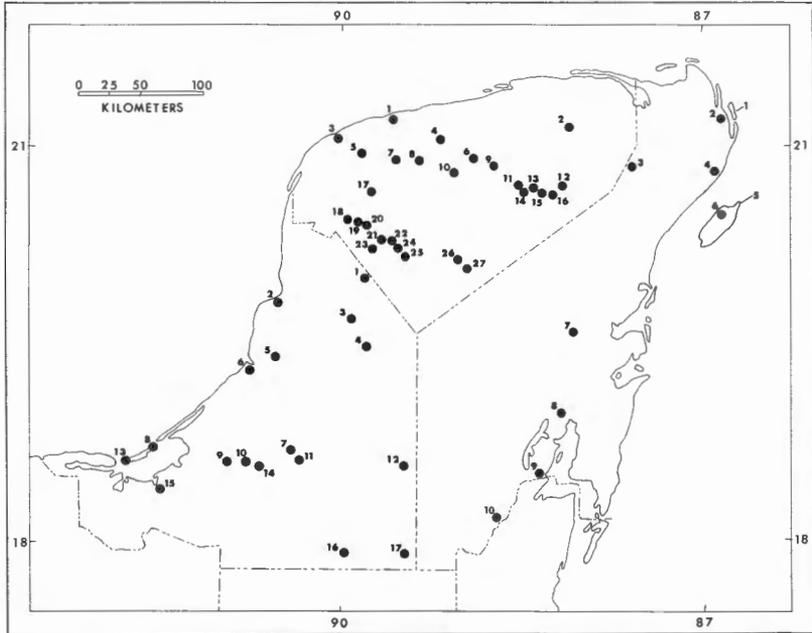


FIG. 2. — Map of Yucatán Peninsula showing location of place-names mentioned in text. CAMPECHE: 1, Bolonchenticul; 2, Campeche; 3, Hopelchén; 4, Dzibalchén; 5, San José Carpizo; 6, Champotón; 7, Apazote; 8, Puerto Real; 9, Treinta y seis (1 km. N, 13 km. W Escárcega); 10, Escárcega; 11, Laguna Silvituc (42 km. E Escárcega); 12, Xpujil (128 km. E Escárcega); 13, Ciudad del Carmen; 14, Matamoros; 15, Balchacaj (= Balchacah); 16, Laguna Chumpich (103 km. SE Escárcega); 17, Laguna Alvarado (65 km. S, 128 km. E Escárcega); La Tuxpeña was not exactly located, but it is near Champotón as specimen labels bear the designation "La Tuxpeña, Champoton." QUINTANA ROO: 1, Isla Mujeres; 2, Puerto Juárez; 3, Pueblo Nuevo X-Can; 4, Puerto Morelos; 5, Isla Cozumel; 6, San Miguel; 7, Felipe Carrillo Puerto; 8, Limones (near 60 km. N, 16 km. E Chetumal); 9, Chetumal; 10, Xcopén. YUCATAN: 1, Progreso; 2, Tizimín; 3, Sisal; 4, Motul; 5, Hunucmá; 6, Izamal; 7, Mérida; 8, Tixpehual; 9, Yaxcach (approximate location based on Gaumer, 1917); 10, Hochtún; 11, Pisté; 12, Valladolid; 13, Gruta de Balankanche; 14, Chichén-Itzá; 15, Kaua; 16, Tekom; 17, Chocholá; 18, Hda. Oxkintok; 19, Calcehtok; 20, Opichen; 21, Yokat; 22, Ticul; 23, Uxmal; 24, Oxkutzcab; 25, Tekax; 26, Peto; 27, Hda. Santa Rosa (Santa Rosa); Buena Vista and Cuetzala were not exactly located.

names used by him, were: *Myotis nigricans*, *Myotis californicus*, *Adelonycteris* [sic] *gaumeri*, *Atalapha noveboracensis*, *Dasypterus intermedius*, *Dasypterus ega*, *Dasypterus xanthinus*, *Rhogoessa* [sic] *tumida*, *Rhogoessa* [sic] *parvula*, *Molossus rufus*, *Molossus obscurus*, *Molossus nigricans*, *Promops nasutus*, *Nyctinomops yucantanicus*,

*Nyctinomops gracilis*, *Nyctinomus mexicanus*, *Nyctinomus brasiliensis*, *Natalus mexicanus*, *Chilonycteris rubiginosa*, *Chilonycteris mexicana*, *Otopterus bocourtianus*, *Otopterus pygmaeus*, *Chrotopterus auritus*, *Micronycteris megalotis*, *Glossophaga soricina*, *Artibeus yucatanicus*, *Dermanura cinereum*, *Sturnira lilium*, and *Desmodus rotundus*.

Although the Yucatán Peninsula presents a unique opportunity to study the "peninsular effect" on speciation, there has not been a comprehensive treatment of the mammals of the region since Gaumer's (1917) publication. Recently, however, other vertebrates, including birds (Paynter, 1955; Klaas, 1968), and amphibians and reptiles (Duellman, 1965) have been treated. The native mammalian fauna of the Mexican portion of the peninsula contains at least 100 species of 11 orders, as follows: Marsupialia, six; Insectivora, one; Chiroptera, 44; Primates, two; Edentata, two; Lagomorpha, two; Rodentia, 19; Carnivora, 18; Sirenia, one; Perissodactyla, one; Artiodactyla, four. A relatively high degree of endemism prevails, with four species endemic to the mainland (*Sciurus yucatanicus*, *Heteromys gaumeri*, *Otonyctomys hatti*, and *Peromyscus yucatanicus*), three endemic to Isla Cozumel (*Reithrodontomys spectabilis*, *Procyon pygmaeus*, and *Nasua nelsoni*), and several subspecies endemic to the mainland or to adjacent islands. However, no species or races of bats are thought to be endemic to the peninsular region.

Our field investigations on the Yucatán Peninsula were initiated in the summer of 1962 when two field parties from the Museum of Natural History at The University of Kansas visited the area. One field party consisted of W. E. Duellman and six students enrolled in a summer field course in vertebrate zoology; the other party was composed of the senior author and four students who were conducting a survey of Middle American terrestrial vertebrates and their ectoparasites. Some of the data relative to ectoparasites obtained during this study have appeared in the publications of Emerson (1971), Kohls *et al.* (1965), Loomis (1969), Price and Emerson (1971), and Wenzel *et al.* (1966). In mid-December 1962, Percy L. Clifton, field representative for the Museum of Natural History, began field work on the peninsula that continued until June 1963. Collections housed in The Museum of Texas Tech University were obtained by John B. Bowles in the spring of 1971.

Specimens listed beyond that are housed in the collection of the Museum of Natural History at The University of Kansas carry no institutional designation. Other collections from which specimens were examined are: American Museum of Natural History (AMNH); British Museum (Natural History) (BM); Field Museum of Natural

History (FM); Instituto de Biología, Universidad Autónoma de México (UM); Los Angeles County Museum (LACM); The Museum, Texas Tech University (TTU); Museum of Vertebrate Zoology, University of California (MVZ); National Museum of Natural History (USNM). In the following accounts, all measurements are in millimeters and weights are given in grams. Localities mentioned in text are plotted on Fig. 2.

## ANNOTATED LIST OF SPECIES

### Family EMBALLONURIDAE

#### **Rhynchonycteris naso** (Wied-Neuwied, 1820) Brazilian Long-nosed Bat

*Specimen examined* (1). — QUINTANA ROO: Chetumal, 1 (BM).

*Additional record*. — QUINTANA ROO: Xcopén (Sanborn, 1937:327).

The Brazilian long-nosed bat is known on the Yucatán Peninsula only from southeastern Quintana Roo, whence a total of five specimens have been recorded. Specimens from Xcopén formed the basis for description of *Rhynchiscus naso priscus* (G. M. Allen, 1914:109); Sanborn (1937) later considered *R. naso* to be monotypic. The apparent absence of this species from the northern parts of the peninsula evidently is due to the paucity there of permanent surface drainage. Sanderson (1941:238-239) recorded an unusual case of predation by white egrets on this species, which commonly roosts beneath overhanging logs and roots along water courses.

