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ANNOTATED CHECKLIST OF THE BATS OF MEXICO AND CENTRAL AMERICA

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Studies of the Chiroptera, particularly Neotropical species, have been an important element of zoological inquiry in México and Central America for many years. With the increasing emphasis in the last decade or so on field-based studies involving ecology, ethology, competition, adaptive strategies, and the like of bats, we felt a synopsis of the species inhabiting Middle America, a term here used to encompass both México and Central America, would prove useful to investigators in the field. Accordingly, we offer the present annoted checklist to meet that need.

As a point of departure in preparing the checklist, we used the compendium of Hall and Kelson (1959). A host of publications dealing with Middle American bats since has appeared, including some containing descriptions of new taxa, and we have attempted to consult all the relevant literature in compiling information presented on the following pages. Systematic revisions and reviews generally are cited in accounts of the taxa to which they pertain. Inclusive faunal works issued since 1959 include Alvarez (1963) on Tamaulipas, Anderson (1972) on Chihuahua, Baker and Greer (1962) on Durango, Burt and Stirton (1961) on El Salvador, Goodwin (1969) on Oaxaca, Hall and Dalquest (1963) on Veracruz, Handley (1966) on Panamá, and Huey (1964) on Baja California.

With specific reference to bats, Villa-R. (1967) summarized material known to that time for the whole of México. Subsequent papers on chiropterans treating major geographic units in that country are those on Jalisco (Watkins *et al.*, 1972), Sinaloa (Jones *et al.*, 1972), the Yucatán Peninsula (Jones *et al.*, 1973; Birney *et al.*, 1974), and

Zacatecas (Genoways and Jones, 1968; Matson and Patton, 1975). Numerous publications of lesser scope have appeared of which Alvarez and Ramírez-Pulido (1972) on new Mexican records, Jiménez (1968) on specimens from Nuevo León, and Jones *et al.* (1971*a*) on *Myotis* in western México are examples.

Likewise, many publications dealing with bats in Central America have appeared since 1959. Those covering Guatemala (Jones, 1966), Nicaragua (Jones *et al.*, 1971*b*; Baker and Jones, 1975), and Costa Rica (Starrett and Casebeer, 1968; Armstrong, 1969; Gardner *et al.*, 1970; Starrett, 1976; LaVal, 1977) are of note as well as the contributions of Davis *et al.* (1964), Carter *et al.* (1966), LaVal (1969), and Valdez and LaVal (1971), which deal with records from more than one country in the region. Recourse to literature that we have cited as well as to citations appearing in a checklist of species of the family Phyllostomatidae by Jones and Carter (1976) will lead the reader to the principal published sources used in preparing this compilation; to have listed all sources consulted would have increased the entries of cited publications threefold or more.

In the accounts that follow, families, subfamilies, and genera are entered in generally accepted phylogenetic sequence, but species of each genus are listed alphabetically. Subgeneric distinctions are not employed, but mention of subgeneric assignment is made where deemed appropriate. For each species, the information on distribution applies specifically to México and Central America but indication is given as to whether the species also occurs northward into the United States or into South America, or both. Many Neotropical taxa occur northward dendritically in suitable habitats in the lowlands of eastern and western México, a few even reaching the southernmost United States, and we have assumed an understanding of this situation on the part of the reader.

Subspecies of polytypic species listed under systematic comments are only those that occur in Middle America. Occasionally, because an encompassing statement linking the distribution of a Middle American species to populations of the same species occurring in more northerly parts of North America or in South America would have been awkward, we have utilized statements of distribution of subspecies in the systematic comments to accomplish the same aim.

We are grateful to several colleagues for comments on early drafts of this checklist. Special mention should be made of the contributions of R. J. Baker, M. A. Bogan, A. L. Gardner, H. H. Genoways, K. F. Koopman, and D. E. Wilson.

Family Emballonuridae

Subfamily Emballonurinae

Rhynchonycteris naso (Wied-Neuwied, 1820)

Distribution.—Oaxaca, Veracruz, and the southern part of the Yucatán Peninsula southeastward into South America.

Systematics.—*R. naso* currently is regarded as a monotypic species.

Saccopteryx bilineata (Temminck, 1838)

Distribution.—Western (Jalisco) and eastern (Veracruz) México southeastward into South America.

Systematics.—Many authors have regarded *S. bilineata* as a monotypic species. However, Alvarez (1968) recognized *S. b. centralis* as applicable to Mexican and at least some Central American populations.

Saccopteryx leptura (Schreber, 1774)

Distribution.—Chiapas southeastward into South America.

Systematics.—*S. leptura* is a monotypic species.

Cormura brevirostris (Wagner, 1843)

Distribution.—Nicaragua southeastward into South America.

Systematics.—*C. brevirostris* is a monotypic species.

Peropteryx kappleri Peters, 1867

Distribution.—Southern Veracruz southeastward into South America.

Systematics.—Middle American specimens are assignable to the nominate subspecies.

Peropteryx macrotis (Wagner, 1843)

Distribution.—Southern México (Oaxaca, Veracruz) southeastward into South America.

Systematics.—*P. m. macrotis* is the subspecific name applied to Middle American populations.

Centronycteris maximiliani (Fischer, 1829)

Distribution.—Southern Veracruz southeastward (excluding the Yucatán Peninsula and much of western Central America) into South America.

Systematics.—*C. m. centralis* is the subspecies in Middle America.

Balantiopteryx io Thomas, 1904

Distribution.—Known only from Oaxaca and Veracruz eastward to Guatemala.

Systematics.—*B. io* is a monotypic species.

Balantiopteryx plicata Peters, 1867

Distribution.—Western (Baja California, Sonora) and eastern (San Luis Potosí) México southeastward to western Costa Rica.

Systematics.—Two subspecies are recognized, *pallida* in southern Baja California, southern Sonora, and adjacent Chihuahua and northern Sinaloa, and *plicata* throughout the remaining distribution of the species.

Subfamily Diclidurinae

Diclidurus virgo Thomas, 1903

Distribution.—Known from scattered localities from Nayarit, Oaxaca, and Veracruz southeastward at least to Panamá and possibly into South America (see Ojasti and Linares, 1971).

Systematics.—*D. virgo* currently is regarded as a monotypic species, but its relationship to the South American *D. albus* is poorly understood.

Cyttarops alecto Thomas, 1913

Distribution.—This rare bat is known in Middle America only from Costa Rica and Nicaragua, but occurs also in South America.

Systematics.—*C. alecto* is a monotypic species.

Family Noctilionidae

Noctilio albiventris Desmarest, 1818

Distribution.—Honduras southeastward into South America.

