We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900
Open access books available

185,000
International authors and editors

200M
Downloads

Our authors are among the

154
Countries delivered to

TOP 1%
most cited scientists

12.2%
Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



15

Diversity of Wild Mammals in a Megalopolis: Mexico City, Mexico

Yolanda Hortelano-Moncada and Fernando A. Cervantes
Departamento de Zoología, Instituto de Biología,
Universidad Nacional Autónoma de México,
Distrito Federal,
México

1. Introduction

Mexico City, the capital of Mexico, is located on the Southern-Central part of the country and it is one of the most important megalopolis in the world. This city lies within the Distrito Federal, bordering with the state of Mexico on the north, east and west and with the state of Morelos on the south. It is one of the 32 political divisions of Mexico and the smallest one, comprising an area of 1,485 km^2 (Fig. 1). Mexico City belongs to the Basin of Mexico together with parts of the states of Hidalgo, Puebla, Tlaxcala and México. México City and the rest of the metropolitan area is one of the largest cities in the world with more than 30 million inhabitants (INEGI, 2010), just behind Tokyo, Japan and forward New York and the Philadelphia area, USA (34.3 and 22 respectely; Brinkhoff, 2011). The rapid growth of its population has led to the loss of original habitats and to the transformation of natural sites and therefore and in spite of being considered as a region with high levels of biodiversity to the local extinction of wildlife species. Mammals are one of the most important components of biodiversity, particularly in México. Several inventories and studies have reported the occurrence of mammals in the Valley of Mexico in the past years. Some of the most remarkable contributions to this subject are by far those of Villa-R (1952) and Hall (1981). However, important mammalian information for the Valley of México was also gathered by Ceballos & Galindo (1984) and Villa & Cervantes (2003). Moreover, the paper published by Ramírez-Pulido *et al.* (1986) more than a quarter of a century ago about mammals of the Distrito Federal contributed important information to the knowledge of the species richness of local mammals species. In addition, several papers reports on mammals collected in diverse areas of the Distrito Federal (López-Forment, 1989; Sánchez *et al.*, 1989; Negrete, 1991; Negrete & Soberón, 1994; Castro-Campillo, 1992; Chávez & Ceballos, 1992, 1994; Chávez, 1993 a, b; Álvarez *et al.*, 1994; Monroy *et al.*, 1999; CONANP-SEMARNAT, 2006; Navarro, *et al.*, 2007; Bárcenas & Medellín, 2007; Gómez-Jiménez, 2009). Research papers referriing especially to particular taxonomic groups (Villa-R, 1966; Álvarez & Ramírez-Pulido, 1972; Polaco *et al.*, 2002; Carraway, 2007) also mentioned the presence of mammals in México City and confirmed the outstanding contribution of mammals to the biodiversity of the Distrito Federal.

Despite this large number of reports, the available information on mammals of Mexico City was scattered and incomplete. Therefore, in order to properly documents the species

richness of mammals in Mexico City, to make decisions about its protection, and to prevent a further loss of species due to the urban sprawl that has endangered all existing ecosystems in the Valley of Mexico, a synthesis on the subject as well as an updated inventory of the mammal fauna of this region was necessary. The result of this research will undoubtedly serve also as a tool for the development of programs aimed to the conservation and sustainable use of the biodiversity of México City and the remaining The Distrito Federal region.

