

MAMMALS FROM THE TARASCAN PLATEAU, MICHOCÁN, MÉXICO

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Resumen. Se examinaron 568 ejemplares de mamíferos nativos de 49 especies, procedentes de 49 localidades de la Meseta Tarasca o Sierra Purépecha del Estado de Michoacán, México. Las especies encontradas en esta región del Eje Volcánico Transversal incluyen 1 marsupial, 2 insectívoros, 17 quirópteros, 2 carnívoros, 24 roedores y 1 lagomorfo. Para calcular la diversidad de especies en los cuatro hábitats muestreados, se utilizaron las 2 especies de insectívoros y 21 de roedores. De mayor a menor diversidad, en el bosque de pino-encino se recolectaron 201 individuos de 15 especies ($H' = 2.49$), en el bosque tropical caducifolio 142 de 15 especies ($H' = 2.43$), en el bosque de oyamel 92 individuos de 10 especies ($H' = 2.01$) y en las áreas de ecotono 52 individuos de cuatro especies ($H' = 1.15$). El registro de *Hylonycteris underwoodi* es el primero para las partes altas del Estado de Michoacán.

Abstract. We examined 568 specimens of native mammals belonging to 47 species from 49 localities of the Tarascan Plateau or Sierra Purépecha mountain range in the State of Michoacán, México. Species composition of this enclave in the Transvolcanic Belt is 1 marsupial, 2 insectivores, 17 bats, 2 carnivores, 24 rodents, and 1 lagomorph. To calculate the species diversity according to the four sampled habitats, only the 2 insectivore and 21 rodent species were included. From higher to lower diversity values, we found 201 specimens from 15 species in pine-oak forest ($H' = 2.49$), 142 from 15 species in tropical deciduous forest ($H' = 2.43$), 92 specimens belonging to 10 species fir forest ($H' = 2.01$), and 52 from four species in an ecotonal area ($H' = 1.15$). *Hylonycteris underwoodi* is the first record for the highlands from the State of Michoacan.

Key words: Mammals, distribution, diversity, Tarascan Plateau, Michoacán.

INTRODUCTION

Since the publication by Hall and Villa R. (1949), which referred to mammals from the north-central part of the State of Michoacán, only Burt (1961) and Orduña Trejo and Salas Páez (1993) have surveyed the region again. Other records for the region have appeared scattered in different papers dealing with mammals from the state (Huerta, 1989; Núñez-Garduño *et al.*, 1996; Álvarez and Sánchez-Casas, 1997; González-Ruíz and Villalpando-R., 1997; Sánchez-Hernández *et al.*, 1999). In fact, most mammal surveys from Michoacan have focused on the coastal region (Sánchez *et al.*, 1985; 1992; Álvarez *et al.*, 1987; Polaco and Muñiz-Martínez, 1987; Álvarez and Álvarez-Castañeda, 1991; Sánchez-Casas and Álvarez, 1997). The papers by Hooper (1961), and Núñez (1989) refer to the Sierra de Coalcomán. Additional papers mentioning mammals from the Transvolcanic Belt of the state are those by Williams and Ramírez-Pulido (1984); Rennert and Kilpatrick (1986), Houseal *et al.* (1987), Arita and Humphrey (1988), Tumlison (1991, 1992), Whitaker *et al.* (1991), Engstrom *et al.* (1992), Glendinning (1992), Alvarez and Hernández-Chávez (1993), Cervantes *et al.* (1993) and, Castro-Campillo and Ramírez-Pulido (2000), among others.

Our objective here is to analyze the diversity of small mammals in three vegetation types (fir forest, pine-oak forest, and tropical deciduous forest) and ecotonal areas of the region known as Sierra Purépecha or Tarascan Plateau (Meseta Tarasca).

MATERIALS AND METHODS

Study Area

The Sierra Purépecha or Tarascan Plateau is located in the central-northwest part of the State of Michoacán, belonging to the Transvolcanic Belt. The area includes mountains and volcanos such as Paricutín, Tancítaro, Angahuan, San Marcos, and Comburindos. In that region, dominant vegetations are coniferous and oak forest with *Pinus*, *Quercus*, and *Abies* forests prevail, and at the boundary, tropical deciduous forest elements appear with genera such as *Bursera*, *Acacia*, *Euphorbia* (Rzedowski, 1978). The height of the Sierra ranges from 1,700 m to 3,200 m.

Rainfall ranges from 1,250 to 1,650 mm, and the climate is the most humid of the temperate subhumid ones with an annual mean temperature between 12 and 18 °C. Rainfall is concentrated in the summer, and winter rainfall is less than 5% of the total annual rainfall. Summers are cool and long, with mean temperature of the hottest month between 6.5 and 22°C (Gómez Tagle, 1984).