Systematics.—The subspecies in Middle America is *N. a. minor* according to Davis (1976). This species was known in the literature for many years under the name *labialis* (see Hershkovitz, 1975).

Noctilio leporinus (Linnaeus, 1758)

Distribution.—Coastal areas of western (Sinaloa) and eastern (Veracruz) México southeastward into South America.

Systematics.—The Middle American subspecies is *N. l. mastivus* (Davis, 1973).

Family Mormoopidae

Pteronotus davyi Gray, 1838

Distribution.—Western (Sonora) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—Two Middle American subspecies currently are recognized (Smith, 1972), *davyi* (Nicaragua southeastward into South America) and *fulvus* (Sonora and Tamaulipas southeastward to Honduras and El Salvador).

P. davyi and *P. gymnonotus* represent the nominate subgenus.

Pteronotus gymnonotus (Wagner, 1843)

Distribution.—Veracruz southeastward into South America.

Systematics.—Smith (1972) considered *P. gymnonotus* to be a monotypic species. The specific name *suapurensis* was applied to this species for many years (see Smith, 1977).

Pteronotus parnellii (Gray, 1843)

Distribution.—Western (Sonora) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—Following Smith (1972), three Middle American subspecies are recognized: *mexicanus* (Isthmus of Tehuantepec north to Chihuahua and Sonora in western México and to Tamaulipas in the east); *mesoamericanus* (southeast of the Isthmus of Tehuantepec on the Yucatán Peninsula and in Tabasco, Chiapas, Guatemala, El Salvador, and western Honduras southeastward in the Pacific versant to Panamá); *rubiginosus* (eastern Honduras southeastward in the Caribbean versant to Panamá).

P. parnellii is the lone representative of the subgenus *Phyllodia.*

Pteronotus personatus (Wagner, 1843)

Distribution.—Western (Sonora) and eastern (Tamaulipas) México southeastward through most of Middle America into South America.

Systematics.—Two subspecies are presently recognized (Smith,

1972), *personatus* (Nicaragua southeastward into South America) and *psilotis* (México southeastward to Honduras).

P. personatus is a representative of the subgenus *Chilonycteris*.

Mormoops megalophylla Peters, 1864

Distribution.—Most of México (including Baja California) southeastward to Honduras; also in South America (although unrecorded from Nicaragua, Costa Rica, and Panamá) and northward barely into the United States (Smith, 1972).

Systematics.—One Middle American subspecies, *megalophylla*, is recognized.

Family Phyllostomatidae

Subfamily Phyllostomatinae

Micronycteris brachyotis (Dobson, 1879)

Distribution.—Oaxaca southeastward into South America.

Systematics.—*M. brachyotis* is a monotypic species and represents the subgenus *Lampronycteris*. The specific name *platyceps*, widely used for this bat for several years, is a synonym of *brachyotis*.

Micronycteris daviesi (Hill, 1964)

Distribution.—Known in Middle America only from Costa Rica; also reported from South America.

Systematics.—*M. daviesi* is a monotypic species that represents the subgenus *Barticonycteris*, which some authors have regarded as a valid genus.

Micronycteris hirsuta (Peters, 1869)

Distribution.—Honduras southeastward into South America.

Systematics.—*M. hirsuta* is a monotypic species.

Micronycteris megalotis (Gray, 1842)

Distribution.—Western (Jalisco) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—Two subspecies occur in Middle America, *mexicana* (México south to western Nicaragua and adjacent Costa Rica and on the Corn islands) and *microtis* (eastern Nicaragua southeastward to Panamá). Handley (1976) listed *microtis* as a species distinct from *megalotis*.

Micronycteris minuta (Gervais, 1856)

Distribution.—Nicaragua southeastward into South America.

Systematics.—*M. minuta* is currently regarded as a monotypic species. Together with *hirsuta, megalotis,* and *schmidtorum* this species represents the subgenus *Micronycteris.*

Micronycteris nicefori Sanborn, 1949

Distribution.—Nicaragua southeastward into South America.

Systematics.—*M. nicefori* is a monotypic species and the only representative of the subgenus *Trinycteris.*

Micronycteris schmidtorum Sanborn, 1935

Distribution.—Yucatán Peninsula of México southeastward into South America.

Systematics.—*M. schmidtorum* is a monotypic species.

Micronycteris sylvestris (Thomas, 1896)

Distribution.—Western (Nayarit) and eastern (Veracruz) México southeastward into South America.

Systematics.—*M. sylvestris* is thought to be a monotypic species, representing the subgenus *Glyphonycteris* (regarded as a distinct genus by Handley, 1976).

Macrotus californicus Baird, 1858

Distribution.—Northwestern México (Baja California, Chihuahua, Sonora, and northern Sinaloa) northward into the United States.

Systematics.—*M. californicus* is a monotypic species. It was regarded by Anderson and Nelson (1965) as a subspecies of *M. waterhousii,* but Davis and Baker (1974) and Greenbaum and Baker (1976) recently have presented morphometric, karyotypic, and electrophoretic evidence demonstrating the specific distinctness of this bat.

Macrotus waterhousii Gray, 1843

Distribution.—Western (Sonora) and eastern (Tamaulipas) México southward to the Yucatán Peninsula and Guatemala.

Systematics.—Two subspecies are recognized on the North American mainland, *bulleri* (western and central México, including the Tres Marías islands) and *mexicanus* (southern México and adjacent Guatemala).

Lonchorhina aurita Tomes, 1863

Distribution.—Southern México (Oaxaca, Tabasco, and Quintana Roo) southeastward into South America.

Systematics.—*L. aurita* probably is a polytypic species, in which case the Middle American subspecies is *L. a. aurita.*

Macrophyllum macrophyllum (Schinz, 1821)

Distribution.—Tabasco southeastward into South America.

Systematics.—*M. macrophyllum* is a monotypic species.

Tonatia bidens (Spix, 1823)

Distribution.—Guatemala southeastward into South America.

Systematics.—*T. b. bidens* is the only Recent subspecies (*T. b. saurophila* is known only as a fossil from Jamaica).

Tonatia nicaraguae Goodwin, 1942

Distribution.—Southern México (Veracruz) southeastward into South America.

Systematics.—*T. nicaraguae* is a monotypic species (*minuta* a synonym), which may prove to be synonymous with *T. brasiliensis.*

Tonatia silvicola (D'Orbigny, 1836)

Distribution.—Southern México (Veracruz) southeastward into South America.

Systematics.—The nominate subspecies occurs in Middle America.

Mimon cozumelae Goldman, 1914

Distribution.—Southern México (Oaxaca, Veracruz, Yucatán Peninsula) southeastward into South America.