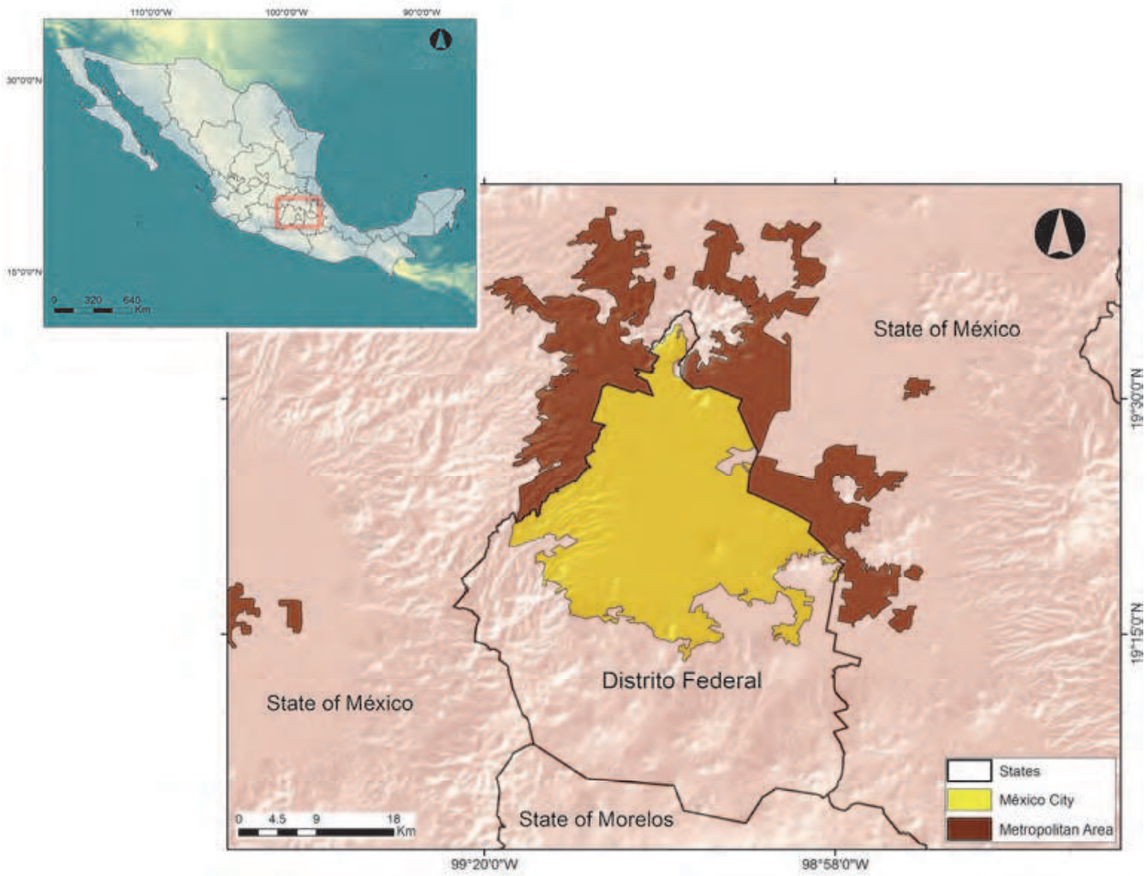


Fig. 1. Mexico City and the rest of the metropolitan area lie in the northeastern and central Distrito Federal.

1.1 Topography

The Distrito Federal topography is defined by a valley whose average altitude is 2,400 m, surrounded by high mountains whose highest elevation 3,930 m- is located on the Ajusco volcano. This city is surrounded by the mountains of Sierra de Guadalupe (2,780 m) and Cerro del Tepeyac in the northern part of the entity. In the central-eastern part is bordered by the mountains of Santa Catarina and Cerro de la Estrella, whereas the mountain range of the Sierra de las Cruces and the volcanoes Ajusco, Xitle, Chichinautzin, Teuhtli and Tláloc are located in the southern part of México City. This mountainous system belongs to the Neovolcanic Axis, also known as Sierra Ajusco-Chichinautzin. The topography of the Valley of México also includes hills such as Peñón de los Baños, Peñón Viejo and Cerro de Chapultepec.

A few years ago several permanent rivers and streams flowed through The Distrito Federal, including the rivers Magdalena, La Piedad, Becerra, Michoacán, Tacubaya, Churubusco, Consulado, San Joaquín, and Los Remedios. They used to drain into the ancient Texcoco Lake; however, today they are intubated and run under streets and avenues; the water of some streams is stored in dams such as Anzaldo and Canutillo. Today the only remaining lakes in the Valley of Mexico are Zumpango, Texcoco, Xochimilco and Chalco.

1.2 Climate

The Distrito Federal climate ranges from mild to cold and wet alpine tundra in the higher parts of the southern mountains. The urban area has a rainy temperate climate, with temperatures ranging from 0 ° C at the beginning of the year to 28 ° C in late spring, being the Ajusco ridge having the coldest one. The wet season runs from May to November, with most rainfall between June and August, with a different pattern because of the altitude. The northern part of the Distrito Federal is dry and warm in contrast to the southern part that is rather mesic due to the presence of forested mountains.

1.3 Vegetation

The Distrito Federal has approximately 149, 830 ha, and depending on the land use and population activities, the land is divided into two areas: urban land and conservation land. The former is found in the northeastern part of the entity which corresponds to Mexico City, whereas the latter comprises about 59% of the Distrito Federal and is located in the southwest section of this entity (SEMARNAT, 2010; Rivera & Espinosa, 2007). Natural vegetation is still found in half of the conservation land, while the rest correspond to agricultural and urban land According to Rivera & Espinosa (2007) the Distrito Federal has the same six types of vegetation described for the Basin of Mexico (Reiche, 1926; Miranda & Hernández, 1963; Rzedowski *et al*., 2001). The vegetation map and soil conservation followed CONABIO (1999) and the vegetation description is after to Rivera & Espinosa (2007). Another two types of vegetation ocurring in the Distrito Federal are the cloud forest and the aquatic and subaquatic vegetation, but they do not appear in maps due to their small extension and scale restrictions.