#### **Saccopteryx bilineata centralis** Thomas, 1904 Greater White-lined Bat

*Specimens examined* (15). — CAMPECHE: 46 km. S Champotón, 10; 1 km. N, 13 km. W Escárcega, 2; 65 km. S, 128 km. E Escárcega, 1; YUCATAN: Chichén-Itzá, 2 (USNM).

Specimens of this white-lined bat listed above were taken under the following circumstances: captured in caves (according to native collectors, although this seems questionable to us) and in tree holes in forest; shot at dusk over small clearings; and netted at the edge of a lagoon along with *Peropteryx macrotis*, *Pteronotus parnellii*, *Mimon crenulatum*, *Trachops cirrhosus*, and *Rhogeessa parvula*. Two of eight females captured on 4 February in southern Campeche contained a single embryo (each measuring 3), whereas another taken on 25 February carried an embryo that measured 5.

The specimen (FM 49982) listed from an unspecified locality in Yucatán by Hatt *et al.* (1953:52) actually is from Chichén-Itzá ac-

ording to Dr. J. C. Moore (personal communication). We follow Alvarez (1970:22-23) in use of the subspecific name *centralis*.

***Peropteryx macrotis macrotis* (Wagner, 1843)**

Lesser Doglike Bat

*Specimens examined* (61). — CAMPECHE: 65 km. S, 128 km. E Escárcega, 1. QUINTANA ROO: Felipe Carrillo Puerto, 30 m., 6; 1½ km. S, 1 km. E Pueblo Nuevo X-Can, 10 m., 5. YUCATAN: Actun Spukil, 4½ km. S Calcehtok, 10 m., 5 (4 UM); Chichén-Itzá, 11 (3 UM, 4 USNM); 13 km. W Peto, 28; Chakixix Cave, Tekax, 2 (USNM); 6 km. N Tizimín, 3.

*Additional records.* — YUCATAN: Calcehtok (Hatt and Villa-R., 1950:227); El Caracol, Ruinas de Chichén-Itzá (Villa-R., 1967:146); Oxkutzcab (Hatt, 1938:334).

This species is relatively common throughout the peninsula, where it frequently roosts in caves and buildings. For example, six were captured in the bell tower of a church in Felipe Carrillo Puerto and several more were found roosting singly in small holes and cracks in a cave located 1½ km. S and 1 km. E Pueblo Nuevo X-Can where *Myotis keaysi* also was taken. Several taken at the last-mentioned place were young of the year (29 and 30 July) in juvenile pelage.

Fourteen of 16 females obtained 13 km. W Peto on 18 April each carried a single embryo (9-13, average 11.1); one young bat was captured at the same time. Two pregnant females from 6 km. N Tizimín (25 April) each contained an embryo that measured 14, and a lactating female was captured at Felipe Carrillo Puerto on 14 August. A February-taken male had testes that measured 2.5, whereas one taken in mid-April had testes that measured 2.0.

Family NOCTILIONIDAE

***Noctilio leporinus mexicanus* Goldman, 1915**

Big Fishing Bat

*Specimens examined* (16). — CAMPECHE: 1 km. SW Puerto Réal, 3 m., Isla del Carmen, 16.

Prior to the capture of the individuals listed above, this fishing bat was unknown from the Yucatán Peninsula. All of our specimens were members of a colony discovered on 7 July in the hollow trunk of a coco palm. The entrance to the cavity was by way of two woodpecker holes about seven feet above the ground, and the floor was filled with large accumulations of guano. The composition of the colony was as follows: three adult males, seven lactating females, four young males, and two young females. The young individuals were only slightly smaller than the adults, but had unfused phalangeal epiphyses.

## Family MORMOOPIDAE

**Pteronotus parnellii mesoamericanus** Smith, 1972

## Parnell's Mustached Bat

*Specimens examined* (120).—CAMPECHE: 5 km. S Champotón, 10 m., 1; 46 km. S Champotón, 1; 20 km. N, 128 km. E Escárcega, 65 m., 2; 1 km. N, 13 km. W Escárcega, 12; 12 km. W Escárcega, 62; 7½ km. W Escárcega, 65 m., 3; 105 km. E Escárcega, 3; 103 km. SE Escárcega, 7; 65 km. S, 128 km. E Escárcega, 7. QUINTANA ROO: 83 km. W Chetumal, 2; 4 km. WSW Puerto Juárez, 5 m., 1. YUCATAN: Gruta de Balankanche, 5 km. E Chichén-Itzá, 16; Valladolid, 3 (UM).

*Additional records*.—CAMPECHE: 120 km. E Campeche (Villa-R., 1967:178). QUINTANA ROO: Cozumel Island (Thomas, 1888:129). YUCATAN: Actun Spukil, 4½ km. SSW Calcehtok (Hatt *et al.*, 1953:60).

Parnell's mustached bat is widespread and abundant on the Yucatán Peninsula. This bat was commonly taken in mist nets set near water or in dense forest, and in caves. At the entrance of Gruta de Balankanche, individuals were captured in mist nets at dusk as they flew into the cave. A small pond located within the cave may have served as a source of water for the bats. Other chiropterans netted at the cave entrance, or taken in the cave, included *Mormoops megalophylla*, *Glossophaga soricina*, *Artibeus jamaicensis*, *Desmodus rotundus*, *Natalus stramineus*, and *Myotis keaysi*.

Of 63 February-taken females from southern Campeche, 45 were pregnant. Embryos measured 2 to 11 in crown-rump length, averaging 5.2. Females collected in January, July, and August evidenced no reproductive activity. A January-taken male had testes that measured 5, whereas those of three collected in early February each measured 4.

**Pteronotus personatus psilotis** (Dobson, 1878)

## Wagner's Mustached Bat

*Specimens examined* (2).—CAMPECHE: 65 km. S, 128 km. E Escárcega, 2.

The specimens listed above constitute the only record of this bat from the Yucatán Peninsula. Both are males (testes, 5, 4) and were trapped in mist nets on 26 and 27 February 1963.

We follow the systematic arrangement of Smith (1972) for this and other species of mormoopid bats.

**Pteronotus davyi fulvus** (Thomas, 1892)

## Davy's Naked-backed Bat

*Specimens examined* (34).—CAMPECHE: Apazote, 1 (USNM); 5 km. S Champotón, 10 m., 2; 1 km. N, 13 km. W Escárcega, 3; 12 km. W Escárcega, 8; 105 km. E Escárcega, 4; La Tuxpeña, 2 (USNM). YUCATAN: Chichén-Itzá, 1 (FM); Hoctun Cave, 14 (MVZ).

All of our specimens were captured in mist nets set over or adjacent to lagoons. None of five females taken in February and July was pregnant. Two males captured on 7 February had testes that measured 7.0 and 7.5.

**Mormoops megalophylla megalophylla** Peters, 1864  
Peters' Leaf-chinned Bat

*Specimens examined* (19).—CAMPECHE: 7 km. N, 51 km. E Escárcega, 1; 1 km. N, 13 km. W Escárcega, 2; 12 km. W Escárcega, 4; 105 km. E Escárcega, 1; 18 km. S, 65 km. E Escárcega, 6; La Tuxpeña, 1 (USNM). YUCATAN: Gruta de Balankanche, 5 km. E Chichén-Itzá, 1; Mérida, 2 (USNM); 10 mi. W Progreso, 1 (LACM).

*Additional record*.—YUCATAN: Actun Spukil, 4½ km. SSW Calcehtok (Hatt *et al.*, 1953:60).

This bat evidently occurs throughout the peninsula. All of our specimens, excepting the one from Gruta de Balankanche (see account of *Glossophaga soricina*), were captured in mist nets set in or near forest. Each of two females taken 12 km. W Escárcega on 8 February carried a single embryo, which measured 4 and 8.

Family PHYLLOSTOMATIDAE

**Micronycteris megalotis mexicana** Miller, 1898  
Brazilian Small-eared Bat

*Specimens examined* (15).—QUINTANA ROO: "Island of Cozumel," 2. YUCATAN: Chichén-Itzá, 1 (USNM); El Laberinto, Hacienda Oxkintok, 2 (1 UM); Izamal, 2 (USNM); 10 km. NE Mérida, 4; Muruztun Cave, Tizimín, 1 (USNM); Opichen, 1 (UM); 6 km. N Tizimín, 1; Xmahit Cave, Tekax, 1 (USNM).