Systematics.—*M. cozumelae* is a monotypic species closely related to *M. bennettii* of South America. These two species comprise the subgenus *Mimon.*

Mimon crenulatum (É. Geoffroy St.-Hilaire, 1810)

Distribution.—Southern Yucatán Peninsula southeastward into South America.

Systematics.—The one Middle American subspecies is *M. c. keenani.* This species is in the subgenus *Anthorhina.*

Phyllostomus discolor Wagner, 1843

Distribution.—Southern México (Oaxaca, Veracruz) southeastward into South America.

Systematics.—*P. d. verrucosus* is the subspecies occurring in Middle America. However, Power and Tamsitt (1973) suggested that this species may be monotypic.

Phyllostomus hastatus (Pallas, 1767)

Distribution.—Honduras southeastward into South America.

Systematics.—The one Middle American subspecies is *P. h. panamensis.*

Phylloderma stenops Peters, 1865

Distribution.—Known in Middle America only from Chiapas, Belize, Honduras, Costa Rica, and Panamá into South America.

Systematics.—Two subspecies are recognized (Handley, 1966), *stenops* (Costa Rica and Panamá into South America) and *septentrionalis* (Chiapas to Honduras).

Trachops cirrhosus (Spix, 1823)

Distribution.—Southern México (Oaxaca, Veracruz, Yucatán Peninsula) southeastward into South America.

Systematics.—Two of the three nominal subspecies are known from Middle America, *cirrhosus* (Costa Rica southeastward) and *coffini* (México to Nicaragua).

Chrotopterus auritus (Peters, 1856)

Distribution.—Southern México (Oaxaca, Veracruz, Yucatán Peninsula) southeastward into South America.

Systematics.—The one Middle American subspecies is *C. a. auritus.* Handley (1966) doubted that geographic races should be recognized in this species.

Vampyrum spectrum (Linnaeus, 1758)

Distribution.—Southern México (Veracruz) southeastward into South America.

Systematics.—According to Husson (1962) and Handley (1966), *V. spectrum* is a monotypic species. Some recent authors, however, have continued to recognize the subspecies *nelsoni* as occurring from Colombia northwestward to México.

Subfamily Glossophaginae

Glossophaga alticola Davis, 1944

Distribution.—Central México (Guerrero, Morelos, Tlaxcala) southeastward to Costa Rica.

Systematics.—*G. alticola* is a monotypic species.

Glossophaga commissarisi Gardner, 1962

Distribution.—Western México (Sinaloa) southeastward to Panamá and undoubtedly adjacent South America.

Systematics.—*G. commissarisi* is a monotypic species as presently understood.

Glossophaga soricina (Pallas, 1766)

Distribution.—Western (Sonora) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—The one Middle American subspecies is *G. s. leachii* (*mutica* of the Tres Marías islands a synonym).

Leptonycteris nivalis (Saussure, 1860)

Distribution.—Guatemala northward through much of México, barely reaching the United States.

Systematics.—*L. nivalis* generally is regarded as a monotypic species.

Leptonycteris sanborni Hoffmeister, 1957

Distribution.—Widely distributed in México; also, southward in Central America at least to El Salvador and northward into the extreme southwestern United States. Prior to a review of *Leptonycteris* by Davis and Carter (1962), and in some cases subsequently, specimens of *sanborni* have been reported as *nivalis*, making the precise distribution of the two species difficult to delimit. Nevertheless, the two seem to be broadly sympatric throughout much of México.

Systematics.—*L. sanborni* is a monotypic species. Some recent authors have used the specific name *yerbabuenae* for this bat (see Watkins *et al.*, 1972).

Lonchophylla concava Goldman, 1914

Distribution.—Known from Costa Rica and Panamá, and from South America.

Systematics.—*L. concava* is recognized provisionally as a monotypic species distinct from *mordax*, with which it may be conspecific. Handley (1966) considered *concava* to be a northern subspecies of *mordax*, but recent authors have not followed that arrangement.

Lonchophylla robusta Miller, 1912

Distribution.—Nicaragua southeastward into South America.
Systematics.—*L. robusta* is a monotypic species.

Lonchophylla thomasi J. A. Allen, 1904

Distribution.—Known in Middle America only from Panamá.
Systematics.—*L. thomasi* is a monotypic species.

Lionycteris spurrelli Thomas, 1913

Distribution.—Known in Middle America only from Panamá.
Systematics.—*L. spurrelli* is a monotypic species.

Anoura cultrata Handley, 1960

Distribution.—Known from Costa Rica and Panamá eastward into South America.
Systematics.—*A. cultrata* is a monotypic species.

Anoura geoffroyi Gray, 1838

Distribution.—Western (Sinaloa) and eastern (Tamaulipas) México southeastward into South America.
Systematics.—*A. g. lasiopyga* is the only Middle American subspecies.

Anoura werckleae Starrett, 1969

Distribution.—Known only from Costa Rica.
Systematics.—*A. werckleae* is a monotypic species closely related to *A. cultrata.*

Lichonycteris obscura Thomas, 1895

Distribution.—Guatemala southeastward into South America.
Systematics.—*L. obscura* is a monotypic species.

Hylonycteris underwoodi Thomas, 1903

Distribution.—Western México (Jalisco) southeastward to western Panamá.

Systematics.—Two subspecies (Phillips and Jones, 1971), *underwoodi* (Veracruz and northern Oaxaca southeastward to Panamá) and *minor* (western México), are recognized.

Choeroniscus godmani (Thomas, 1903)

Distribution.—Western México (Sinaloa) southeastward into South America.

Systematics.—*C. godmani* is a monotypic species.

Choeronycteris mexicana Tschudi, 1844

Distribution.—Honduras northward through much of México into the extreme southwestern United States.

Systematics.—*C. mexicana* is here regarded as a monotypic species.

Musonycteris harrisoni Schaldach and McLaughlin, 1960

Distribution.—Presently known only from the states of Colima, Guerrero, and Michoacán in western México.

Systematics.—*M. harrisoni* is a monotypic species. Although some recent authors have regarded *Musonycteris* as a synonym of *Choeronycteris*, we follow Phillips (1971) in recognizing it as a distinct genus.

Subfamily Carolliinae

Carollia brevicauda (Schinz, 1821)

Distribution.—Eastern México (San Luis Potosí, Veracruz) southeastward into South America.

Systematics.—Pine (1972) considered *C. brevicauda* to be a monotypic species.

Carollia castanea H. Allen, 1890

Distribution.—Honduras southeastward into South America.

Systematics.—According to Pine (1972), *C. castanea* is a monotypic species.