1.3.1 Coniferous forest: Oyamel (*Abies religiosa*)

The tree stratum composed by oyamel *Abies religiosa* is scarce but *Roldana angulifolia* prevails, and sometimes *Ribesciliatum*, *Symphoricarpos microphyllus*, *Cestrum anagyris*, *Solanum cervantesii* and *Physalis coztomatl*, among others. The herbaceous stratum is composed by *Arracacia atropurpurea*, *Sigesbeckia jorullensis*, *Alchemilla procumbens*, *Stellaria cuspidata* and *Euphorbia furcillata*. Almost all the forests in this region show different stages of damage and a large part of the original landscape has become urbanized. The high demographic density imposes a negative pressure against these resources, principally on forest management issues (wood extraction), creating spaces for urbanization, agricultural management or pastures for cattle management (cows and sheep). Oyamel forests are mainly located in the western part of The Distrito Federal, in the following political delegations: Cuajimalpa, Álvaro Obregón and Magdalena Contreras (Cañada de Contreras); there are also small spots in the political delegations of Tlalpan and Milpa Alta. This type of vegetation is mainly located at altitudes between 2500 and 3500 m (Rivera & Espinosa, 2007).

1.3.2 Coniferous forests: Pines (*Pinus*)

This kind of vegetation is composed of pine trees: Pinus hartwegii, P. montezumae, P. pseudostrobus, P. teocote, P. rudis, besides Salix paradoxa and Juniperus monticola, along with other tree species such as Alnus jorullensis, Quercus laurina, Arbutus xalapensis and shrubs such as Buddleja cordata. There is practically no vegetation strata at high altitudes whereas at lower altitudes we have Solanum cervantesii and Barkleyanthus salicifolius wich are notorious, Alchemilla procumbens, Salvia prunelloides, Stipa ichu, Muhlenbergia quadridentata and Festuca tolucensis are abundant in places where bunch grasslands conform the herbaceous stratum, these grasslands are quite frequent, also containing dominant grasses like Muhlenbergia macroura, M. quadridentata, M. robusta, Festuca tolucensis and F. amplissima, together with the herbs Penstemon tenuiflora, Piqueria trinervia and Zephyranthes fosteri, among others. This is the most extended kind of vegetation in the Distrito Federal at altitudes between 2700 and 3800 m, and it mainly occurs in the following political delegations: Cuajimalpa, Álvaro Obregón, Magdalena Contreras, Tlalpan and Milpa Alta (Rivera & Espinosa, 2007).

1.3.3 Oak (*Quercus*) forest

The dominant oak species are: Quercus rugosa, Q. laeta, Q. crassipes and Q. castanea. In smaller numbers we find: Q. obtusata, Q. candicans, Q. crassifolia and Q. dysophylla. They are frequently found with Pinus leiophylla, P. rudis, Clethra mexicana, Arbutus xalapensis, Garrya laurifolia, Prunus serotina ssp. capuli and Ceanothus coeruleus. The shrub stratum is abundant, with the most common species being: Solanum cervantesii, Cestrum anagyris, Monnina ciliolata, Bouvardia ternifolia, Acaciella angustissima and Croton adspersus. In the herbaceous stratum it is common to find Penstemon roseus, Peperomia campylotropa, Polygala alba, Castilleja tenuiflora and Ageratina pazcuarensis, among others. The presence of climbing plants such as Smilax mora-nensis, Dioscorea galeottiana, Passiflora exsudans, Clematis dioica and Bomarea hirtella is common in this forest. Oak forests are located in the political delegations of: Cuajimalpa, Álvaro Obregón, Magdalena Contreras, Xochimilco, Gustavo A. Madero, at altitudes between 2300 and 3000 m. Some spots of these plant species in Milpa Alta and Tlalpan, are located at altitudes of 3300 m (Rivera & Espinosa, 2007).

1.3.4 Sarcocrassicaule (Xerophitic) ticket

Xerophytic thicket and say it is located in the driest areas of the Distrito Federal between 2300 and 3060 m (Rivera & Espinosa, 2007). The dominant species is *Pittocaulon praecox*. Others species are: *Buddleja cordata*, *Dodonaea viscosa*, *Montanoa tomentosa*, *Schinus molle* and *Wigandia urens*, all of which form a rich tree stratum. Some of the abundant shrubs are represented by *Verbesina virgata*, *Bouvardia ternifolia* and *Sedum oxypetalum*. In the herbaceous stratus we can find: *Commelina coelestis*, *Arracacia tolucensis* var. *multifida*, *Anagallis arvensis*, *Begonia gracilis*, *Muhlenbergia robusta*, *Pseudognaphalium oxyphyllum*, *Asclepias linaria*, *Dahlia coccinea*, *Sarcoglottis schaffneri*, *Lepechinia caulescens* and *Manfreda pringlei*. These thickets are located in the political delegations of Gustavo A. Madero (Sierra de Guadalupe), Iztapalapa (Cerro de la Estrella and Sierra de Santa Catarina), Tláhuac (Sierra de Santa Catarina), Tlalpan (Pedregal de San Ángel), Xochimilco and Milpa Alta.