*Additional record*.—YUCATAN: Xconsacab Cave, Tizimín (Pearse and Kellogg, 1938:302).

*Micronycteris megalotis* evidently is uncommon on the Yucatán Peninsula. Four males from 10 km. NE Mérida were captured in a small, artificial cave formed by removal of dirt for road construction. A female taken in Yucatán on 28 April carried a single embryo (19).

**Micronycteris schmidtorum** Sanborn, 1935  
Schmidt's Small-eared Bat

*Specimen examined* (1).—QUINTANA ROO: 3½ km. N San Miguel, Isla Cozumel, 1.

Our only specimen, a female (KU 91539) in juvenile pelage and with unfused phalangeal epiphyses, appears to represent the first valid record of *M. schmidtorum* from the peninsular region. It was taken in a mist net stretched between two palm trees near a small cot-

TABLE 1. — Selected measurements of two species of *Micronycteris* from the Yucatán Peninsula.

Measurement	<i>M. schmidtorum</i>		<i>M. megalotis</i>	
	KU 91539 ♀	KU 93348 ♂	KU 93349 ♂	KU 35192 ♂
Length of forearm	40.4	35.3	35.7	36.0
Greatest length of skull	20.3	19.3	19.3	—
Condylobasal length	17.7	16.7	17.1	—
Zygomatic breadth	9.7	9.2	9.5	—
Postorbital constriction	4.0	3.9	3.8	3.9
Breadth of braincase	7.8	7.6	—	—
Mastoid breadth	9.1	9.0	—	—
Length of max. toothrow	7.6	7.3	7.3	7.5

tage adjacent to the beach on the west side of Cozumel. Jones and Lawlor (1965:412) earlier referred this specimen to the species *megalotis*.

Hatt and Villa-R. (1950:227) and Villa-R. (1967:195) assigned two specimens from Yucatán to *M. schmidtorum*, but our examination of their material reveals the two bats to be *M. megalotis mexicana*. Selected measurements of *schmidtorum* and *megalotis* as represented in our material are given in Table 1.

***Macrotus waterhousii mexicanus* Saussure, 1860**  
Waterhouse's Leaf-nosed Bat

The presumed occurrence of this bat on the Yucatán Peninsula is based entirely on Gaumer's (1917:292) listing of the species from 10 localities in Yucatán. Judging by the photograph that accompanied Gaumer's account and also by his description of habits, we are reasonably confident, as were Anderson and Nelson (1965:27), of the presence of *M. waterhousii* on the peninsula, although none was taken in the course of our work there.

***Lonchorhina aurita aurita* Tomes, 1863**  
Tomes' Long-eared Bat

*Specimens examined* (5). — QUINTANA ROO: 2 km. N Felipe Carrillo Puerto, 30 m., 5.

The specimens listed above represent the first record of occurrence of this species on the Yucatán Peninsula. The bats were collected on 16 August, in association with *Carollia brevicauda*, *Desmodus rotun-*

*dus*, *Natalus stramineus*, and *Myotis keaysi*, in a large water-filled cenote about 60 feet long, 40 feet wide, and with a ceiling up to 10 feet high. Two small holes at one end of the stalagmite-covered ceiling were the only means of access into the cavern. A total number of 12 to 15 *Lonchorhina* inhabited the cenote. One of us (Jones) recorded the following in his field notes: "One group of 8-10 were found clustered together in a depression in the ceiling among stalagmites. Others, possibly disturbed by my presence (and shooting) were hanging singly. All *Lonchorhina* were in the deepest (away from the entrance) part of the cenote." The only female in our material was not reproductively active.

### ***Tonatia silvicola silvicola* (D'Orbigny, 1836)**

#### D'Orbigny's Round-eared Bat

*Specimen examined* (1). — CAMPECHE: 12 km. W Escárcega, 1.

The specimen here recorded along with one listed by Lay (1963: 374-375) from 1 mi. E Teapa, Tabasco, represent the only records of *T. s. silvicola* from México. Our bat, an adult male (testes, 11), was netted in quasi rainforest at the edge of an aguada shortly after dark on 7 February 1963. *Pteronotus parnellii*, *Pteronotus davyi*, and *Mormoops megalophylla* were caught in the same net.

Selected measurements of our male (KU 93346) along with those of a male from British Honduras (Goodwin, 1942:208) and a female from Izabal, Guatemala (Carter *et al.*, 1966:490), are, respectively: length of forearm, 47.1, —, 50.0; greatest length of skull, 25.1, 25.1, 26.0; zygomatic breadth, 11.8, 12.2, 12.6; length of maxillary toothrow, 8.4, 8.7, 8.8.

### ***Mimon cozumelae* Goldman, 1914**

#### Cozumel Spear-nosed Bat

*Specimens examined* (47). — CAMPECHE: Dzibalchén, 2; 2 km. NE Hopelchén, 4. QUINTANA ROO: "Island of Cozumel," 5 (1 USNM). YUCATAN: 5 km. ENE Calcehtok, 10 m., 1 (UM); Izamal, 1 (USNM); 10 km. NE Mérida, 8; 13 km. W Peto, 2; Pisté, 10 m., 4; 8 km. NE Tixpehual (on highway to Tixkokab), 1 (UM); 6 km. N Tizimín, 17; Valladolid, 2.

*Additional records*. — YUCATAN: Buena Vista (Sanborn, 1941:373); Actun Spukil, 4½ km. SSW Calcehtok (Hatt *et al.*, 1953:60); Actun Tuz-ic, Calcehtok (Hatt and Villa-R., 1950:227); Tekom (Hershkovitz, 1951:555).

*M. cozumelae* is common on the Yucatán Peninsula where it is principally an inhabitant of caves. The species has been found roosting in association with *Glossophaga soricina*, *Desmodus rotundus*, *Diphylla ecaudata*, *Micronycteris megalotis*, and *Carollia perspicillata*.

Each of 19 females taken in northern Yucatán between 18 and 28 April carried a single embryo (range, 20-33). Lactating females and juveniles were obtained late in May in central Campeche, and a lactating female and nearly grown young were taken on 22 July at Pisté, Yucatán.

Specimens of this species listed above as from "Island of Cozumel" were collected by George F. Gaumer in the early 1900's. As has been noted elsewhere (Jones and Lawlor, 1965:417), no precise data accompanied the specimens and *M. cozumelae* has not been obtained from Cozumel by subsequent collectors. Thus, the location whence the holotype originated is open to question.

Some recent authors (Schaldach, 1965:132, for example) have relegated *cozumelae* to subspecific status under the South American *Mimon bennettii*. As did Carter *et al.* (1966:491), we prefer to retain *cozumelae* as a distinct species until intergradation between it and *bennettii* has been demonstrated; the morphological differences between the two kinds are admittedly slight.

**Mimon crenulatum keenani** Handley, 1960  
Geoffroy's Spear-nosed Bat

*Specimen examined* (1). — CAMPECHE: 65 km. S, 128 km. E Escárcega, 1.

Our one specimen, which represents the only record of this spear-nosed bat from México, was earlier reported by Jones (1964:510). The bat was captured on 25 February along with *Peropteryx macrotis*, *Saccopteryx bilineata*, *Pteronotus parnellii*, *Trachops cirrhosus*, and *Rhogeessa parvula* in a mist net stretched over water along the edge of a small lagoon. A female, it carried a single embryo that measured 2.

**Trachops cirrhosus coffini** Goldman, 1925  
Fringe-lipped Bat

*Specimen examined* (1). — CAMPECHE: 65 km. S, 128 km. E Escárcega, 1.

The above-mentioned specimen represents the first record for the fringe-lipped bat from the Yucatán Peninsula, although the species has been reported previously from British Honduras, Chiapas, Guatemala, and Veracruz. A nonpregnant female, it was netted on 25 February less than a foot above water at the edge of a laguna.

**Chrotopterus auritus auritus** (Peters, 1856)  
Peters' False Vampire Bat

*Specimens examined* (9). — QUINTANA ROO: 1½ km. S, 1 km. E Pueblo Nuevo X-Can, 10 m., 5. YUCATÁN: 6 km. N Tizimín, 4.