Carollia perspicillata (Linnaeus, 1758)

Distribution.—Veracruz and Oaxaca southeastward into South America.

Systematics.—The Middle American subspecies is *C. p. azteca.*

Carollia subrufa (Hahn, 1905)

Distribution.—Western México (Jalisco) southeastward, mostly in the Pacific versant of Middle America, to Nicaragua.

Systematics.—*C. subrufa* was regarded by Pine (1972) as a monotypic species.

Subfamily STENODERMINAE

Sturnira lilium (É. Geoffroy St.-Hilaire, 1810)

Distribution.—Widely distributed from western (Sonora) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—The one Middle American subspecies is *S. l. parvidens.*

Sturnira ludovici Anthony, 1924

Distribution.—Western (Sinaloa) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—Two subspecies presently are recognized in Middle America, *ludovici* (central México into South America) and *occidentalis* (western México).

Sturnira mordax (Goodwin, 1938)

Distribution.—Recorded only from Costa Rica.

Systematics.—*S. mordax* is a monotypic species described originally as the sole representative of the genus *Sturnirops*, which is possibly valid as a subgenus (see Davis *et al.*, 1964).

Uroderma bilobatum Peters, 1866

Distribution.—Southern México (Oaxaca, Veracruz) southeastward into South America.

Systematics.—Currently recognized subspecies in Middle America (Davis, 1968; Baker and McDaniel, 1972) include: *convexum* (Pacific versant of Central America from Nicaragua southeastward into South America); *davisi* (Pacific versant from Chiapas to El Salvador and probably Honduras); *molaris* (Caribbean versant from Veracruz to Costa Rica).

Uroderma magnirostrum Davis, 1968

Distribution.—Oaxaca southeastward in Pacific versant of Central America into South America.

Systematics.—*U. magnirostrum* is a monotypic species.

Vampyrops dorsalis Thomas, 1900

Distribution.—Presently known from Panamá and from South America.

Systematics.—This species is in need of systematic review, but is here regarded as monotypic. We follow Gardner and Carter (1972) and Carter and Rouk (1973) in our treatment of *V. dorsalis.*

Vampyrops helleri Peters, 1866

Distribution.—Southern México (Oaxaca, Veracruz) southeastward into South America.

Systematics.—As pointed out by Rouk and Carter (1972), certain differences exist between specimens of *helleri* from México south through Central America and those from Amazonian Perú, but too few specimens are available to interpret these differences. The species, therefore, is currently regarded as monotypic.

Vampyrops vittatus (Peters, 1860)

Distribution.—Costa Rica southeastward into South America.

Systematics.—*V. vittatus* is a monotypic species.

Vampyrodes caraccioloi (Thomas, 1889)

Distribution.—Southern México (Oaxaca, Veracruz) southeastward into South America.

Systematics.—The one Middle American subspecies is *V. c. major.* Some recent authors, however, have regarded *major* as a species distinct from, but closely related to, *caraccioloi.*

Vampyressa nymphaea Thomas, 1909

Distribution.—Reported from Nicaragua, Costa Rica, Panamá, and adjacent South America.

Systematics.—*V. nymphaea* is a monotypic species representing the subgenus *Metavampyressa.*

Vampyressa pusilla (Wagner, 1843)

Distribution.—Southern México (Oaxaca, Veracruz) southeastward into South America.

Systematics.—According to Peterson (1968), the Middle American subspecies is *V. p. thyone*, although Handley (1966) did not recognize

subspecies in *V. pusilla*. This species represents the nominate subgenus.

Chiroderma salvini Dobson, 1878

Distribution.—Western (Chihuahua) and central México southeastward into South America.

Systematics.—Two subspecies currently are recognized, *salvini* (Puebla southeastward to northern South America) and *scopaeum* (western México from Chihuahua south to Guerrero).

Chiroderma trinitatum Goodwin, 1958

Distribution.—Known in Middle America only from Panamá.

Systematics.—*C. t. gorgasi* is the Panamanian subspecies.

Chiroderma villosum Peters, 1860

Distribution.—Southern México (Oaxaca and Veracruz) southeastward into South America.

Systematics.—The Middle American subspecies is *C. v. jesupi.*

Ectophylla alba H. Allen, 1892

Distribution.—Known only from Nicaragua, Costa Rica, and western Panamá.

Systematics.—*E. alba* is a monotypic species.

Ectophylla macconnelli (Thomas, 1901)

Distribution.—Costa Rica and Panamá eastward into South America.

Systematics.—*E. m. macconnelli* is the subspecific name applicable to mainland populations of this species. For many years, *E. macconnelli* was regarded as representing the monotypic genus *Mesophylla*, which name still is used by some as a subgenus (but see Starrett and Casebeer, 1968, and Greenbaum *et al.*, 1975).

Artibeus aztecus Andersen, 1906

Distribution.—Disjunct populations at moderate to relatively high elevations in central México (Sinaloa, Nuevo León, and Tamaulipas south to Guerrero), Guatemala and adjacent parts of Chiapas and Honduras, and Costa Rica and western Panamá.

Systematics.—Three subspecies (Davis, 1969) are recognized as occurring in the three distributional regions listed above—*aztecus*, *minor*, and *major*, respectively.

Artibeus hirsutus Andersen, 1906

Distribution.—Western México from Sonora southward to Morelos and Guerrero.

Systematics.—*A. hirsutus* is a monotypic species.

Artibeus inopinatus Davis and Carter, 1964

Distribution.—Presently known only from El Salvador, Honduras, and Nicaragua.

Systematics.—*A. inopinatus* is a monotypic species closely related to *A. hirsutus.*

Artibeus jamaicensis Leach, 1821

Distribution.—Western (Sinaloa) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—Middle American subspecies are as follows (Davis, 1970*b*): *paulus* (Pacific versant of Middle America from Chiapas to Costa Rica); *richardsoni* (Caribbean versant from Chiapas southeastward to Panamá and into South America); *triomylus* (western México from Sinaloa to Oaxaca); *yucatanicus* (eastern México and the Yucatán Peninsula).

Artibeus lituratus (Olfers, 1818)

Distribution.—Western (Sinaloa) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—Infraspecific relationships are poorly understood at present in this species. The Middle American subspecies probably is *A. l. intermedius.*

Artibeus phaeotis (Miller, 1902)

Distribution.—Western (Sinaloa) and eastern (Veracruz) México southeastward into South America.

Systematics.—Subspecies (Davis, 1970*a*) include: *phaeotis* (Caribbean versant from Veracruz to South America); *nanus* (Pacific versant from Sinaloa to Oaxaca); *palatinus* (Pacific versant from Chiapas to Costa Rica).