1.3.5 Halophytic and gypsophytic vegetation

These are located in the southern part of the Valley of Mexico, in soil with high amounts of salt and alkaline within areas affected by constant flooding. Some of the typical species of

this type of vegetation are *Distichlis spicata*, *Muhlenbergia* spp. and *Atriplex* spp. (CONABIO, 1999).

1.3.6 Cloud forest

This type of vegetation occurs only in a very small area in the Cañada de Contreras or Cañada de los Dínamos, the National Park Desierto de los Leones, the Parque Ecológico of the Mexico City and other spots with sharp edges and in the bottom of some ravine, between 2500 and 2700 m. Among the dominant species of trees we can find *Clethra mexicana*, *Cornus disciflora*, *C. excelsa*, *Meliosma dentata*, *Symplocos citrea*, *Viburnum stenocalyx*, *Rhamnus mucronata*, *Sambucus nigra* var. *canadensis* and *Quercus laurina*. We can also find *Abies religiosa*, *Cupressus lusitanica*, *Prunus serotina* ssp. *capuli* and *Quercus rugosa*. In the shrub stratus, we can find *Archibaccharis asperifolia*, *Cestrum anagyris*, *Ageratina aschenborniana* and *Iresine ajuscana*. At the edge of creeks, we can find the following species: *Acer negundo* var. *mexicanum*, *Ilex tolucana* and *Alnus acuminata*. Climbing plants are *Valeriana clematitis*, *Philadelphus mexicanus*, *Lonicera pilosa*, *Archibaccharis hirtella*, *Solanum appendiculatum*, *Clematis dioica*, *Didymaea alsinoides* and *Smilax moranensis*. *Tillandsia andrieuxii*, *T. violacea*, *Peperomia galioides* are also found in this forest. Different kinds of ferns are common in the herbaceous stratum, along with *Bidens ostruthioides* and *Peperomia hispidula* (Rivera & Espinosa, 2007).

1.3.7 Aquatic and subaquatic vegetation

The Broad-leaf cat-tail, Typha latifolia is the most abundant species, though Polygonum amphibium, Cyperus semiochraceus, Hydrocotyle ranunculoides, Pistia stratiotes, Berula erecta, Hydromystria laevigata and Jaegeria bellidiflora are also common in the edges of Xochimilco canals and ditches as well as in other spots of The Distrito Federal. Floating vegetation is very common in these places, and it mainly consists of thick layers of Lemna spp. and Azolla filiculoides, which occasionally cover all the canals. These canals are mainly located in the political delegations of Xochimilco and Tláhuac, at altitudes of 2250 m, on the slopes of the southern mountains of The Distrito Federal (Rivera & Espinosa, 2007).

1.3.8 Agricultural, cattle and forestal management

The agricultural areas are located in the southern and southeastern part of The Distrito Federal, and they were created as a result of deforestation. There are induced pastures most of them derived from bunch grasslands also called alpine or subalpine bunch grassland and are associatted to the *Pinus hartwegii* forest.

These pastures are maintained by the continuous shepherding of cattle and by controlled burning, which stimulate their growth during the rainy season. Some representative species of these grasses important in pastures for livestock are: *Bouteloua* spp. *Aristida* sp. *Muhlenbergia macroura, Festuca tolucencis*, *F. amplissima* and *Stipa ichu*. Most agricultural zones are seasonal, where we may also find corn, bean, chile, oats, broad bean and nopal. In the lowest areas of The Distrito Federal there are other pastures of secondary origin, commonly mixed with the xerophitic bushes. There may occur *Aristida adscensionis*, *Bouteloua simplex* and *Hilaria cenchroides*, isolated specimens of *Schinus molle* and *Mimosa biuncifera*. This vegetative association is located in the political delegations Cuajimalpa, Álvaro Obregón, Magdalena Contreras, Tlalpan and Milpa Alta, between 2800 and 3860 m. In some areas like Xochimilco the cultivation of vegetables and floriculture is important (SEMARNAT, 2010; Rivera & Espinosa, 2007).

2. Materials and methods

To create an updated inventory of mammals of Mexico City we gathered data from collecting work in the field, from visiting mammalian collections in the Valley of Mexico, and from consulting the literature and databases available in web sites. Collected specimens were conventionally prepared as museum specimens and taxonomically determined following conventional identification keys (Hall, 1981; Medellín *et al.*, 1997; Villa & Cervantes, 2003). Voucher specimens were stored and catalogued in the mammalian collection "Colección Nacional de Mamíferos (CNMA)" of Instituto de Biología, Universidad Nacional Autónoma de Mexico, at Mexico City.
All resulting data were stored and managed in a database created in Microsoft Access 2003, where were incorporated 50 fields of geographical and biological information according to the guidelines of Darwin Core (Ver. 3.0) and MaNIS/HerpNet/ORNIS Georeferencing Guidelines (Wieczorek, 2001).