Plant communities

The largest areas of fir forest occur in the mountainous region of the Tancítaro volcano, in the region of Angahuan-Zacán, 2,350 masl, and in Opopeo (2,100 masl) particularly in Cruz Gorda area in the Villa Escalante municipality. The fir forest in the central north region of the State of Michoacán is commonly found between 2,400 and a little over 3,000 masl. The fir forest consists of *Abies religiosa* associated with species of *Pinus* or *Quercus* (Bello González, 1983).

Pine-oak forests are widespread in the region. Representative three species include *Pinus douglaciana*, *P. leiophylla*, *P. michoacana*, *P. pringlei*, *P. pseudostrobus*, *P. rudis*, and *P. teocote* (Madrigal, 1982); oak species are represented by *Quercus castanea*, *Q. candicans*, *Q. crassifolia*, *Q. crassipes*, *Q. glaucoiudes*, *Q. laurina*, *Q. magnoliifolia*, *Q. obtusata*, *Q. rugosa*, and *Q. scytophylla* (Bello González and Labat, 1987). Other species associated with the pine-oak forest are *Alnus arguta*, *A. firmifolia*, *Arbutus xalapensis*, *Carpinus caroliniana*, *Crataegus mexicana*, *Cletra mexicana*, *Cornus disciflora*, *Prunus capuli*, *Salix babilonica*, *Tilia mexicana*, and *Vitex mollis*.

Transition forest, are located southwest of the City of Uruapan. Although, we could refer to this plant association as pine-oak forest also, it includes different species of pines and oak trees, at the ecotone with tropical deciduous forest. The prevailing species is *Pinus occarpa*, although *P. michoacana* is found in small areas. Several *Quercus* species such as *Q. resinosa* and *Q. conspersa* are also located there (Salas Paez, 1986).

The tropical deciduous forest is found in the northern part and in the northeast area of the Sierra Purépecha. The altitude limits are usually located between 1,500 and 2,000 masl. The annual mean temperature ranges between 17 and 21 °C, and rainfall ranges between 500 and 900 mm annually. Soils are sandy, acidic and poor in organic matter. The most common species are *Bursera* sp., *Lysiloma acapulensis*, *Acacia penatula*, *A. farmesiana*, *A. angustissima*, *Ipomea murocoides*, *Opuntia* sp., *Croton adsparsus*, *Agonandra racemosa*, *Lemaireocereus* sp., *Agave* sp., *Tecoma stans*, *Verbesina sphaerocephala*, *Bouvardia ternifolia*, *Euphorbia dentata*, *Tagetes lucida*, *Melapodium* sp., *Andropogon* sp., *Boutelova* sp., *Muhlenbergia* sp., *Senna huisuta*, *Paspalum* sp., *Mimosa monacista*, and *Eysenhardtia polystachya* (Bello González, 1983).

Field Work

Fieldwork focused on the capture of rodents in areas within each major plant community. Sixteen trips were carried out and each plant community was sampled four times during three consecutive nights separated by a 45-day interval.

Bats were obtained by mist netting, at random sites in each vegetation type. For rodents and insectivorous, “Sherman” live-traps and “Museum Special” traps were used, with a mixture of oats and peanut butter as bait. The traps were placed on three lines in 20 stations, each one 20 m apart.

For medium sized mammals, “National” and “Tomahawk” live-traps were placed in a 20-station line, each one 50 m apart. Canned sardine and/or pieces of fruit were used as bait. The presence of mammals was also detected by observing tracks and scats in a 30-minute transects (Rabinovich, 1984). Pocket gophers were trapped with “Volke” traps placed inside their tunnels, and checked during two consecutive days. All captured specimens were prepared as study skins and deposited in a collection of the Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP) at Uruapan, Michoacán.

Selection of sampling localities was made at random, with the traps placed in primary forest, and not in crop areas. Sampling localities appear on Figure 1, and the gazetteer in Appendix 1.

Diversity of mammals in plant communities was calculated with the Shannon-Weaver’s index, and the abundance was estimated using effort in traps/hour/night.

RESULTS AND DISCUSSION

We captured 568 specimens from 47 species including 1 marsupial, 2 insectivores, 17 bats, 2 carnivores, 24 rodents, and 1 lagomorph (Appendix 2). The former specific categories were obtained in 49 localities from the four habitats.

Capture rate in small mammals (excluding the three species of pocket gophers) was calculated including 487 specimens captured in 11,520 traps/hours/night. 18.8% were obtained from the fir forests, 41.5% from pine-oak forests, 29.0% from tropical deciduous forest and only 10.6% from the ecotone area (Fig. 2). Of the 23 species, 10 were found in the fir forest; 15 in the pine-oak forest; 15 in tropical deciduous forest and only four came from the ecotonal area (Table 1). Diversity was higher in the pine-oak forest ($H' = 2.49$), followed by the tropical deciduous forest ($H' = 2.43$), fir forest ($H' = 2.01$), and the ecotonal area ($H' = 1.15$).