Artibeus toltecus (Saussure, 1860)

Distribution.—Western (Durango, Sinaloa) and eastern (Nuevo León, Tamaulipas) México southeastward at low and moderate elevations to Panamá and probably adjacent South America.

Systematics.—Recognized subspecies (Davis, 1969) include *toltecus* (eastern México southeastward to Panamá) and *hesperus* (Pacific versant of western México south to Nicaragua).

Artibeus watsoni Thomas, 1901

Distribution.—Southern México (Oaxaca, Veracruz) southeastward through much of Central America into South America.

Systematics.—*A. watsoni* was recognized by Davis (1970*a*) as a monotypic species closely related to *A. glaucus*, with which it may prove to be conspecific, and to *A. cinereus*.

Enchisthenes hartii (Thomas, 1892)

Distribution.—Western (Jalisco) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—*E. hartii* is a monotypic species. The genus *Enchisthenes* is regarded by some authorities as indistinct from *Artibeus*.

Centurio senex Gray, 1842

Distribution.—Western (Sinaloa) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—The subspecies occurring in Middle America is *C. s. senex* (Paradiso, 1967).

Subfamily DESMODONTINAE

Desmodus rotundus (É. Geoffroy St.-Hilaire, 1810)

Distribution.—Western (Sonora) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—The one subspecies in Middle America is *D. r. murinus*.

Diaemus youngii (Jentink, 1893)

Distribution.—Recorded from scattered localities from Tamaulipas southeastward into South America.

Systematics.—*D. youngii* is currently regarded as a monotypic species. Handley (1976) did not recognize *Diaemus* as a genus distinct from *Desmodus*.

Diphylla ecaudata Spix, 1823

Distribution.—Southern Texas southward through eastern México, hence southeastward into South America.

Systematics.—Two subspecies were recognized by Ojasti and Linares (1971), *ecaudata* (eastern Panamá into South America) and *centralis* (western Panamá to Texas), although some recent authors (see, for example, Starrett, 1976) have regarded this species as monotypic.

Family Natalidae

Natalus stramineus Gray, 1838

Distribution.—Western (Baja California, Chihuahua, Sonora) and eastern (Nuevo León, Tamaulipas) México southeastward into South America.

Systematics.—Two Middle American subspecies currently are recognized, *mexicanus* (southward in western México to Sinaloa) and *saturatus* (remainder of continental distribution).

Family Furipteridae

Furipterus horrens (F. Cuvier, 1828)

Distribution.—Known from Costa Rica and Panamá, and from South America.

Systematics.—*F. horrens* is a monotypic species.

Family Thyropteridae

Thyroptera discifera (Lichtenstein and Peters, 1855)

Distribution.—Known in North America only from the vicinity of Bluefields, Nicaragua, but probably occurs elsewhere in Caribbean lowlands from Nicaragua southeastward.

Systematics.—The Nicaraguan population represents *T. d. abdita* (Wilson, 1976), with type locality on the Escondido River, 50 mi. E (by river) Bluefields, actually the I. P. Plantation, 3 km. S and 13 km. E Rama.

Thyroptera tricolor Spix, 1823

Distribution.—Southern Veracruz southeastward into South America.

Systematics.—The Middle American subspecies is *T. t. albiventer* (see Wilson and Findley, 1977).

Family Vespertilionidae

Subfamily Vespertilioninae

Myotis albescens (É. Geoffroy St.-Hilaire, 1806)

Distribution.—Southern Veracruz and Chiapas southeastward into South America.

Systematics.—*M. albescens* was regarded as a monotypic species by LaVal (1973*a*).

For subgeneric placement of species of the genus *Myotis*, see Findley (1972).

Myotis auriculus Baker and Stains, 1955

Distribution.—Central México (Jalisco, Veracruz) northward into the United States.

Systematics.—Two subspecies are recognized (Genoways and Jones, 1969), *auriculus* in eastern México (Veracruz to Coahuila) and *apache* in western México (Jalisco northward).

Myotis californicus (Audubon and Bachman, 1842)

Distribution.—Chiapas northward throughout most of México into the United States.

Systematics.—Three subspecies have been recorded from México: *californicus* (northern and western México, including much of Baja California and possibly the Tres Marías islands, south to northern Zacatecas); *mexicanus* (mountainous areas of south-central México, from Tamaulipas and southern Sinaloa southward to Chiapas); *stephensi* (region of Colorado River Delta in Baja California and Sonora). See Bogan (1975) for remarks on geographic variation.

Myotis cobanensis Goodwin, 1955

Distribution.—Presently known only from Cobán, Guatemala.

Systematics.—Originally described as a subspecies of *M. velifer*, this bat was regarded as a distinct species by de la Torre (1958), who noted that the " . . . relationship [of *cobanensis*] to other named species or its possible identity with some already described species must await further study."

Myotis elegans Hall, 1962

Distribution.—Eastern (San Luis Potosí) México southeastward to Costa Rica.

Systematics.—*M. elegans* is a monotypic species.

Myotis evotis (H. Allen, 1864)

Distribution.—Widely distributed in temperate western North America, but known from México only from Comondú, Baja California.

Systematics.—Inclusion of this species in the present checklist rests solely on the holotype of *Myotis micronyx* Nelson and Goldman from Comondú, Baja California del Sur. Miller and Allen (1928) first relegated *micronyx* to synonymy under *evotis* and this arrangement has been followed by subsequent authors. Genoways and Jones (1969) compared the holotype of *micronyx* with specimens of *auriculus,* with which they thought it might prove to be conspecific, and found "that it possesses the characteristic external and cranial characters of *evotis*, although it does differ slightly from typical specimens of that species in having a more inflated braincase anteriorly, resulting in a relatively sharp angle between rostrum and frontal region of the skull." The specimen from Comondú currently is referred to the subspecies *M. e. evotis.*

Myotis fortidens Miller and G. M. Allen, 1928

Distribution.—Chiapas, Oaxaca, Tabasco, and Veracruz northward in western México to Sonora.

Systematics.—Two subspecies are recognized (Findley and Jones, 1967), *sonoriensis* in southern Sonora and adjacent Sinaloa, and *fortidens* from central Sinaloa southward.

Myotis keaysi J. A. Allen, 1914

Distribution.—Eastern México (Tamaulipas) southeastward into South America.

Systematics.—The only Middle American subspecies is *M. k. pilosatibialis.*

Myotis leibii (Audubon and Bachman, 1842)

Distribution.—Northwestern and north-central México (south to Zacatecas) northward into the United States.

Systematics.—One subspecies, *M. l. melanorhinus*, is known in México.