*Additional records* (Hatt et al., 1953:60, unless otherwise noted). — YUCATAN: Buena Vista (Elliot, 1907:529); Actun Spukil, 4½ km. SSW Calcehtok; Actun Lara, 3 km. SW Yokat.

Aside from a single specimen reported by Elliot (*loc. cit.*), an adult male presented to the Field Museum of Natural History by G. F. Gaumer, one reported from Yaxcach, Yucatán, by Gaumer himself (1917:294), and the remains recovered from cave deposits by Hatt et al. (1953:60), no other specimens of this species have been recorded from the peninsula. Of those listed above, four were captured on 29 April, along with *Desmodus rotundus*, in a cave located 6 km. N Tizimín. One of two females in this group carried an embryo that measured 30.

On 29 July southeast of Pueblo Nuevo X-Can, five *C. a. auritus* were collected from a deep chimneylike dome in the ceiling of a cave. The bats were roosting around entangled tree roots that penetrated the dome and hung to the cave floor. *Peropteryx macrotis*, *Desmodus rotundus*, *Diphylla ecaudata*, and *Myotis keaysi* were taken in the same cavern, but not in direct association with *Chrotopterus*. The only adult female present in our sample from this cave was lactating, and was accompanied by a juvenile female.

**Glossophaga soricina leachii** (Gray, 1844)  
Pallas' Long-tongued Bat

*Specimens examined* (116). — CAMPECHE: Apazote, 5 (USNM); 10 km. SSW Champotón, 37; 46 km. S Champotón, 3; Ciudad del Carmen, Isla del Carmen, 9; Dzibalchén, 9; 103 km. SE Escárcega, 2; 2 km. NE Hopelchén, 2; La Tuxpeña, 3 (USNM). QUINTANA ROO: "Island of Cozumel," 4; 4 km. NNE Felipe Carrillo Puerto, 30 m., 2; 2 km. N Felipe Carrillo Puerto, 30 m., 1; Rancho del Pirata, center of Isla Mujeres, 1. YUCATAN: Xkyc Cave, Calcehtok, 1 (USNM); Chichén-Itzá, 1 (USNM); Gruta de Balankanche, 5 km. E Chichén-Itzá, 6; Mérida, 1; Cenote de Chapultepec, Mérida, 1 (UM); 4 km. S Mérida, 1; El Laberinto, Oxkintok, 4 (UM); 13 km. W Peto, 13; Pisté, 10 m., 2; ½ km. SSW Casa Principal, Hda. Santa Rosa, 6 (4 UM); Muruztun Cave, Tizimín, 1 (USNM); Valladolid, 1 (UM).

*Additional records*. — YUCATAN: Actun Spukil, Calcehtok (Hatt and Villa-R., 1950:229); Cuetzala (Hershkovitz, 1951:555); Actun Coyok, 3½ km. SSE Oxkutzcab (Hatt et al., 1953:60); Loltun, 5 km. SW Oxkutzcab (Hatt et al., 1953:60); Tekom (Hershkovitz, 1951:555).

This species is one of the most abundant and widespread bats on the peninsula. It has been found roosting in a variety of refuges, especially in caves and unoccupied buildings, and has been netted commonly in forest clearings and along forest trails, in banana groves, and in mango plantations. At Gruta de Balankanche, near Chichén-Itzá, *G. soricina* and *Myotis keaysi* evidently roosted by day deep inside the cave, being taken at or near the entrance only after it was blocked at dusk

with a mist net; three other species (*Artibeus jamaicensis*, *Desmodus rotundus*, and *Natalus stramineus*) roosted in passages near the entrance. Additionally, individuals of *Pteronotus parnellii* and *Mormoops megalophylla* were netted at the entrance of Gruta de Balan-kanche as they attempted to enter the cave. Villa-R. (1967:238) reported "*Glossophaga morenoi*" from Cenote de Chapultepec and El Laberinto, Yucatán, but we have examined these specimens and find them to be *G. s. leechii*.

Pregnant or lactating females have been taken on the Yucatán Peninsula in February, April, and July. Crown-rump lengths of 12 embryos, from females captured 10 km. SSW Champotón on 10 July, ranged from 3 to 15.

Molting adult *Glossophaga* are present among specimens collected in the period 7 July to 16 August. Time of molt is variable among individuals from the same place in that all stages may be represented at any one time, as in a sample of nine bats taken on 7 July at Ciudad del Carmen. Judging from our material, molt in *Glossophaga soricina* begins as an overall growth of new hair beneath the old, worn, reddish-brown pelage. Progressively, as the new dark pelage lengthens, old hairs drop out in patches. Although loss of worn pelage appears to be random over much of the body, that on the head and shoulders seems to be lost first. Near the termination of molt, individual hairs of the old pelage remain more or less uniformly distributed over the dorsum, giving the pelage a pale, somewhat washed appearance.

### **Carollia brevicauda** (Wied-Neuwied, 1821)

#### Maximillian's Short-tailed Bat

*Specimens examined* (48).—CAMPECHE: Apazote, 21 (USNM); 5 km. S Champotón, 10 m., 1; Dzibalchén, 2; 103 km. SE Escárcega, 19. QUINTANA ROO: 60 km. N, 16 km. E Chetumal, 2; 4 km. WSW Puerto Juárez, 5 m., 3.

*Additional records*.—QUINTANA ROO: Chetumal (Hershkovitz, 1951:556). YUCATAN: Mérida (Ingles, 1959:383).

This species is one of the common bats on the Yucatán Peninsula. All of our specimens were captured in mist nets stretched across roads and trails through forest. A female taken on 14 April was pregnant (embryo, 21), but six adult females collected on 14 January evinced no gross reproductive activity. Nine males obtained in mid-January had testes that averaged 4.4 (3-6.5) in length, whereas those of one taken on 14 April measured 7.

*C. brevicauda* differs markedly from *C. perspicillata* (see following account). We follow Pine (1972) in applying specific names to North American *Carollia*.

***Carollia perspicillata azteca* Saussure, 1860**  
 Seba's Short-tailed Bat

*Specimens examined* (17).—CAMPECHE: Apazote, 2 (USNM); Dzibalchén, 2; 7½ km. W Escárcega, 65 m., 1. QUINTANA ROO: 2 km. N Felipe Carrillo Puerto, 30 m., 3; Pueblo Nuevo X-Can, 10 m., 3; 1½ km. S, 7 km. E Pueblo Nuevo X-Can, 3; 2 km. S Pueblo Nuevo X-Can, 1; 4 km. WSW Puerto Juárez, 5 m., 1. YUCATAN: 13 km. W Peto, 1.

The distribution of *Carollia perspicillata* has been shown frequently to include the entire Yucatán Peninsula. The only actual record of its occurrence there, however, was based on two specimens from Apazote reported by Hahn (1907:112). This species is among the most widely distributed bats on the peninsula, although it may not be so abundant as the closely related species *C. brevicauda*. We shot or netted *C. perspicillata* in or near caves and cenotes. Other species of bats found in close association with *perspicillata* included: *Pteronotus parnellii*, *Lonchorhina aurita*, *Mimon cozumelae*, *Artibeus jamaicensis*, *Artibeus phaeotis*, *Desmodus rotundus*, *Diphylla ecaudata*, *Natalus stramineus*, and *Myotis keaysi*. The two species of *Carollia* known from the peninsula have been taken several times at the same locality, and on at least one occasion both were captured in the same mist net (near a cenote, 4 km. WSW Puerto Juárez).

A single embryo was found in each of two females taken on 31 May at Dzibalchén (both embryos measured 4). Each of five females captured in the period 28 to 31 July near Pueblo Nuevo X-Can carried an embryo (range, 15-22), and a female taken 2 km. N Felipe Carrillo Puerto on 16 August also contained one embryo (27). An immature male (weight, 14.0, phalangeal epiphyses unfused) was obtained on 30 July, whereas an adult taken on 18 April had testes that measured 6.5.