Highest diversity of mammals was found in pine-oak forest, followed by tropical deciduous forest. Although more individuals were captured in the pine-oak forest (201), the diversity value ($H' = 2.49$) was similar to the tropical deciduous forest ($H' = 2.43$), where 142 specimens were trapped. In fact there were three dominant species in each one with *Peromyscus gratus*, *P. maniculatus*, and *Reithrodontomys megalotis* in the pine-oak forest representing 39.4% of the sample. Meanwhile, *Liomys irroratus*, *Oligoryzomys fulvescens*, and *R. sumichrasti* were dominant species in the tropical deciduous forest with 48.6% of the sample. Besides in

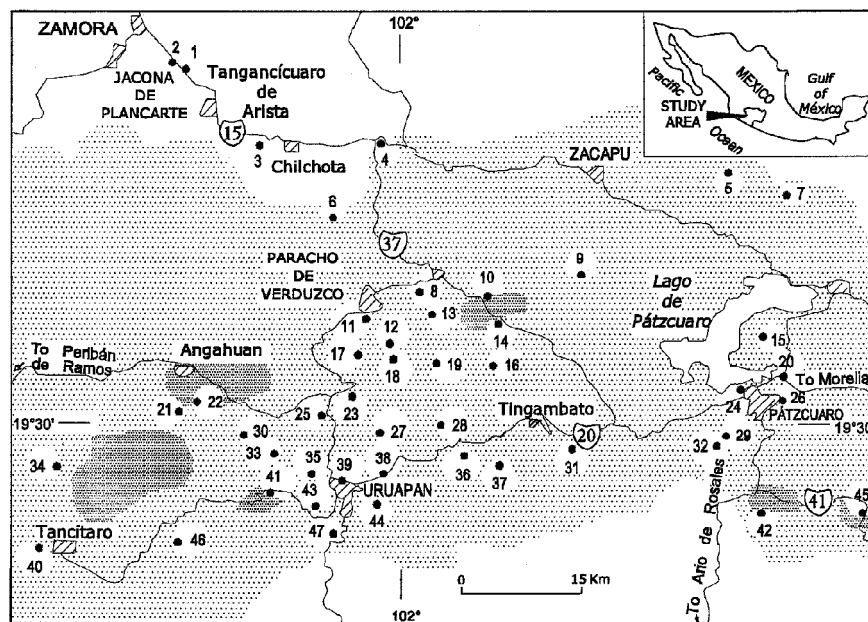


Figure 1. Regional map of the Tarascan Plateau, Michoacán, México. Numbers and dots correspond to gazetteer in Appendix 1. The vegetation types are indicated as follows: fir forest = darkest areas, pine-oak forest = dotted areas, and tropical deciduous forest = white areas.

the pine-oak forest, and in the tropical deciduous forest there were 12 additional species. Compared to the other two plant associations, these two habitats have highest diversity due to three shared species.

Species diversity diminishes in both fir forest and the ecotonal area. Diversity in the fir forest was lower since two species (*Reithrodontomys megalotis*, and *R. sumichrasti*) were the most abundant (47.8%), and only other eight species occurred. Finally, in the ecotonal area, where the smallest diversity was obtained, there were only four species with 52 individuals and *Peromyscus maniculatus* represented 42.3% of the sample.

Nelsonia goldmani was captured only in a fir forest (Table 1). *Peromyscus levipes*, *P. melanotis*, and *Sigmodon alleni* were taken in the pine-oak forest. *Cryptotis parva*, *Baiomys musculus*, *Neotoma mexicana*, *Oryzomys couesi*, *P. melanophrys*, *P. spicilegus*, and *S. mascotensis* were captured in the tropical deciduous forest. No species was restricted to the ecotonal area, and only *P. aztecus*, and *Reithrodontomys*

megalotis appeared in all four habitats.

Sorex saussurei, *Microtus mexicanus*, and *Neotomodon alstoni* were captured in fir forest and pine-oak forest. *Liomys irroratus*, and *Sigmodon hispidus* were trapped in pine-oak forest, and tropical deciduous forest. *Oligoryzomys fulvescens*, *P. gratus*, and *Reithrodontomys sumichrasti* in fir forest, pine-oak forest, and tropical deciduous forest. Only *R. chrysopsis* was captured in fir forest, pine-oak forest, and ecotonal area.

The fir forest has one exclusive species; nine are shared with other plant associations, and 13 are absent. In the pine-oak forest, three species are exclusive, 12 are shared, and eight are absent. In the tropical deciduous forest seven are exclusive, eight are shared and eight are absent. In the ecotonal area, no species is exclusive, four are shared, and 19 are absent.