2.1 Updated list, distribution and conservation status

The list of the inventory was elaborated only with taxa adequately documented, at least with one voucher specimen cataloged in a biological collection. An exception to this was the coyote, *Canis latrans* (Aranda, 2010a; Farías, 2010) and *Nasua narica* (Aranda, 2010b). The nomenclature and classsification at species level we followed was that by Wilson & Reeder (2005), while for subspecies level we consulted the list of Ramírez-Pulido *et al.* (2005). For taxa of the family Heteromyidae and Soricomorpha we followed Hafner *et al.* (2007) and Carraway (2007) respectively. We reported the category of extinction risk of the taxa according to both the Norma Oficial Mexicana 059 (SEMARNAT, 2010), and the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES). The endemic condition (E) of a species and its condition as a monotypic or polytypic taxon is indicated (SEMARNAT, 2010; Carraway, 2007).

2.2 Collecting locaties

Specimens collecting locaties were verified because many were wrong, incomplete, or their names were ambiguous. Therefore, it was necessary to check maps, gazeteers, literature, field diaries and catalogues to accurately identify the localities referred. The names of the locaties were standardized and the geographic coordinates were calculated using a conventional guide for georeferencing (Wieczorek, 2001); topographic maps at scales 1:50,000 and 1:100,000 were used (INEGI, 2001; Secretaría de Comunicaciones y Transportes, 1987, respectively); in those cases when the data were taken directly from a Global Positioning System (GPS) unit (Garmin Co. Inc.). The information obtained was visualized using Arcview software and the digital map of The Distrito Federal was provided by the Unidad de Informática para la Biodiversidad (UNIBIO).

3. Results

The results produced 5,724 records of mammals from Mexico City in The Distrito Federal and some near localities bordering on the other states confoming the Valley of Mexico. The specimens correspond to different preservation types such as skin, skull, skeleton and alcohol cataloged in 17 mammalian collections, seven of them are domestic and ten from the United States of America. The collection name, acronym (Hafner *et al.*, 1997; Lorenzo *et al.*,

2006) and the number of specimens held are as follows: Colección Nacional de Mamíferos, Instituto de Biología, UNAM, (CNMA, 1,622); Universidad Autónoma Metropolitana, Iztapalapa, (UAMI, 1,489), Colección de Cordados, Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional, (ENCB, 951), Colección de Fotocolectas Biológicas del Instituto de Biología, UNAM (CFB: FB, 43); Museo de Zoología "Alfonso L. Herrera", Facultad de Ciencias, UNAM, (MZFC, 33), Instituto Nacional de Antropología e Historia (INAH, 12); Museo Dugès, Universidad de Guanajuato, Gto, Mexico (MADUG-MA,1); University of Michigan, Museum of Zoology (UMMZ 567); Smithsonian Institution National Museum of Natural History (USNM, 421); University of Kansas, Museum of Natural History (KU 270); The Field Museum of Natural History (FMNH, 139); Brigham Young University, Monte L. Bean Life Science Museum (BYU, 62); University of California, Berkeley, Museum of Vertebrate Zoology (MVZ, 48); Michigan State University Museum (MSU, 29); Yale University Peabody Museum (MAM, 23); Texas Tech University, Museum of Texas Tech University (TTU, 9); and Harvard University Provider (MCZ, 5). The database containing the whole data set will be available through the CNMA at the web site of Instituto de Biología, Universidad Nacional Autónoma de Mexico (http//unibio.ibunam.mx).

3.1 Collected specimens by species and collecting periods

The number of specimens cataloged by mammalian collection varied from 1 to 1,622; the collection period recorded was 1830 – 2011, excluding several years with no collecting. Some years have few collectings (1 – 25 specimens) whereas other years show intense collecting activity: 1892 (240), 1944 (359), 1947 (468), 1949 (196), 1980 (226), 1985 (210) and 1996 (485), 1997 (482), 1998 (264), 1999 (280). The decades of the 1940s and 1990s correspond to periods of the greatest number of specimens collected (Fig. 2). On the other hand, the oldest mammal records for the Distrito Federal correspond to the following carnivores: *Bassariscus astutus astutus (B*[*assaris*] *astuta ,* Lichtenstein, 1830), **Mustela frenata* (Lichtenstein, 1831), **Procyon lotor hernandezii* (*Pr*[*ocyon*] *hernandezii ,* Wagler, 1831), and the skunk **Mephitis macroura* (Lichtenstein, 1832). The first and second specimens were collected near Mexico City, the third specimen in Tlalpan, and the last one in the hills NW of Mexico City.