Individuals of *C. perspicillata* from the Yucatán Peninsula are distinctly larger than are those of *C. brevicauda*. Average and extreme selected measurements of 10 adult *perspicillata* and 20 adult *brevicauda* are, respectively: total length, 74.4 (68-83), 62.5 (55-69); length of forearm (dry), 44.3 (42.8-45.4), 39.4 (38.3-41.0); greatest length of skull (exclusive of incisors), 23.6 (23.0-24.1), 21.7 (21.1-22.4); length of maxillary toothrow, 8.0 (7.8-8.2), 7.0 (6.8-7.4). Six adult *perspicillata* (four males, two nonpregnant females) averaged 22.7 (20.4-28.5) grams, whereas 20 adult *brevicauda* (14 males, six nonpregnant females) weighed an averaged of 14.9 (11.5-18.5).

***Sturnira lilium parvidens* Goldman, 1917**

## Yellow-shouldered Bat

*Specimens examined* (16). — CAMPECHE: 7 km. N, 51 km. E Escárcega, 1; 7½ km. W Escárcega, 65 m., 1; 105 km. E Escárcega, 1; 103 km. SE Escárcega, 8; La Tuxpeña, 1 (USNM); Isla del Carmen, 1 km. SW Puerto Réal, 3 m., 1. QUINTANA ROO: 27 km. NW Chetumal, 1; 4 km. NNE Felipe Carrillo Puerto, 30 m., 1. YUCATAN: "northern Yucatan," 1 (BM).

The yellow-shouldered bat appears to be limited on the Yucatán Peninsula primarily to the tall forests of Campeche and Quintana Roo, although Alston (1879-82:208) reported a specimen (listed above) of this species as captured by Gaumer in "northern Yucatan." Our specimens were collected in mist nets set across old logging roads or forest paths. Other species netted along with *S. lilium* included *Pteronotus parnellii*, *Glossophaga soricina*, *Carollia perspicillata*, *Artibeus lituratus*, *Artibeus phaeotis*, and *Centurio senex*.

*Sturnira lilium* probably breeds throughout the year. Five females collected in the dry season (10-16 January) from 103 km. SSE Escárcega, each carried an embryo (range, 7-11). Additionally, pregnant females were taken during the wet season on 8 July on Isla del Carmen (one embryo, 33) and on 16 August at a place 4 km. NNE Felipe Carrillo Puerto (one embryo, 27). Three adult males collected on 10 January all had testes that measured 4, whereas those of one taken on 15 February measured 5.5.

Concerning an individual from La Tuxpeña, Goldman (1917:116) remarked: "The skull of the specimen appears abnormally small (greatest length 20.1) for a form of *S. lilium* and may represent that of a distinct species." When compared with three males and five females from our material, the bat mentioned by Goldman falls near the mean of greatest length of skull, 20.6 (19.9-21.2), and our specimens average only slightly smaller than do individuals of *S. l. parvidens* from adjacent Chiapas and Guatemala.

***Vampyressa pusilla* (Wagner, 1843)**

## Little Yellow-eared Bat

*Specimen examined* (1). — CAMPECHE: 65 km. S, 128 km. E Escárcega, 1.

Goodwin (1963:14) recorded the distribution of *Vampyressa pusilla* as extending northward in Central America to southeastern Costa Rica. Later, Davis *et al.* (1964:384), Starrett and de la Torre (1964:60), and Peterson (1968:14) extended the known northern limits of this species through Nicaragua and British Honduras to central Chiapas, México. Our specimen extends the range farther

northeastward onto the Yucatán Peninsula. A female, it carried one embryo measuring 16 when captured on 28 February.

We follow Handley (1966:767) in regarding *Vampyressa pusilla* as a monotypic species. The following selected measurements of our female from Campeche, when compared with those reported for other Middle American specimens (see citations above), indicate slight variation throughout the region: total length, 47; length of hind foot, 10; length of ear, 15; length of forearm, 31.0; weight, 10 grams; greatest length of skull, 18.5; zygomatic breadth, 10.8; mastoid breadth, 9.3; length of maxillary toothrow, 6.0.

***Chiroderma villosum jesupi* J. A. Allen, 1900**  
Hairy White-line Bat

*Specimen examined* (1). — CAMPECHE: 103 km. SE Escárcega, 1.

Our one specimen barely extends the known distribution of *Chiroderma villosum* onto the Yucatán Peninsula, but the species likely will be found in other forested parts of the region. This bat, an adult male (testes, 4), was caught in a mist net set across a road through mature forest and near an "aguada" on 13 January 1963, in company with *Pteronotus parnellii*, *Carollia brevicauda*, *Sturnira lilium*, *Artibeus jamaicensis*, and *Desmodus rotundus*.

***Artibeus jamaicensis yucatanicus* J. A. Allen, 1904**  
Jamaican Fruit-eating Bat

*Specimens examined* (196). — CAMPECHE: Apazote, 6 (USNM); 5 km. S Champotón, 10 m., 2; 46 km. S Champotón, 2; Ciudad del Carmen, Isla del Carmen, 10; 7-7½ km. W Escárcega, 65 m., 9; 42 km. E Escárcega, 1; 65 km. S, 128 km. E Escárcega, 1; 103 km. SE Escárcega, 1; 2 km. NE Hopelchén, 2; 1 km. SW Puerto Réal, 3 m., Isla del Carmen, 17. QUINTANA ROO: N end Isla Mujeres, 13; Pueblo Nuevo X-Can, 10 m., 2; 1½ km. S, 6 km. E Pueblo Nuevo X-Can, 8; 1½ km. S, 7 km. E Pueblo Nuevo X-Can, 3; 2 km. S Pueblo Nuevo X-Can, 10 m., 11; 4 km. WSW Puerto Juárez, 5 m., 12; 3½-4 km. N San Miguel, Isla Cozumel, 18; "Island of Cozumel," 2 (1 BM). YUCATAN: Chichén-Itzá, 4 (1 AMNH, 3 USNM); 2 km. E Chichén-Itzá, 2; Gruta de Balankanche, 5 km. E Chichén-Itzá, 10; 2 km. N Hunucmá, 3 (UM); Izamal, 4 (USNM); Mérida, 14 (13 TTU, 1 USNM); Oxkutzcab, 1 (USNM); Pisté, 10 m., 25; Progreso, 8 (USNM); Sisal, 2 (UM); Uxmal, 2 (UM); no specific locality, 1 (BM).

*Additional records*. — CAMPECHE: Campeche (Villa-R., 1967:300); Matamoros (Handley, 1965:300). YUCATAN: Actun Coyok, Oxkutzcab (Hatt, 1938:335); Calcehtok (Hatt and Villa-R., 1950:230); Chochoha (Ingles, 1959:383); Cueva Oxkintok (Davis, 1970b:118); Ebizt Cave, Loltun Cave, Puz Cave, and San Roque Road, all near Oxkutzcab (Pearse and Kellogg, 1938:302); Kaua Cave, Kaua (Pearse and Kellogg, 1938:302); Chakxix Cave, Cinco de Mayo Cave, and Sabacha, all near Tekax (Pearse and Kellogg, 1938:302); Tekom (Hershkovitz,

1951:556); Yokat (Handley, 1965:300). In addition, Hatt *et al.* (1953:61) encountered the remains of this species in all but two caves excavated by them.

*Artibeus jamaicensis yucatanicus* occurs throughout the Yucatán Peninsula and is one of the most abundant bats in the region. Most of our specimens were caught in mist nets or found roosting in caves, cenotes, or buildings.

The majority of our material was collected in the months of July and August. Females taken in July were in terminal stages of pregnancy, lactating, or not reproductively active. Most embryos ranged in crown-rump length from 36 to 53, but several were in the range of 7 to 23. Also present in our July sample are several newborn young with the umbilical cord attached; these are nearly naked (only sparse, "fuzzy" pelage dorsally) and have forearms ranging from 24.4 to 29.3 in length. Several August-taken females were lactating. In addition, one female taken on 4 February carried an embryo measuring 24, one taken on 3 April had an embryo 48 in crown-rump length, and a lactating animal was caught on 15 May. These data suggest year-round breeding of *Artibeus jamaicensis yucatanicus* on the Yucatán Peninsula. Testes of individual males taken on 13 January, 8 July, and 10 August measured 8, 9, and 10, respectively.