The mammals from the Tarascan Plateau or Sierra Purépecha mentioned in this paper represent one third of the total reported species for the State of Michoacán, which is one of the richest in México (Hall, 1981; Ramírez-Pulido *et al.*, 1986;

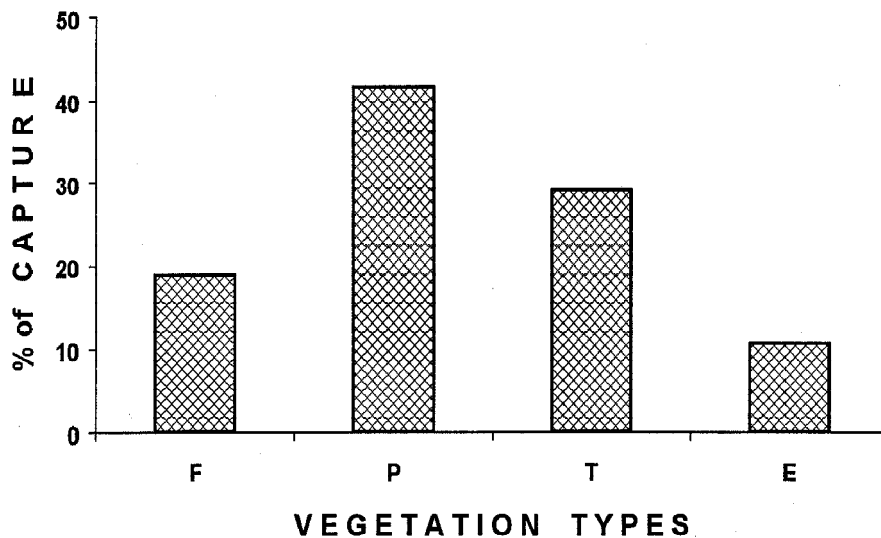


Figure 2. Percentage of capture of rodent and insectivore species in four plant communities at the Tarascan Plateau, Michoacán. F = fir forest, P = pine-oak forest, T = tropical deciduous forest, and E = ecotonal area.

Table 1. Insectivores and rodents collected in four types of vegetation in the Tarascan Plateau, Michoacán, México. F = fir forest; P = pine-oak forest; T = tropical deciduous forest; and E = ecotonal area.

| S P E C I E S | F | P | T | E |
|------------------------------------|----|-----|-----|----|
| <i>Cryptotis parva</i> | 0 | 0 | 1 | 0 |
| <i>Sorex saussurei</i> | 2 | 3 | 0 | 0 |
| <i>Liomys irroratus</i> | 0 | 4 | 22 | 0 |
| <i>Microtus mexicanus</i> | 11 | 19 | 0 | 0 |
| <i>Baiomys musculus</i> | 0 | 0 | 8 | 0 |
| <i>Nelsonia goldmani</i> | 2 | 0 | 0 | 0 |
| <i>Neotoma mexicana</i> | 0 | 0 | 4 | 0 |
| <i>Neotomodon alstoni</i> | 12 | 6 | 0 | 0 |
| <i>Oligoryzomys fulvescens</i> | 7 | 7 | 25 | 0 |
| <i>Oryzomys couesi</i> | 0 | 0 | 1 | 0 |
| <i>Peromyscus hylocetes</i> | 6 | 18 | 7 | 1 |
| <i>Peromyscus gratus</i> | 5 | 33 | 8 | 0 |
| <i>Peromyscus levipes</i> | 0 | 15 | 0 | 0 |
| <i>Peromyscus maniculatus</i> | 0 | 20 | 11 | 22 |
| <i>Peromyscus melanotis</i> | 0 | 7 | 0 | 0 |
| <i>Peromyscus melanophrys</i> | 0 | 0 | 7 | 0 |
| <i>Peromyscus spicilegus</i> | 0 | 0 | 5 | 0 |
| <i>Reithrodontomys chrysopsis</i> | 3 | 6 | 0 | 13 |
| <i>Reithrodontomys megalotis</i> | 20 | 27 | 6 | 16 |
| <i>Reithrodontomys sumichrasti</i> | 24 | 17 | 22 | 0 |
| <i>Sigmodon alleni</i> | 0 | 3 | 0 | 0 |
| <i>Sigmodon hispidus</i> | 0 | 16 | 9 | 0 |
| <i>Sigmodon mascotensis</i> | 0 | 0 | 6 | 0 |
| T O T A L | 92 | 201 | 142 | 52 |

Ramírez-Pulido and Castro-Campillo, 1990; 1993; 1994a; 1994b).

The three specimens of *Hylonycteris underwoodi* from the neighborhood of Uruapan are noteworthy since they represent the first record for the species at 1,600 masl in the Tarascan Plateau. This species was firstly recorded for the state in the Coastal Region between 800 masl and 980 masl (Polaco and Muñiz-Martínez, 1987).