Myotis lucifugus (Le Conte, 1831)

Distribution.—Reported from the states of Chihuahua and México, and from the Distrito Federal; widely distributed to the north of México.

Systematics.—The one Mexican subspecies is *M. l. occultus.*

Myotis milleri Elliot, 1903

Distribution.—Known only from the higher mountains of Baja California del Norte.

Systematics.—*M. milleri* is a monotypic species thought to be closely related to *M. evotis.*

Myotis nigricans (Schinz, 1821)

Distribution.—Western (Nayarit) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—Two Middle American subspecies currently are recognized, *M. n. carteri* in western México (Nayarit, Jalisco, and Colima) and *M. n. nigricans* from Tamaulipas and Oaxaca into South America (LaVal, 1973*a*).

Myotis oxyotus (Peters, 1867)

Distribution.—Known in Middle America only from Costa Rica and western Panamá.

Systematics.—The Middle American race is *M. o. gardneri.*

Myotis peninsularis Miller, 1898

Distribution.—Southern Baja California del Sur.

Systematics.—Although regarded for many years as a subspecies of *M. velifer*, specific rank was accorded *peninsularis* by Hayward (1970).

Myotis planiceps Baker, 1955

Distribution.—This species currently is known from but three specimens from boreal forests in the Mexican states of Coahuila, Nuevo León, and Zacatecas (Matson, 1975).

Systematics.—*M. planiceps* is a monotypic species.

Myotis riparius Handley, 1960

Distribution.—Honduras southeastward into South America.

Systematics.—*M. riparius*, originally described as a subspecies of *M. simus*, was regarded by LaVal (1973*a*) as monotypic.

Myotis thysanodes Miller, 1897

Distribution.—Chiapas northward in highland areas throughout much of México into the United States.

Systematics.—Two subspecies are known from México—*aztecus* from Chiapas and Oaxaca, and *thysanodes* from throughout the remainder of the distribution in the country.

Myotis velifer (J. A. Allen, 1890)

Distribution.—Much of northern and central México southeastward in highlands to Honduras.

Systematics.—Two subspecies are recorded from the region (Hayward, 1970), both occurring northward into the United States: *incautus* (eastern Durango and Tamaulipas northward); *velifer* (Honduras, Guatemala, and southern México, northward throughout much of western México).

Myotis vivesi Menegaux, 1901

Distribution.—Islands and coastal areas of Gulf of California in Sonora and central Baja California; also along Pacific Coast of central Baja California.

Systematics.—*M. vivesi*, a monotypic species, was for many years regarded as representing a distinct genus, *Pizonyx*. Recent investigations strongly suggest that *vivesi* is properly included within *Myotis*. Findley (1972), for example, placed *vivesi* in the *macrotarsus* group of the *Myotis* subgenus *Leuconoe*.

Myotis volans (H. Allen, 1866)

Distribution.—Parts of northwestern (including Baja California) and north-central México, and a disjunct population in the mountains of central México.

Systematics.—Three subspecies are known in México: *amotus* (mountains from Jalisco to Veracruz); *interior* (from northern Baja California to Durango and Coahuila, northward into the United States); *volans* (peninsular Baja California).

Myotis yumanensis (H. Allen, 1864)

Distribution.—Central México (Hidalgo, México, Michoacán) northward on the Plateau and in western México (including Baja California) into the United States.

Systematics.—Four subspecies have been reported from México: *lambi* (vicinity of San Ignacio, Baja California del Sur); *lutosus* (southern part of range on Mexican Plateau north to San Luis Potosí and Zacatecas, and northward west of Sierra Madre Occidental to southern Sonora); *sociabilis* (limits of range uncertain but reported

from northwestern Baja California del Norte); *yumanensis* (Chihuahua, Coahuila, Durango, Sonora, and adjacent regions, limits of range uncertain as also recorded from much of Baja California). See especially Harris (1974).

Lasionycteris noctivagans (Le Conte, 1831)

Distribution.—Widely distributed in the north-temperate parts of North America, this migrant species occurs southward at least to Tamaulipas, where it is known from a single locality in the San Carlos Mountains.

Systematics.—*L. noctivagans* is a monotypic species.

Pipistrellus hesperus (H. Allen, 1864)

Distribution.—Central and western México (south to Hidalgo and Guerrero) northward into the United States.

Systematics.—Two subspecies of *P. hesperus* currently are recognized (Findley and Traut, 1970), both of which are known from México. *P. h. hesperus* occurs to the west of the Continental Divide (including Baja California) and *P. h. maximus* is found to the east of the Divide.

Pipistrellus subflavus (F. Cuvier, 1832)

Distribution.—Eastern México southward (excluding Yucatán Peninsula) to coastal Honduras and northward into the United States.

Systematics.—Three subspecies have been reported from Middle America: *clarus* (Coahuila), *subflavus* (Tamaulipas), and *veracrucis* (Veracruz to Honduras).

Eptesicus andinus (J. A. Allen, 1914)

Distribution.—Highlands from Veracruz southeastward into South America.

Systematics.—According to Davis (1966), *E. andinus* is a monotypic species.

Eptesicus furinalis (D'Orbigny, 1847)

Distribution.—Western (Jalisco) and eastern (San Luis Potosí) México southeastward into South America.

Systematics.—The two Middle American subspecies (Davis, 1965) are *carteri* (mountains of Costa Rica and western Panamá) and *gaumeri* (remainder of distribution in the region).

Eptesicus fuscus (Palisot de Beauvois, 1796)

Distribution.—Most of México, southeastward at higher elevations into South America.

Systematics.—Four subspecies currently are thought to occur in Middle America: *fuscus* (Nuevo León and presumably adjacent Tamaulipas northward into the United States); *miradorensis* (Sinaloa, Zacatecas, and southern Tamaulipas southward through Panamá); *pallidus* (Chihuahua, Coahuila, Sonora, and northern Baja California northward into the United States); *peninsulae* (peninsular Baja California). The area of intergradation in México between *miradorensis* and *pallidus*, and between each of these taxa and *fuscus*, has not been well defined.

Lasiurus borealis (Müller, 1776)

Distribution.—Widely distributed in North America; found throughout most of México, including Baja California, southeastward into South America. At least some populations of this species are migratory.

Systematics.—Three Middle American subspecies currently are recognized (Handley, 1960): *borealis* (northern México, from Chihuahua to Tamaulipas); *frantzii* (Chiapas southeastward through Panamá); *teliotis* (western México, including Baja California and the Tres Marías islands, and eastern México north to Nuevo León and southern Tamaulipas, southward to Oaxaca and the Yucatán Peninsula).

Lasiurus castaneus Handley, 1960

Distribution.—Known only from the type locality and one other place in Panamá.