***Artibeus lituratus palmarum* J. A. Allen and Chapman, 1897**  
Big Fruit-eating Bat

*Specimens examined* (22). — CAMPECHE: Apazote, 1 (USNM); 5 km. S Champotón, 10 m., 2; 7 km. N, 51 km. E Escárcega, 1; 12 km. W Escárcega, 1; 7½ km. W Escárcega, 65 m., 2; 105 km. E Escárcega, 3; 18 km. S, 65 km. E Escárcega, 2; 65 km. S, 128 km. E Escárcega, 1; 103 km. SE Escárcega, 2; La Tuxpeña, 1 (USNM). QUINTANA ROO: "Island of Cozumel," 1; 60 km. N, 16 km. E Chetumal, 1; 27 km. NW Chetumal, 1; 4 km. NNE Felipe Carrillo Puerto, 30 m., 1; 3½ km. N San Miguel, Isla Cozumel, 1. YUCATAN: Pisté, 10 m., 1.

*Additional records*. — YUCATAN: Mérida (Villa-R., 1967:303); Ruinas de Uxmal (Villa-R., 1967:303); Tekom (Hershkovitz, 1951:557).

The big fruit-eating bat is not so abundant on the peninsula as is *Artibeus jamaicensis*. However, both species frequently were captured together in mist nets set across forest roads. Embryos from pregnant females had crown-rump lengths as follows: two taken on 14 January measured 10 and 12; one obtained on 15 February measured 28; two collected on 14 and 15 April were 27 and 44; and one taken on 14 July measured 40. Two males taken in mid-August both had testes that measured 6.

**Artibeus phaeotis phaeotis** (Miller, 1902)  
Dwarf Fruit-eating Bat

*Specimens examined* (73). — CAMPECHE: Champotón, 1; 5 km. S Champotón, 10 m., 2; 7 km. N, 51 km. E Escárcega, 3; 1 km. N, 13 km. W Escárcega, 3; 12 km. W Escárcega, 1; 7½ km. W Escárcega, 65 m., 4; 105 km. E Escárcega, 20; 18 km. S, 65 km. E Escárcega, 2; 65 km. S, 128 km. E Escárcega, 13; 103 km. SE Escárcega, 10; La Tuxpeña, 1 (USNM). QUINTANA ROO: 60 km. N, 16 km. E Chetumal, 2; 27 km. NW Chetumal, 2; 83 km. W Chetumal, 1; 81 km. W Chetumal, 2; 4 km. WSW Puerto Juárez, 5 m., 2; 3½ and 4 km. N San Miguel, Isla Cozumel, 3. YUCATAN: Chichén-Itzá, 1 (USNM).

*Additional record*. — YUCATAN: 10 mi. W Progreso (Davis, 1970a:398).

Although this small fruit-eating bat is widespread on the peninsula, it is uncommon except in quasi rainforest. This species was netted on many occasions along with *Artibeus jamaicensis* and *A. lituratus* in forested situations near and over water.

A female taken 103 km. SE Escárcega on 14 January and another captured 18 km. S and 65 km. E Escárcega on 18 January each carried a single embryo that measured 4. Four females from 105 km. E Escárcega, collected on 25 February, had single embryos ranging from 6 to 18 in crown-rump length; another taken at the same time and place was nongravid, but had a recent placental scar. Three females from 65 km. S and 128 km. E Escárcega, taken between 26 and 28 February, carried embryos ranging from 7 to 16; a female at this locality, netted on 1 March, had a placental scar and was lactating. An embryo (11) was found in a female captured on 7 March at 81 km. W Chetumal. Females are poorly represented in our summer-taken sample, and few at hand were gravid. Two taken on 10 and 11 August on Isla Cozumel carried embryos measuring 23 and 25, respectively.

Sixteen males collected between 20 December and 28 February had testes that averaged 4.7 (3-6) in length; testes of one taken on 5 April measured 5.

**Centurio senex senex** Gray, 1842  
Wrinkle-faced Bat

*Specimens examined* (9). — CAMPECHE: 5 km. S Champotón, 10 m., 4; 103 km. SE Escárcega, 1; 65 km. S, 128 km. E Escárcega, 1; La Tuxpeña, 1 (USNM). QUINTANA ROO: Cozumel Island, 2.

Excepting two specimens (KU 1669-70) collected by G. F. Gaumer and alleged to be from Cozumel Island (Jones and Lawlor, 1965:417), *Centurio senex* has been recorded from the Yucatán Peninsula only by Paradiso (1967:600). All of our specimens were netted in quasi-rainforest, and we suspect the species is restricted to this habitat in the more mesic areas of the peninsula.

Of three females in our sample, one carried a single embryo (15) on 24 February, another taken on 9 July had one embryo that measured 4, and a nonpregnant individual was netted on 16 January.

### ***Desmodus rotundus murinus* Wagner, 1840**

#### **Vampire Bat**

*Specimens examined* (81). — CAMPECHE: 1 mi. SW Bolonchenticul, 4; Campeche, 4 (USNM); 46 km. S Champotón, 2; Dzibalchén, 1; 103 km. SE Escárcega, 2. QUINTANA ROO: 27 km. NW Chetumal, 2; 2 km. N Felipe Carrillo Puerto, 30 m., 9; 1½ km. S, 1 km. E Pueblo Nuevo X-Can, 10 m., 6. YUCATAN: Chichén-Itzá, 10 m., 8; Xtoloc Cenote Cave, Chichén-Itzá, 1 (USNM); Gruta de Balankanche, 5 km. E Chichén-Itzá, 13; Hda. Santa Rosa, 1 (UM); Hochtun Cave, Hochtun, 1 (USNM); Izamal, 1 (USNM); 10 km. NE Mérida, 5; Mérida, 12 (1 UM, 11 USNM); San Buhla Cave, Motul, 1 (USNM); Hda. Oxkintok, 1 (UM); 3 km. N Pisté, 2; 6 km. N Tizimín, 3; Tizimín, 1 (USNM); Cenote de Santa Ana, Valladolid, 1 (UM).

*Additional records*. — YUCATAN: Calcehtok (Hatt, 1938:335); Loltun, 5 km. SW Oxkutzcab (Hatt *et al.*, 1953:61); Tekom (Hershkovitz, 1951:557).

The vampire bat is a common inhabitant of caves and cenotes on the Yucatán Peninsula (see accounts of *Chrotopterus auritus* and *Lonchorhina aurita*). Additionally, *Desmodus* was captured along with six other species of bats at Gruta de Balankanche. In this cave, adult vampires with young were isolated from other species in side passageways.

Pregnant females and dates captured (size of embryos) were as follows: 13 January (18); 4 February (19); two on 23 March (20 and 30); four in April (6, 25, 24, and 35); 4 June (38); 29 July (38). Lactating females were collected in April, July, and August, and juveniles were obtained in the latter two months. An adult male taken on 5 April had testes that measured 6.

### ***Diphylla ecaudata centralis* Thomas 1903**

#### **Hairy-legged Vampire Bat**

*Specimens examined* (7). — CAMPECHE: La Tuxpeña, 1 (USNM); Dzibalchén, 1. QUINTANA ROO: 2 km. N Felipe Carrillo Puerto, 30 m., 1; 1½ km. S, 1 km. E Pueblo Nuevo X-Can, 10 m., 1. YUCATAN: Hda. Santa Rosa, 1 (UM); Oxolodt Cave, Kaua, 1 (USNM); 13 km. W Peto, 1; 10 km. NE Mérida, 1.

*Additional record*. — YUCATAN: Yokat (Hatt, 1938:335).

This species was found in caves or cavernous cenotes, frequently in association with the more abundant *Desmodus rotundus*. All of our specimens are males; two April-taken individuals had testes that measured 5.5 and 4.0, whereas one obtained on 16 August had testes that measured 5.0.

We follow Ojasti and Linares (1971) in the use of the subspecific name *centralis*. Burt and Stirton (1961) regarded *D. ecaudata* as monotypic.

#### Family NATALIDAE

### **Natalus stramineus saturatus** Dalquest and Hall, 1949

#### Funnel-eared Bat

*Specimens examined* (102).—CAMPECHE: Apazote, 1 (USNM); 46 km. S Champotón, 2; La Tuxpeña, 3 (USNM). QUINTANA ROO: 2 km. N Felipe Carrillo Puerto, 30 m., 2; San Miguel, Cozumel Island, 32 (USNM). YUCATAN: Chichén-Itzá, 1 (USNM); Gruta de Balankanche, 5 km. E Chichén-Itzá, 60 (4 USNM); Hochtun Cave, Hochtun, 1 (USNM).