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 Appendix 1. Gazetteer of localities in the Tarascan Plateau, Michoacán.

| | |
|--|---------------------------|
| 1. 5 Km SE Zamora, 1,800 masl | 19° 56' 05", 102° 15' 11" |
| 2. 4 Km SE Zamora, 1,800 masl | 19° 56' 30", 102° 15' 58" |
| 3. Los Nogales, 1,750 masl | 19° 50' 10", 102° 09' 53" |
| 4. San Antonio Carapan, 2,000 masl | 19° 50' 32", 102° 02' 09" |
| 5. La Naranja, 15 Km E Zacapu, 2,000 masl | 19° 48' 04", 101° 39' 23" |
| 6. Tanaco, 2,200 masl | 19° 43' 04", 102° 05' 28" |
| 7. Cerro Gacho, 2,600 masl | 19° 46' 30", 101° 36' 32" |
| 8. Cherán, 2,200 masl | 19° 39' 45", 101° 58' 07" |
| 9. Cerro de la Mojonera, 3,000 masl | 19° 40' 32", 101° 50' 03" |
| 10. Nahuatzen, 2,800 masl | 19° 38' 00", 101° 55' 11" |
| 11. Paracho, 2,750 masl | 19° 37' 35", 102° 03' 02" |
| 12. 6 Km SE Paracho, 2,800 masl | 19° 34' 56", 102° 00' 46" |
| 13. Cerro San Marcos, 2,900 masl | 19° 38' 24", 101° 58' 50" |
| 14. Sevina, 2,600 masl | 19° 36' 52", 101° 54' 41" |
| 15. Cerro del Timbén, Mabusco, 2,100 masl | 19° 36' 13", 101° 37' 05" |
| 16. Cerro de la Bandera, Comachuén, 2,900 masl | 19° 32' 50", 101° 55' 05" |
| 17. 8 Km N Capacuaro, 2,600 masl | 19° 36' 26", 102° 03' 48" |
| 18. 10 Km NE Capacuaro, 2,500 masl | 19° 35' 00", 101° 59' 30" |
| 19. Cerro Cicopién, 2,600 masl | 19° 33' 30", 101° 58' 23" |
| 20. Tzurumútar, 2,100 masl | 19° 32' 17", 101° 35' 34" |
| 21. Cerro Los Gallineros, 2.5 Km SW Angahuan, 2,400 masl | 19° 30' 43", 102° 15' 08" |
| 22. 2 Km SE Angahuan, 2,450 masl | 19° 31' 26", 102° 13' 02" |
| 23. Cerro del Banco, Capacuaro, 2,350 masl | 19° 31' 52", 102° 03' 48" |
| 24. Bonilla, 2,100 masl | 19° 31' 30", 101° 42' 16" |
| 25. San Lorenzo, 17 Km NE Uruapan, 1,900 masl | 19° 30' 21", 102° 07' 37" |
| 26. Pátzcuaro, 2,500 masl | 19° 30' 43", 102° 36' 30" |
| 27. El Columpio, Pátzcuaro, 2,500 masl | 19° 30' 43", 102° 36' 30" |
| 27. Teamba, 1,900 masl | 19° 29' 31", 102° 01' 52" |
| 28. Montelongos, 2,000 masl | 19° 29' 39", 101° 56' 18" |
| 29. 12 Km N Villa Escalante, 2,500 masl | 19° 28' 00", 101° 39' 02" |
| 30. Cerro La Mejorana, 2,200 masl | 19° 28' 40", 102° 09' 26" |
| 31. Cerro Comburindos, Tingambato, 2,350 masl | 19° 29' 56", 101° 51' 16" |
| 32. 9 Km SW Pátzcuaro, 1,900 masl | 19° 27' 17", 101° 40' 25" |
| 33. Cerro Las Cocinas, 2,250 masl | 19° 27' 27", 102° 07' 04" |
| 34. Derramadero, 12 Km NW Tancítaro, 2,200 masl | 19° 27' 13", 102° 21' 13" |
| 35. 5 Km NW Uruapan, 2,650 masl | 19° 26' 08", 102° 06' 21" |
| 36. 6 Km N, 15 Km E Uruapan, 1,850 masl | 19° 27' 17", 102° 55' 58" |
| 37. San Angel Zurumucapio, 1,700 masl | 19° 27' 39", 101° 54' 35" |
| 38. Santa Catarina, 1,600 masl | 19° 26' 17", 102° 01' 30" |
| 39. Barranca del Cupatitzio, 1,640 masl | 19° 25' 50", 102° 03' 06" |

Appendix 1. Cont. ...

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| 39. Campo Experimental Forestal del Cupatitzio, 1640 masl | 19° 25' 50", 102° 03' 06" |
| 40. 1 Km N, 2 Km W Tancítaro, 2,900 masl | 19° 25' 21", 102° 16' 05" |
| 41. San Juan Nuevo, 1,850 masl | 19° 24' 13", 102° 08' 13" |
| 42. El Abrojal, Opopeo, 2,100 masl | 19° 24' 34", 101° 36' 27" |
| 43. 4 Km SW Uruapan, 1,760 masl | 19° 22' 39", 102° 05' 58" |
| 44. La Huizachera, Santa Rosa, 1,600 masl | 19° 24' 05", 102° 02' 35" |
| 45. 2 km W Cruz Gorda, 3,100 masl | 19° 24' 12", 101° 29' 30" |
| 46. Los Barrancos Cutzato, 1,700 masl | 19° 20' 54", 102° 15' 28" |
| 47. Presa del Cupatitzio, 1,600 masl | 19° 24' 01", 102° 05' 00" |

Appendix 2. Specimens examined.