Systematics.—*L. castaneus* is a monotypic species.

Lasiurus cinereus (Palisot de Beauvois, 1796)

Distribution.—Widely distributed in North America, south at least to Guatemala. This migratory species evidently occurs in México and Guatemala only during the colder parts of the year.

Systematics.—*L. c. cinereus* is the North American subspecies, which is geographically isolated from other races of the species (one in South America and one on the Hawaiian islands).

Lasiurus ega (Gervais, 1856)

Distribution.—Coastal western México (including Baja California) and eastern México (Coahuila, Nuevo León, Tamaulipas) southeastward into South America.

Systematics.—Of the two North American subspecies, *panamensis* occurs from Oaxaca southeastward through Panamá and *xanthinus* occurs to the north of Oaxaca (and evidently also on the Yucatán Peninsula) barely into the United States.

Lasiurus egregius (Peters, 1870)

Distribution.—Known in Middle America only by a single specimen from Armila, San Blas, Pananá.

Systematics.—*L. egregius* is a monotypic species.

Lasiurus intermedius H. Allen, 1862

Distribution.—Western (Sinaloa) and eastern (Nuevo León and Tamaulipas northward into the United States) México southeastward to Honduras.

Systematics.—The Middle American subspecies is *L. i. intermedius.*

Lasiurus seminolus (Rhoads, 1895)

Distribution.—Although reported previously from northeastern México (Villa-R., 1955, 1967), this bat does not likely occur there. Certain records of occurrence nearest México are in extreme eastern Texas (Davis, 1974).

Systematics.—*L. seminolus* is a monotypic species.

Nycticeius humeralis (Rafinesque, 1818)

Distribution.—Known from northeastern México (Coahuila, Nuevo León, San Luis Potosí, Tamaulipas, Veracruz) northeastward into the United States.

Systematics.—The nominate subspecies has been reported from Matamoros, Tamaulipas; *N. h. mexicanus* is the race occurring throughout the remainder of the distribution in México.

Rhogeessa alleni Thomas, 1892

Distribution.—Mountainous areas of western México from Oaxaca northward to Zacatecas.

Systematics.—*R. alleni* is an monotypic species representing the subgenus *Baeodon.* The latter was regarded as a distinct genus prior to LaVal's (1973*b*) review of *Rhogeessa.*

Rhogeessa gracilis Miller, 1897

Distribution.—Known only from nine specimens from the Mexican states of Jalisco, Oaxaca, and Puebla (Jones, 1977).

Systematics.—*R. gracilis* is a monotypic species of the nominate subgenus, as are the remaining species of *Rhogeessa* treated.

Rhogeessa mira LaVal, 1973

Distribution.—Known only from the Mexican state of Michoacán.

Systematics.—The recently described *R. mira* is a monotypic species.

Rhogeessa parvula H. Allen, 1866

Distribution.—According to LaVal (1973*b*), this species occurs only in western México (from central Sonora southeastward to the Isthmus of Tehuantepec in Oaxaca, including the Tres Marías islands).

Systematics.—LaVal (1973*b*) regarded *R. parvula* as a monotypic species.

Rhogeessa tumida H. Allen, 1866

Distribution.—Eastern México (Tamaulipas southward to Chiapas, Oaxaca, and the Yucatán Peninsula) southeastward into South America.

Systematics.—*R. tumida* was regarded as a monotypic species by LaVal (1973*b*), but see Goodwin (1958) for a different interpretation of variation in both *tumida* and *parvula* as well as the specific identity of some specimens.

Euderma maculatum (J. A. Allen, 1891)

Distribution.—Known only from northern and central México (south to Querétaro) on the Mexican Plateau, northward into the United States (Watkins, 1977).

Systematics.—*E. maculatum* is a monotypic species.

Plecotus mexicanus (G. M. Allen, 1916)

Distribution.—Mountains of central México (states of México,

Michoacán, Morelos, Veracruz) northward in the Sierra Madre Occidental to Sonora and Chihuahua and northward in the Sierra Madre Oriental to Nuevo León; also reported from the Yucatán Peninsula (Koopman, 1974).

Systematics.—*P. mexicanus* is a monotypic species (Handley, 1959). This species and *P. townsendii* represent the subgenus *Corynorhinus.*

Plecotus townsendii Cooper, 1837

Distribution.—Arid mountainous and plateau areas of interior México from Oaxaca northward into the United States; also in northwestern México and Baja California.

Systematics.—Two subspecies are known from México—*australis* throughout most of the range of *P. townsendii* in that country and *pallescens* in northern Chihuahua and adjacent northwestern México.

Idionycteris phyllotis (G. M. Allen, 1916)

Distribution.—Mexican Plateau and adjacent mountainous areas from Jalisco and Distrito Federal northward into the United States.

Systematics.—*I. phyllotis* is a monotypic species. Handley (1959) regarded *Idionycteris* as a subgenus of *Plecotus*, but Williams *et al.* (1970) provided evidence for generic recognition.

Subfamily NYCTOPHILINAE

Antrozous dubiaquercus Van Gelder, 1959

Distribution.—Presently known only from María Magdalena Island in the Tres Marías islands, Veracruz, and Honduras.

Systematics.—Two subspecies are recognized (Pine *et al.*, 1971), *dubiaquercus* on María Magdalena Island and *meyeri* from Honduras and Veracruz. *A. dubiaquercus* represents the subgenus *Bauerus.*

Antrozous pallidus (Le Conte, 1856)

Distribution.—Northern México (including Baja California) southward on the Mexican Plateau and in adjacent mountain ranges at least to Jalisco and Querétaro, and northward into the United States.

Systematics.—Four races have been reported in México: *minor* (southern Baja California); *obscurus* (Nuevo León and Tamaulipas southward to Querétaro); *pacificus* (northern Baja California); *pallidus* (remainder of distribution in México). *A. pallidus* represents the nominate subgenus.

Family Molossidae

Molossops greenhalli (Goodwin, 1958)

Distribution.—Reported from western México (Guerrero, Jalisco, Oaxaca), Honduras, and Costa Rica; known also in South America and, according to K. F. Koopman (personal communication), there are Panamanian specimens in the American Museum of Natural History.

Systematics.—The Mexican and Central American specimens are referable to the subspecies *mexicanus*. This and the following species are representative of the subgenus *Cynomops*.

Molossops planirostris (Peters, 1865)

Distribution.—Panamá eastward into South America.

Systematics.—The nominate subspecies occurs in Panamá.

Tadarida aurispinosa (Peale, 1848)

Distribution.—Reported from the Mexican states of Colima, Durango, Michoacán, Nayarit, Oaxaca, Sonora, Tamaulipas, and Zacatecas; not known to occur in Central America although recorded from South America.