*Additional record*.—YUCATAN: Muruztun Cave, Tizimín (Pearse and Kellogg, 1938:303).

Funnel-eared bats typically inhabit caves on the peninsula, and all those for which we have collection data came from such situations. On 23 July 1962, at Gruta de Balankanche, for example, many individuals of this species were found roosting singly in pockets and crevices on walls and ceiling; six other species of bats were taken at the same cave (see accounts of *Pteronotus parnellii* and *Glossophaga soricina*). Aside from several of the females from Gruta de Balankanche that had placental scars, we have no information on reproductive activity.

#### Family VESPERTILIONIDAE

### **Myotis elegans** Hall, 1962

#### Elegant Myotis

*Specimen examined* (1).—CAMPECHE: 65 km. S, 128 km. E Escárcega, 1.

Our one specimen, a female, of this poorly-known species was taken from a hole in a rock cliff near Laguna Alvarado on 26 February 1963. This bat was pregnant, carrying a single embryo that measured 3. The area around Laguna Alvarado, but 10 kilometers north of the Guatemalan border, supports dense quasi rainforest.

External and cranial measurements of the female are: total length, 76; length of tail, 30; length of hind foot, 8; length of ear, 11; length of forearm, 32.9; greatest length of skull, 12.6; condylobasal length, 12.0; zygomatic breadth, 8.0; breadth of braincase, 6.3; postorbital breadth, 3.3; length of maxillary toothrow, 4.7. Comparative measurements for a female from Nicaragua and the female holotype from Veracruz were given by Jones *et al.* (1971).

**Myotis keaysi pilosatibialis** LaVal, 1973

## Keays' Myotis

*Specimens examined* (116). — CAMPECHE: 65 km. S, 128 km. E Escárcega, 1; La Tuxpeña, 1 (USNM). QUINTANA ROO: San Miguel, Cozumel Island, 5 (USNM); 2 km. N Felipe Carrillo Puerto, 30 m., 75; Pueblo Nuevo X-Can, 10 m., 3; 1½ km. S, 1 km. E Pueblo Nuevo X-Can, 10 m., 3; 1½ km. S, 7 km. E Pueblo Nuevo X-Can, 5. YUCATAN: Gruta de Balankanche, 5 km. E Chichén-Itzá, 6; Cenote de Hunucmá, 13 (UM); Izamal, 2 (USNM); 13 km. W Peto, 1; Cinco de Mayo Cave, Tekax, 1 (USNM).

*Additional records.* — YUCATAN: Yokat (Hatt, 1938:335); no specific locality (Miller and Allen, 1928:182).

This small myotis is one of the most abundant cave-dwelling bats in the peninsular region. Most of our specimens were taken in caves or cavernous cenotes, but some came from buildings. Often, the population of *keaysi* in an individual cave exceeded that of all other bats combined. See accounts of *Peropteryx macrotus*, *Pteronotus parnellii*, *Lonchorhina aurita*, and *Molossus ater* for additional information on this species.

The majority of our July and August-taken specimens are in fresh blackish pelage or molting from a worn reddish brown pelage. Although there evidently is considerable individual variation, the progression of molt generally follows that illustrated by Constantine (1957: 464) for *Myotis velifer incautus*. The dorsum appears to molt first, judging from the presence of small patches of old hair on the venter of individuals otherwise in fresh pelage. A July-taken female evidenced no reproductive activity, nor did 46 females taken near Felipe Carrillo Puerto on 16 August.

**Eptesicus furinalis gaumeri** (J. A. Allen, 1897)

## Tropical Brown Bat

*Specimens examined* (2). — QUINTANA ROO: Pueblo Nuevo X-Can, 10 m., 1. YUCATAN: Pisté, 10 m., 1.

*Additional records.* — CAMPECHE: Balchacaj, Laguna de Terminos (Davis, 1965:234). YUCATAN: Actun Spukil, 4½ km. SSW Calcehtok (Hatt *et al.*, 1953: 61); Izamal (J. A. Allen, 1897:231-232); no specific locality (Davis, 1965:234).

With the exception of the remains from a cave deposit at Actun Spukil, only six preserved specimens of *Eptesicus furinalis* are known from the Yucatán Peninsula. The specimen from Pisté was taken on 20 July 1962 in a mist net set over the entrance of a cenote along with *Glossophaga soricina* and *Artibeus jamaicensis*; another was obtained nine days later from a villager in Pueblo Nuevo X-Can. Both of our specimens are males in fresh pelage.

**Lasiurus borealis teliotis** (H. Allen, 1891)

## Red Bat

*Specimen examined* (1). — QUINTANA ROO: "Island of Cozumel," 1.

*Additional record*. — YUCATAN: Ebizt Cave, Oxkutzcab (Pearse and Kellogg, 1938:303).

The red bat evidently is uncommon on the peninsula. Our one specimen, collected by G. F. Gaumer, bears only "Island of Cozumel, Yucatan," on the museum label.

Southern México, including the Yucatán Peninsula, may well represent the zone of intergradation between the subspecies *frantzii* and the more northern *teliotis*. Carter *et al.* (1966:496) identified three specimens from central and southwestern Chiapas as *frantzii*. We, however, assign our unsexed adult to *teliotis* because it agrees generally in color with comparative material from Nuevo León, and the forearm (42.8) falls within limits of measurements of *teliotis* presented by Handley (1960:470). Handley recorded the range in length of forearm for both sexes of *frantzii* as from 38.3 to 40.6.

**Lasiurus ega xanthinus** (Thomas, 1897)

## Southern Yellow Bat

*Specimen examined* (1). — YUCATAN: Yaxcach, 1 (USNM).

*Additional records*. — CAMPECHE: Xpuhil (= Xpujil) (Alvarez and Ramírez-Puledo, 1972:174). QUINTANA ROO: Puerto Morelos (Ingles, 1959:384). YUCATAN: Ebizt Cave, Oxkutzcab (Pearse and Kellogg, 1938:303); Xocneceh, 8 km. SSE Ticul, 25 m. (Villa-R., 1967:413).

This bat seemingly is rare on the peninsula. Aside from a skull found in Ebizt Cave, only four preserved specimens are known.

Villa-R. (1967:415) encountered about 15 individuals roosting under the eaves of the straw roof of a Mayan's home, apparently undisturbed by smoke from the kitchen hearth; only one individual was captured from this group.

**Lasiurus intermedius intermedius** H. Allen, 1862

## Big Yellow Bat

*Specimens examined* (6). — YUCATAN: Izamal, 5 (USNM); Tekom, 1 (FM).

*Additional record*. — YUCATAN: Yaxcach (Hall and Jones, 1961:84).

Little is known concerning the status of this yellow bat on the Yucatán Peninsula. Only three stations of occurrence have been recorded.

**Rhogeessa parvula aeneus** Goodwin, 1958

## Little Yellow Bat

*Specimens examined* (18).—CAMPECHE: La Tuxpeña, 1 (USNM); 5 km. S Champotón, 10 m., 3; 65 km. S, 128 km. E Escárcega, 1; 1 km. S Puerto Réal, 3 m., Isla del Carmen, 1. QUINTANA ROO: 4 km. N San Miguel, Cozumel Island, 2; 4 km. NNE Felipe Carrillo Puerto, 30 m., 1; Pueblo Nuevo X-Can, 10 m., 2; 4 km. WSW Puerto Juárez, 5 m., 1. YUCATAN: Pisté, 10 m., 2; 13 km. WSW Sisal, 2; "N. Yucatan," 2 (BM).

*Additional records*.—YUCATAN: Chichén-Itzá (Goodwin, 1958:7); Tekom (Hershkovitz, 1951:558).

Judging from our experience, the little yellow bat is widely distributed but uncommon on the Yucatán Peninsula. However, our assessment of abundance may reflect the fact that these bats, as well as some other fast-flying insectivorous species, are not readily captured in mist nets. Most of our specimens were netted or shot as they foraged near cenotes or in forest clearings.