- Didelphis marsupialis cauceae* J. A. Allen, 1900. Specimens examined: Barranca del Cupatitzio, 1,640 masl (1).
- Cryptotis parva berlandieri* (Baird, 1858). Specimens examined: Tzurumútaró, 2,100 masl (1).
- Sorex saussurei saussurei* Merriam, 1892. Specimens examined: Cerro los Gallineros, Angahuan, 2,400 masl (2); Cerro Comburindos, Tingambato, 2,350 masl (1); El Abrojal, Opopeo, 2,100 masl (2);
- Pteronotus parnellii mexicanus* (Miller, 1902). Specimen examined: La Huizachera, Santa Rosa, 1,600 masl (1).
- Macrotus waterhousii mexicanus* Saussure, 1860. Specimens examined: 10 Km NE Capacuaro, 2,500 masl (1); 5 Km NW Uruapan, 2,650 masl (1).
- Desmodus rotundus murinus* Wagner, 1840. Specimen examined: 5 Km NW Uruapan, 2,650 masl (1); Barranca del Cupatitzio, 1,640 masl (1).
- Anoura geoffroyi lasiopyga* (Peters, 1868). Specimen examined: Cerro Las Cocinas, 2,250 masl (1); Tiamba, 1,900 masl (1); Barranca del Cupatitzio, 1,640 masl (1).
- Choeronycteris mexicana* Tschudi, 1844. Specimen examined: Barranca del Cupatitzio, 1,640 masl (1).
- Glossophaga soricina handleyi* Webster y Jones, 1980. Specimen examined: 10 Km NE Capacuaro, 2,500 masl (1).
- Hylonycteris underwoodi minor* Phillips y Jones, 1971. Specimen examined: La Huizachera, Santa Rosa, 1,600 masl (1); Presa del Cupatitzio, 1,600 masl (2).
- Leptonycteris nivalis* (Saussure, 1460). Specimens examined: 10 Km NE Capacuaro, 2,500 masl (1); Campo Experimental Forestal del Cupatitzio, Uruapan, 1,640 masl (1); Barranca del Cupatitzio, 1,640 masl (4).
- Artibeus jamaicensis triomylus* Handley, 1966. Specimen examined: 5 Km NW Uruapan, 2,650 masl (1).
- Chiroderma salvini scopaeum* Handley, 1966. Specimen examined: Cerro del Banco, Capacuaro, 2,350 masl (1).
- Dermanura azteca azteca* (Andersen, 1906). Specimens examined: Tiamba, 1900 masl (1); San Lorenzo, 17 Km NE Uruapan, 1900 masl (2); San Angel Zurumucapio, 1,700 masl (2).
- Sturnira ludovici ludovici* Anthony, 1924. Specimens examined: 2 Km SW Angahuan, 2290 masl (2); 5 Km NW Uruapan, 2,650 masl (9); Carretera Tancítaro, Santa Catarina, 1,600 masl (1); San Angel Zurumucapio, 1700 masl (11).
- Corynorhinus mexicanus* G. MASL. Allen, 1916. Specimen examined: 5 Km NW Uruapan, 2,650 masl (1); El Abrojal, Opopeo, 2,100 masl (1).
- Eptesicus fuscus miradorensis* (H. Allen, 1866). Specimen examined: Campo Experimental Forestal del Cupatitzio, Uruapan, 1,640 masl (11).
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Myotis californica mexicana (Saussure, 1860). Specimen examined: Barranca del Cupatitzio, 1,640 masl (1).

Appendix 2. Cont. ...

Myotis thysanodes thysanodes Miller, 1897. Specimen examined: Barranca del Cupatitzio, 1,640 masl (3).

Myotis velifera velifera (J. A. Allen, 1890). Specimen examined: Campo Experimental Forestal del Cupatitzio, Uruapan, 1,640 masl (1).

Mephitis macroura macroura Lichtenstein, 1832. Specimen examined: Barranca del Cupatitzio, 1,640 masl (1).

Mustela frenata leucoparia (Merriam, 1896). Specimen examined: El Abrojal, Opopeo, 2,100 masl (1).

Cratogeomys gymnurus imparilis (Goldman, 1939). Specimens examined: Nahuatzen, 2,800 masl (1); San Lorenzo, 17 Km NE Uruapan, 1900 masl (1); El Abrojal, Opopeo, 2,100 masl (1).

Cratogeomys tylosinus angustirostris (Merriam, 1903). Specimen examined: Derramadero, 12 Km NW Tancítaro, 2,200 masl (1); Barranca del Cupatitzio, 1,640 masl (2).