Systematics.—*T. aurispinosa* is a monotypic species.

Tadarida brasiliensis (I. Geoffroy St.-Hilaire, 1824)

Distribution.—Widespread throughout México and Guatemala, northward into the United States; also found in Costa Rica and Panamá eastward into South America.

Systematics.—The infraspecific relationships of *T. brasiliensis* are not well understood. Three subspecies have been recognized in Middle America: *mexicana* (northern México south to the Yucatán Peninsula and the lowlands of Chiapas and northern Guatemala); *intermedia* (highlands of Chiapas and Guatemala); and *brasiliensis* (Costa Rica and Panamá). However, we believe *intermedia* to be consubspecific with *mexicana*.

Tadarida femorosacca (Merriam, 1889)

Distribution.—México from Oaxaca northward (including Baja California and east to Nuevo León) into the southwestern United States; however, K. F. Koopman (personal communication) has reported to us that Oaxacan material listed by Goodwin (1969) actually is referable to *Tadarida laticaudata*.

Systematics.—*T. femorosacca* is a monotypic species.

Tadarida laticaudata (É. Geoffroy St.-Hilaire, 1805)

Distribution.—Eastern México (Tamaulipas) south through southern México (west to Guerrero) and the Yucatán Peninsula into South America.

Systematics.—Two Middle American subspecies have been recognized, *ferruginea* (Tamaulipas south to Oaxaca) and *yucatanica* (Chiapas and the Yucatán Peninsula southeastward through Panamá).

Tadarida macrotis (Gray, 1839)

Distribution.—Reported from scattered localities in México (south at least to Guerrero and Veracruz) northward into the United States; disjunct populations occur in South America and on the Greater Antilles.

Systematics.—*T. macrotis* appears to be a monotypic species but has received little attention since Shamel's (1931) revision of the American representatives of the genus.

Eumops auripendulus (Shaw, 1800)

Distribution.—Southern México (Oaxaca, Quintana Roo, Tabasco) southeastward into South America.

Systematics.—A single subspecies, *E. a. auripendulus*, is represented by populations in México and Central America (Eger, 1977). The specimen of *E. maurus* reported by Villa-R. (1956, 1967) from Quintana Roo is referable to *E. auripendulus* (Jones *et al.*, 1973; Eger, 1977).

Eumops bonariensis (Peters, 1874)

Distribution.—Reported in Middle America only from Tabasco, Veracruz, Yucatán, Honduras, and Panamá; occurs also in South America.

Systematics.—The subspecies name *nanus* applies to Middle American populations.

Eumops glaucinus (Wagner, 1843)

Distribution.—Central México (Colima, Morelos) southeastward into South America.

Systematics.—*E. g. glaucinus* is the subspecies in Middle America.

Eumops hansae Sanborn, 1932

Distribution.—Costa Rica and Panamá southeastward into South America.

Systematics.—*E. hansae* is a monotypic species.

Eumops perotis (Schinz, 1821)

Distribution.—Known in North America from Zacatecas northward into the southwestern United States; occurs also in South America.

Systematics.—A single subspecies, *E. p. californicus*, occurs in México.

Eumops underwoodi Goodwin, 1940

Distribution.—Pacific versant of Honduras northwestward through western México barely into the United States.

Systematics.—Two subspecies are recognized, *underwoodi* from Chihuahua southward and *sonoriensis* from Sonora (Eger, 1977).

Promops centralis Thomas, 1915

Distribution.—Western México (Jalisco) southeastward (including the Yucatán Peninsula) into South America.

Systematics.—*P. centralis* is a poorly known species and might be conspecific with the South American *P. davisoni* and *P. occultus*. The Middle American subspecies is *centralis*.

Molossus ater É. Geoffroy St.-Hilaire, 1805

Distribution.—Western (Sinaloa) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—Middle American populations are assigned to the subspecies *nigricans*.

Molossus bondae J. A. Allen, 1904

Distribution.—Known certainly from Costa Rica southeastward into South America (see LaVal, 1977); also reported from Cozumel Island, Quintana Roo, by Alverez and Ramírez-Pulido (1972) and, according to K. F. Koopman (personal communication), there is a specimen from Nicaragua in the American Museum of Natural History.

Systematics.—*M. bondae* is a monotypic species.

Molossus molossus (Pallas, 1766)

Distribution.—Western (Sinaloa) and eastern (Tamaulipas) México southeastward into South America.

Systematics.—The name *M. molossus* has been applied to one or more species of the genus for more than 200 years. This species is clearly in need of systematic review, but, until such time, we recognize for Middle America the subspecies *aztecus* (México south to Nicaragua) and *coibensis* (Costa Rica and Panamá).

Molossus pretiosus Miller, 1902

Distribution.—Nicaragua southeastward into South America.

Systematics.—*M. pretiosus* appears to be a monotypic species of unclear relationship to *M. ater*. *M. macdougalli*, first described as a subspecies of *M. pretiosus*, is here considered to be a synonym of *Molossus ater nigricans*.

Molossus sinaloae J. A. Allen, 1906

Distribution.—Western México (Sinaloa) southeastward (including the Yucatán Peninsula) into South America.

Systematics.—Only the nominate subspecies occurs in Middle America.

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EFFECTS OF ELEPHANT AND OTHER WILDLIFE ON VEGETATION ALONG THE CHOBE RIVER, BOTSWANA

C. David Simpson

Constant human pressures and restriction of game populations to limited areas are demanding more careful husbandry of natural resources in Africa. This is especially true when large numbers of animals are seasonally concentrated and deterioration of vegetation causes significant changes in the carrying capacity of an area over the long term. Thus, the degree of vegetation use by herbivores and its long-term effect on the ecology of the diverse wildlife populations in reserves is one of the key management concerns of game department administrators.

This problem is a major concern in the northern section of the Chobe National Park in Botswana. At the height of the dry season, the only surface water available to wildlife is along 23 miles of river in the northern portion of the park. High densities of game animals, especially elephant (*Loxodonta africana*) and buffalo (*Syncerus caffer*), along the river in the dry months are rapidly destroying the riparian and riverine vegetation. This destruction of already restricted habitats poses a threat to some localized wildlife species, as well as detracting strongly from the aesthetic value of this unique tourist attraction.

Prior to any management decision, the degree of vegetative change in the area due to wildlife damage, as well as quantitative information on the numbers of animals involved, their past history and their movements, should be documented. Accordingly, this study examined the wildlife use of woody vegetation to find out the effects of these large animal concentrations on riverside habitats.