The little yellow bat was known previously only from three localities on the peninsula—two in Yucatán and one in northern Campeche. Goodwin (1958:6-7) described the peninsular population as a subspecies of *R. parvula* characterized as being small and reddish brown, with a small skull, relatively large braincase, and broad rostrum. Our material from the northern part of the peninsula agrees with Goodwin's description, but the specimens examined from Campeche and Quintana Roo average slightly larger in cranial dimensions.

We have compared our Yucatán material with specimens of *parvula* and *tumida* as conceived by Goodwin (1958). We are not entirely convinced by his arguments concerning the validity of two species as opposed to one highly variable species, or, if two species are recognized, to which specimens from the peninsula are assignable. We are convinced that the entire peninsular population is referable to a single taxon for which the name *R. p. aeneus* is presently available.

## Family MOLOSSIDAE

**Tadarida laticaudata yucatanica** (Miller, 1902)

## Broad-tailed Bat

*Specimens examined* (98).—CAMPECHE: 7 km. N, 51 km. E Escárcega, 1; San José Carpizo, 49 km. S Campeche, 1 (UM). QUINTANA ROO: Cozumel Island, 1 (BM). YUCATAN: Chichén-Itzá, 11 (USNM); Mérida, 9 (5 TTU, 4 UM); 66 km. NE Mérida, 27; 13 km. W Peto, 2; 6 km. N Tizimín, 3; Uxmal, 43 (18 UM); "N. Yucatan," 1 (BM).

*Additional record*.—YUCATAN: Loltun, 5 km. SW Oxkutzcab (Hatt *et al.*, 1953:61).

This free-tailed bat occurs throughout the peninsula but appears to be most abundant in the northern part where it frequents man-made structures. The species is the most conspicuous bat associated with Mayan ruins, at Chichén-Itzá and Uxmal, for example. Average (and extreme) measurements of eight males and 20 females from the state of Yucatán additional to those reported by Jones and Alvarez (1962) are, respectively: total length, 99.8 (94-108), 99.3 (90.5-108); length of hind foot, 11.0 (10-12), 10.3 (8-11); length of forearm (dry), 43.8 (42.6-44.8), 42.9 (41.9-44.7); greatest length of skull (exclusive of incisors), 17.8 (17.3-18.3), 17.5 (17.0-18.1); zygomatic breadth, 10.3 (10.1-10.5), 10.1 (9.8-10.4); length of maxillary tooththrow, 6.4 (6.1-6.6), 6.2 (6.1-6.4).

Fifteen of 16 females collected in April 1963 were pregnant; each contained a single embryo (average crown-rump length, 9.2, range, 5-12). One taken on 15 May carried an embryo that measured 2. Many females collected in August were lactating. A nonpregnant female was captured on 28 December.

**Molossus ater nigricans** Miller, 1902  
Black Mastiff Bat

*Specimens examined* (104).—QUINTANA ROO: Cozumel Island, 2; Felipe Carrillo Puerto, 30 m., 10; Pueblo Nuevo X-Can, 10 m., 2. YUCATAN: Hda. Calcehtok, 10 m., 1 (UM); Chichén-Itzá, 10 m., 6 (USNM); Mérida, 11 (TTU); 3 km. N, 9 km. E Mérida, 4; Oxkutzcab, 1 (USNM); 13 km. W Peto, 14; Opichen, near Hda. Calcehtok, 10 m., 1 (UM); Pisté, 10 m., 13; Sisal, 1 (UM); 6 km. N Tizimín, 32; Valladolid, 5 (1 TTU, 4 UM); Yaxcach, 1 (USNM).

*Additional record*.—YUCATAN: Peto (Villa-R., 1955:1).

This species commonly roosts in Mayan ruins and in older buildings—in attics and walls, under corrugated tin roofs, and in eaves. In an old sugar mill near Peto, *M. ater* was found along with *Glossophaga soricina*, *Myotis keaysi*, and *Tadarida laticaudata*.

Pregnant females have been taken in the months of April, May, July, and August. Of 33 females taken in mid- and late April 1963, three were lactating and 29 were pregnant, each with a single embryo (16-38, average 28.8). Of six taken in April 1971, however, only one (4 April, embryo 6 in crown-rump length) was definitely gravid (J. B. Bowles, personal communications).

The specific name *ater* is applied to this bat for the reasons stated by Goodwin (1960). *Cynomops malagai*, described from the Yucatán Peninsula by Villa-R. (1955:1-6), is placed in synonymy of *M. a. nigricans* following Jones (1965:93).

**Molossus bondae** J. A. Allen, 1904

## Bonda Mastiff Bat

In a recent paper, Alvarez and Ramírez-Pulido (1972) listed a female of this species, the only individual thus far reported from México, from 6 km. NE San Miguel, Isla Cozumel. We have not had the opportunity to examine this specimen, and thus tentatively admit the record here.

**Molossus sinaloae sinaloae** J. A. Allen, 1906

## Allen's Mastiff Bat

*Specimens examined* (37).— YUCATAN: Hda. Calcehtok, 10 m., 2 (UM); Mérida, 32 (26 TTU, 6 UM); 66 km. NE Mérida, 1; Yaxcach, 2 (USNM).

*Additional record*.— YUCATAN: Peto (Villa-R., 1955:6).

Seemingly, this mastiff bat is less common on the peninsula than is its larger relative, *M. ater*. A male from 66 km. NE Mérida was trapped in a mist net placed over an opening in the wall of a church, whereas a series from Mérida was netted in March, April, and May 1971 over the swimming pool of the Colegio Peninsular. Many females in the latter series were pregnant (Bowles, 1973); the earliest gravid individual was taken on 18 March (embryo 3 in crown-rump length) and the latest on 15 May (19).

**Eumops glaucinus** (Wagner, 1843)

## Wagner's Mastiff Bat

*Specimens examined* (2).— YUCATAN: Hda. Calcehtok, 10 m., 1 (UM); "N. Yucatan," 1 (BM).

*Additional record*.— YUCATAN: no specific locality (Sanborn, 1932:353).

Little is known of the status of Wagner's mastiff bat on the peninsula. Selected measurements of a male from Hda. Calcehtok are: total length, 140; length of tail, 51; length of hind foot, 12; length of ear, 26; greatest length of skull, 24.4; zygomatic breadth, 14.7; postorbital constriction, 4.8; mastoid breadth, 13.0; breadth of rostrum, 8.1; length of maxillary toothrow, 8.4. Those of an unsexed adult from "N. Yucatan" are: length of forearm, 59.3; greatest length of skull, 23.7; zygomatic breadth, 14.0; postorbital constriction, 4.8; mastoid breadth, 12.6; length of maxillary toothrow, 9.0.

**Eumops auripendulus oaxacensis** Goodwin, 1956

## Shaw's Mastiff Bat

*Specimen examined* (1).— QUINTANA ROO: 10 mi. E Yucatán-Quintana Roo border on road from Valladolid to Puerto Morelos, 1 (UM).

The above-listed individual, a young female, was shot in late evening as it flew over a road through dense forest (Ingles, 1959:385). It is easily distinguished from *Eumops glaucinus* by its narrow braincase, palate, and interorbital region.

External measurements of the one known specimen from the peninsula are: total length, 131; length of tail, 41; length of hind foot, 10; length of ear, 20 (Villa-R., 1956:543). Other measurements (taken by Jones) are: length of forearm, 54.5; greatest length of skull, 23.8; postorbital constriction, 4.3; mastoid breadth, 12.0; breadth of rostrum, 7.7; length of maxillary toothrow, 8.4. This same specimen was reported as *Eumops maurus* by Villa-R. (1956:543, 1967:451) owing to the fact that it lacks the minute upper premolar normally present in specimens of *auripendulus*. We tentatively follow Goodwin (1969:112) in use of the subspecific name *oaxacensis* for northern populations of this species.

### **Promops centralis centralis** Thomas, 1915

Thomas' Mastiff Bat

*Specimens examined* (3).—YUCATAN: Yaxcach, 1 (USNM); "N. Yucatan," 2 (BM).

This rare molossid is known on the Yucatán Peninsula by only four specimens, three of which (including the holotype) were collected by G. F. Gaumer and presented to the British Museum (see Thomas, 1915:62). The specimen from Yaxcach is represented only by a partially crushed skull (USNM 172076).

We follow Ojasti and Linares (1971) in regarding *P. centralis* as a polytypic species.

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