Zygoeomys trichopus trichopus Merriam, 1895. Specimens examined: Nahuatzen, 2,800 masl (2); Barranca del Cupatitzio, 1,640 masl (2).

Liomys irroratus alleni (Coues, 1881). Specimens examined: Los Nogales, 1,750 masl (4); La Naranja, 15 Km E Zacapu, 2,000 masl (5); Cerro Comburindos, Tingambato, 2,350 masl (4); Bonilla, 2,100 masl (1); Pátzcuaro, 2,500 masl (6); El Columpio, Pátzcuaro, 2,500 masl (4); 9 Km SW Pátzcuaro, 1900 masl (2).

Microtus mexicanus fundatus Hall, 1948. Specimens examined: Cerro de la Mejorana, 2,200 masl (2); Sevina, 2,600 masl (8); 2 Km W Cruz Gorda, 2,300 masl (3); 2 Km SE Angahuan, 2,450 masl (9); Cerro Los Gallineros, 2.5 Km SW Angahuan, 2,400 masl (3); 12 Km N Villa Escalante, 2,500 masl (1); El Abrojal, Opopeo, 2,100 masl (4).

Baiomys musculus pallidus Russell, 1952. Specimens examined: Los Nogales, 1,750 masl (1); Cerro Las Cocinas, 2,250 masl (1); 9 Km SW Pátzcuaro, 1900 masl (4); El Columpio, Pátzcuaro, 2,500 masl (1); Tzurumútar, 2,100 masl (1).

Nelsonia goldmani goldmani Merriam, 1903. Specimens examined: Cerro San Marcos, 2,900 masl (2).

Neotoma mexicana tenuicauda Merriam, 1892. Specimens examined: Los Nogales, 1,750 masl (1); Bonilla, 2,100 masl (1); Pátzcuaro, 2,500 masl (1); Derramadero, 12 Km NW Tancítaro, 2,200 masl (1).

Neotomodon alstoni Merriam, 1898. Specimens examined: Cerro San Marcos, 2,900 masl (9); El Abrojal, Opopeo, 2,100 masl (7); 2 Km W Cruz Gorda, 3100 masl (2).

Oligoryzomys fulvescens lenis (Goldman, 1915). Specimens examined: Los Nogales, 1,750 masl (8); Cerro San Marcos, 2,900 masl (4); Sevina, 2,600 masl (1); Cerro Cicopién, 2,600 masl (1); Bonilla, 2,100 masl (3); 6 Km N, 15 Km E Uruapan, 1,850 masl (3); Montelongos, 2,000 masl (1); Pátzcuaro, 2,500 masl (6); 9 Km SW, Pátzcuaro, 1,900 masl (1); El

Abrojal, Opopeo, 2,100 masl (2); San Juan Nuevo, 1850 masl (1); La Huizachera, Santa Rosa, 1,600 masl (2); Barranca del Cupatitzio, 1,640 masl (2); 2 Km W Cruz Gorda, 3100 masl (4).

Appendix 2. Cont. ...

Oryzomys couesi regillus Goldman, 1915. Specimens examined: 3 Km W Venustiano Carranza (not shown in map) (1).

Peromyscus hylocetes Merriam, 1897. Specimens examined: 8 Km N Capacuaro, 2,600 masl (3); Cerro de la Bandera, Comachuén, 2,900 masl (1); 6 Km N, 15 Km E Uruapan, 1,850 masl (19); 2 Km W Cruz Gorda, 3100 masl (2); Cerro Comburindos, Tingambato, 2,350 masl (1); El Abrojal, Opopeo, 2,100 masl, (1); Pátzcuaro, 2,500 masl (3); Cerro Piedra China, San Angel Zurumucapio, 1700 masl (1); Presa del Cupatitzio, 1,600 masl (1).

Peromyscus gratus gratus Merriam, 1898. Specimens examined: Los Nogales, 1,750 masl (4); San Antonio Carapan, 2,000 masl (1); Bonilla, 2,100 masl (2); Cherán, 2,200 masl (2); Cerro Cicopién, 2,600 masl (21); Tzurumútaró, 2,100 masl, (1); San Lorenzo, 17 Km NE Uruapan, 1,900 masl (2); Cerro Comburindos, Tingambato, 2,350 masl (7); La Huizachera, Santa Rosa, 1,600 masl (2); Pátzcuaro, 2,500 masl (4).

Peromyscus levipes levipes Merriam, 1898. Specimens examined: Cerro Los Gallineros, 2.5 Km SW Angahuan, 2,400 masl (5); 6 Km N, 15 Km E Uruapan, 1850 masl (1); Presa del Cupatitzio, 1,600 masl (3); Ejido San Francisco, Uruapan, 1,600 masl (2); La Huizachera, Santa Rosa, 1,600 masl (1); Pátzcuaro, 2,500 masl (3).