There are also four species of bats with old records, a specimen of *Nyctinomops macrotis (Nyctinomus drepressus*, Ward, 1891*;* 9246 CNMA*)* that was collected in Tacubaya in 1887). A second specimen of this species was collected in Mexico City´s Cathedral (270 MADUG-MA),there is no date on the label but the collector´s notes (Dugès)indicate that it was collected between 1870-1910; it also indicates that the museum only keeps this mammal from the Distrito Federal. From the Iztapalapa region we have*Tadarida brasiliensis*, *Molossus ater* (Herrera, 1895) and *Myotis velifer* and two from Valley of Mexico (in USNM and MCZ respectely; Miller & Allen, 1928), all bat specimens are kept in alcohol. The analysis of the data-base generated shows that 1892 was the year with the highest number of new records from The Distrito Federal, with a total number of 25, some of which are: one marsupial *Didelphis virginiana,* two rabbits, *Sylvilagus cunicularius* and *S. floridanus*, two shrews,*Cryptotis parva* (50762 USMN **Blarina soricina,* Merriam, 1895) and *C. alticola*; one bat *Tadarida brasiliensis* and two carnivores*, Spilogale putorius* (50825 USMN, **Spilogale a. angustifrons,* Howell, 1902). After a period of 51 years in which only two more species appear, in 1943 there are again new records of species with a slow but constant increase, with a maximum number of 6 species in one year. (Fig. 3). In addition, our data set shows that approximately 170 collectors have contributed the specimens collected in Mexico City and surroundings. Similarly, the representation of specimens by species found was highly

variable (1 – 1,175; Table 1). As expected, few species (6 taxa, 7.4%) were represented by a high number of specimens, particularly the mouse species, such as *Peromyscus melanotis* (1,175), *Peromyscus gratus gratus* (649), *Neotomodon alstoni* (512), *Microtus mexicanus mexicanus* (456), *Peromyscus difficilis felipensis* (354), *Peromyscus maniculatus labecula* (236). In contrast there were 14 species represented only by one specimen: one shrew (*Sorex orizabae*), 10 bats (*Artibeus lituratus palmarum*, *Pteronotus parnelli mexicanus*, *Natalus stramineus saturatus*, *Eumops perotis californicus*, *Molossus rufus*, *Nyctinomops laticaudatus ferruginea*, *Lasiurus intermedius intermedius*, *Corynorrinus townsendii australis*, *Idionycterys phyllotis* and two carnivores, *Nasua narica* and *Taxidea taxus berlandieri*.

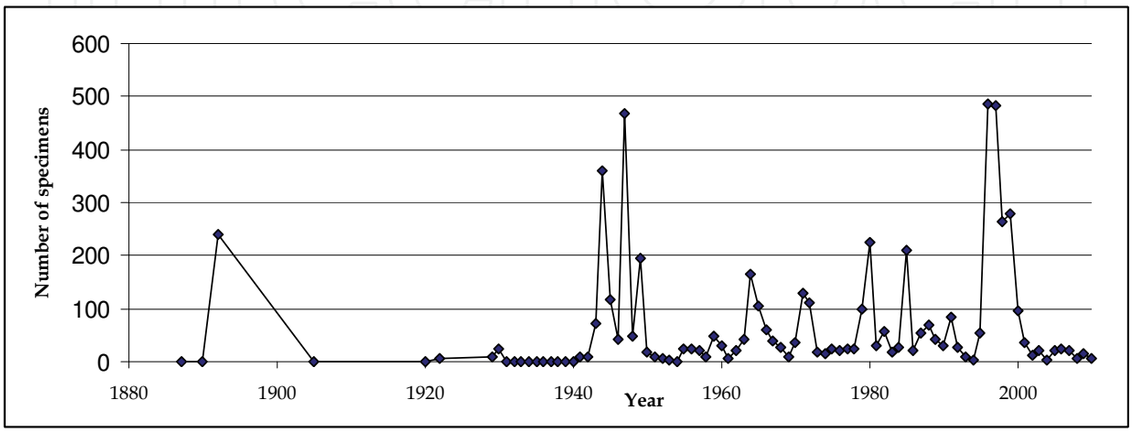


Fig. 2. Representation of the number of specimens collected by year in Mexico City and other localities of Distrito Federal.

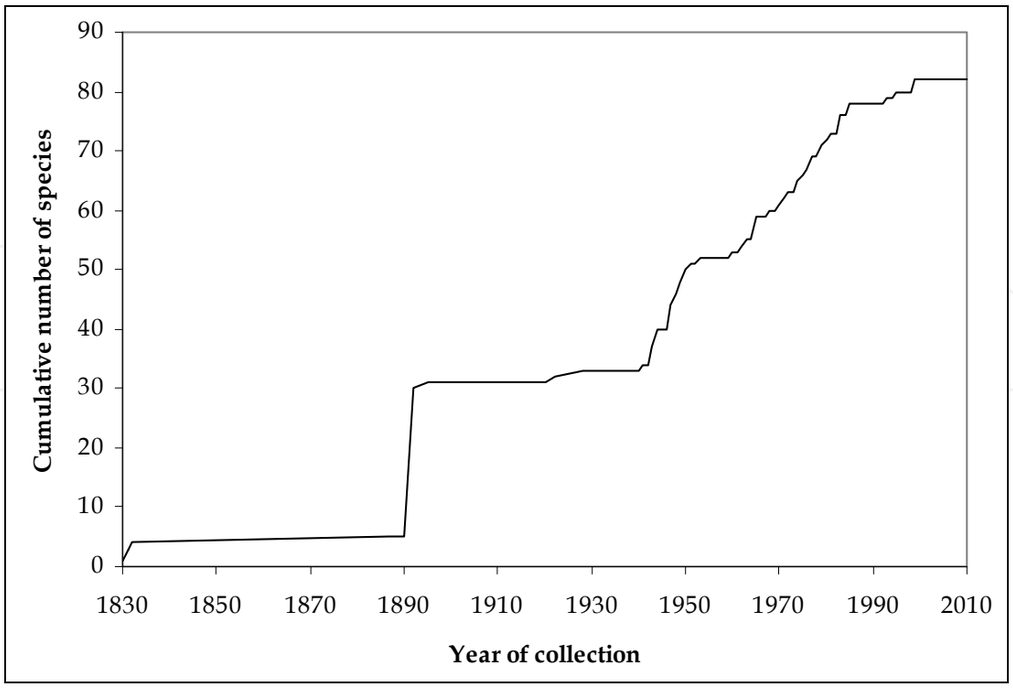


Fig. 3. Accumulation curve of mammal species registered in Mexico City and other localities of the Distrito Federal from 1830 to 2011.

ORDER DIDELPHIMORPHIA
Didelphis virginiana californica (62): **CNMA:** 5, 437-438, 796, 3785-3787, 4165, 4254, 8736, 11305, 16491, 16863, 23070, 30722-30723, 31342, 33417, 34642-34645, 34780, 34858, 37131, 40199, 42908-42910, 43372-43377, 44049-44054, 44085, 45113-45116; **ENCB:** 339, 5426, 10942, 40020, 40730, 41531, 42380, 43363; **MZFC:** 3465, 3468; **KU:** 27979, 66268; **UAMI:** 5171; **USNM:** 50062-50064.
ORDER CINGULATA
Dasypus novemcinctus mexicanus (5): **CNMA:** 16738**; CFB-FB**: 1699, 1732; **KU:** 28280, 28281.
ORDER LAGOMORPHA
Romerolagus diazi (172): **CNMA:** 341-350, 353-358, 401, 3800-3803, 4166, 6797, 12479-12486, 13504, 14577, 15221-15222, 16888-16951, 16955-16958, 16960, 16962, 18287-18288, 26427, 26430-26431, 28525-28526, 30731, 34335-34339, 34824, 34840, 34856, 35586, 39776-39777, 45929-45930; **CFB-FB**: 1997; **ENCB:** 1468-1472, 10244-10249, 19283; **INAH:** 1558, 4381; **KU:** 30815, 102028-102033; **MCZ:** 59284; **MZFC:** 465-469; **UMMZ:** 96526, 103246, 111225-111226, 112316-112318; **USNM:** 143611, 146901, 146918-146919, 146935-146941.
Sylvilagus cunicularius cunicularius (21): **CNMA:** 1063, 16525, 16739, 16744-16745, 18294, 18296-18299; **ENCB:** 5354; **KU:** 28277; **USNM:** 50069-50071, 50073-50074; **UAMI:** 2757, 8226-8227, 8341.
Sylvilagus floridanus orizabae (77): **CNMA:** 1056-1062, 1064-1069, 1133, 7166, 16740-16743, 16876-16884, 18289-18293, 19595-19596, 19602, 30732, 34841, 44513-44522, 44091-44092; **CFB-FB**: 1709; **KU:** 28273-28274; **UAMI:** 8228-8230, 8342-8350, 13196-13197; **UMMZ:** 112315; **USNM:** 50072, 50075-50080, 51111, 143612.
ORDER SORICOMORPHA
Cryptotis (1): **CNMA** 45805.
Cryptotis alticola (12): **CNMA:** 951, 6118; **UAMI:** 13208*, 13209, 13210**-13212,* 14610, 14611*, 14612, 14619*; **UMMZ:** 93367*, 94597*; **USMN***: 50763.*
Cryptotis parva soricina (5): **CNMA:** 439; **ENCB:** 29010; **UAMI:** 5; **USNM:** 50760, 50762.
Sorex (2): **CNMA** 45806; **CFB-FB**: 2404.
Sorex oreopolus (6): **CNMA:** 440, 19591, 31955; **UAMI:** 13245, 13247, 14613.
Sorex orizabae (1): **ENCB:** 5316**.
Sorex saussurei saussurei (103): **CNMA:** 847, 12791, 12792, 42911, 42912, 43368-43371, 44055-44062; **ENCB:** 581, 41701; **UAMI:** 13237*, 13238, 13239-13244*, 13246*, 13248*, 13249*, 14614*, 14615*, 14617*, 14618*, 14620*-14644*, 14646*, 14648*-14655*, 14657*, 14658**, 14659-14661*, 14663-14669*, 14671-14682*; **UMMZ:** 88635-88639, 88640*, 91606, 91902-91903, 94586; **USNM**: 143604.
Sorex ventralis (19): **ENCB:** 1490*(**), 2344-2345*(**), 2389- 2391*(**), 5229*(**), *16479-16481*(**)*; **UAMI:** 14683-14685*(**), 15100-15105*;* **JRP***: 3979-3980**.*
Sorex veraecrucis altoensis (Nueva especie) (9): **CNMA:** 790, 9059, 38637; **UAMI:** 14616, 14645*(**), 14647*(**), 14656*(**), 14662*(**), 14670.
ORDER CHIROPTERA
Anoura geoffroyi lasiopyga (10): **CNMA:** 3921, 15478, 16965, 22570, 34646, 42768-42769; **USNM:** 559548-559550.