Peromyscus maniculatus labecula Elliot, 1903. Specimens examined: Paracho, 2,750 masl (13); Cerro del Banco, Capacuaro, 2,350 masl (1); Cerro Las Cocinas, 2,250 masl (1); 8 Km N Capacuaro, 2,600 masl (14); Cerro Los Gallineros, 2 Km SE Angahuan, 2,450 masl (14); Barranca del Cupatitzio, 1,640 masl (1); La Huizachera, Santa Rosa, 1,600 masl (5); Pátzcuaro, 2,500 masl (3); 12 Km N Villa Escalante, 2,500 masl (2).

Peromyscus melanotis J. A. Allen y Chapman, 1897. Specimens examined: 6 Km SE Paracho, 2,800 masl (1); Cerro de la Bandera, Comachuén, 2,900 masl (1); La Huizachera, Santa Rosa, 1,600 masl (3); Pátzcuaro, 2,500 masl (2).

Peromyscus melanophys zamorae Osgood, 1904. Specimens examined: 4 Km SE Zamora, 1,800 masl (4); 5 Km SE Zamora, 1800 masl (3).

Peromyscus spicilegus J. A. Allen, 1897. Specimens examined: Tanaco, 2,200 masl (1); La Huizachera, Santa Rosa, 1,600 masl (2); Presa del Cupatitzio, 1,600 masl (2).

Reithrodontomys chrysopsis chrysopsis Merriam, 1,900. Specimens examined: Cerro Cicopién, 2,600 masl (2); Sevina, 2,600 masl (12); El Abrojal, Opopeo, 2,100 masl (3); San Juan Nuevo, 1,850 masl (5).

Reithrodontomys megalotis saturatus J. A. Allen y Chapman, 1897. Specimens examined: San Antonio Carapan, 2,000 masl (1); Cerro Tres Esquinas, Cherán, 2,200 masl (1); Cerro San Marcos, 2,900 masl (1); Sevina, 2,600 masl (14); Cerro del Banco, Capacuaro, 2,350 masl (2); Cerro Cicopién, 2,600 masl (2); Bonilla, 2,100 masl (12); Cerro del Timbén, Mabusco, 2,100 masl (2); San Lorenzo, 17 Km NE Uruapan, 1,900 masl (9); Cerro Comburindos, Tingambato, 2,350 masl (1); Cerro Las Cocinas, 2,250 masl (3); Tancítaro (4); El Abrojal,

Opopeo, 2,100 masl (7); San Juan Nuevo, 1,850 masl (3); Pátzcuaro, 2,500 masl (2); 2 Km W Cruz Gorda, 3100 masl (3); Cerro Piedra China, San Angel Zurumucapio, 1700 masl (1); Los Barrancos, Cutzato, 1700 masl (1).

Appendix 2. Continuación...

Reithrodontomys sumichrasti nerterus Merriam, 1901. Specimens examined: Los Nogales, 1,750 masl (1); Tanaco, 2,200 masl (1); Cerro Cicopién, 2,600 masl (7); Cerro del Banco, Capacuaro, 2,350 masl (3); Cerro San Marcos, 2,900 masl (5); El Abrojal, Opopeo, 2,100 masl (10); Paracho, 2,750 masl (1); Bonilla, 2,100 masl (3); Montelongos, 2,000 masl (3); 9 Km SW Pátzcuaro, 1,900 masl (1); Pátzcuaro, 2,500 masl (5); Cerro Comburindos, Tingambato, 2,350 masl (1); Cerro Las Cocinas, 2,250 masl (4); Sevina, 2,600 masl (1); 2 Km SE Angahuan, 2,450 masl (1); Cerro Los Gallineros, Angahuan, 2,400 masl (3); San Juan Nuevo, 1,850 masl (6); San Lorenzo, 17 Km NE Uruapan, 1,900 masl (3); 1 Km N, 2 Km W Tancítaro, 2,900 masl (1). Barranca del Cupatitzio, 1,640 masl (3).

Sigmodon alleni Bailey, 1902. Specimens examined: Bonilla, 2,100 masl (1); San Lorenzo, 17 Km NE Uruapan, 1,900 masl (1); Barranca del Cupatitzio, 1,640 masl (1).

Sigmodon hispidus berlandieri Baird, 1855. Specimens examined: Cerro Cicopién, 2,600 masl (1); San Lorenzo, 17 Km NE Uruapan, 1,900 masl (2); Cerro Las Cocinas, 2,250 masl (12); 2.5 Km SW Angahuan, 2290 masl (3); La Huizachera, Santa Rosa, 1,600 masl (3); Barranca del Cupatitzio, 1,640 masl (4);

Sigmodon mascotensis J. A. Allen, 1897. Specimens examined: Barranca del Cupatitzio, 1,640 masl (1); Cerro Piedra China, San Angel Zurumucapio, 1700 masl (4); Pátzcuaro, 2,500 masl (1).

Sylvilagus floridanus orizabae (Merriam, 1893). Specimens examined: 4 Km SW Uruapan, 1760 masl (1).