Choeronycteris mexicana (16): **CNMA:** 15485-15486, 16865, 42760-42767, 44063-44066; **ENCB:** 41209.
Glossophaga soricina handleyi (38): **CNMA:** 441-456, 2627-2632; **KU:** 27980-27992; **YPM:** 3771-3773
Leptonycteris (14): **YPM:** 4252-4256, 4262, 11021-11022, 10766-10767.
Leptonycteris nivalis (4): **CNMA:** 4201, 4729, 4731, 15471.
Leptonycteris yerbabuenae (44): **CNMA:** 457-472, 478-479, 8972, 27782-27783, 34647, 42770-42771; **ENCB:** 18868; **UAMI:** 5210; **KU:** 27995-28012.
Macrotus waterhousii mexicanus (3): **CNMA:** 27784-27785, 37258.
Artibeus lituratus palmarum (1): **UAMI:** 1862.
Mormoops megalophylla megalophylla (7): **CNMA:** 3410, 3928, 9886, 10621, 27780, 37259; **ENCB:** 472.
Pteronotus parnellii mexicanus (1): **CNMA:** 3409.
Natalus stramineus saturatus (1): **CNMA:** 27781.
Eumops perotis californicus (1): **CNMA:** 16866.
Molossus ruffus (1): **CNMA:** 5212.
Nyctinomops laticaudatus ferruginea (1): **UAMI:** 4858.
Nyctinomops macrotis (29): **CNMA:** 2626, 3919, 3925-3927, 4197, 8739, 8973, 9246, 11497-11498, 17035, 39349, 40871-40873, 44093; **ENCB:** 30502, 39122; **MADUG-MA:** 270, **MZFC:** 1339, 6684-6685; **UAMI:** 3160, 3832, 4858, 5260, 8361-8363;
Tadarida brasiliensis mexicana (64): **CNMA:** 477, 1054, 1747, 3922-3923, 4809, 7907, 9874, 10068, 11495, 13444-13445, 14878, 15562, 15580, 15642, 18531, 45935; **ENCB:** 4468-4470, 7601, 18845, 30501, 41844; **FMNH:** 8807-8808, 15124-15126; **INAH:** 6064; **KU:** 28298; **MZFC:** 3308, 5648; **USNM:** 50814-50819, 52454-52468; **UAMI:** 1622, 4857, 10410-10412, 12075.
Eptesicus fuscus miradorensis (28): **CNMA:** 3930; **ENCB:** 3730, 40672, 40695-40704, 41575-41586, 42208-42209; **UAMI:** 5234.
Lasiurus blossevillii teliotis (9): **CNMA:** 3924; **ENCB:** 40705-40708, 41587-41588, 41825-41826.
Lasiurus cinereus cinereus (19): **CNMA:** 493-494, 7679, 10682, 30150, 40426; **ENCB:** 1235, 2043, 5187, 27932, 36833, 40085, 41827-41829, 42196, 42210; **UAMI:** 11969; **UMMZ:** 91904.
Lasiurus ega panamensis (2): **CNMA** 45931; **UAMI:** 885.
Lasiurus intermedius intermedius (1): **CNMA:** 16061.
Corynorhinus mexicanus (27): **CNMA:** 7358, 9484, 9718, 10686, 28350; **CFB-FB**: 2381, 2397; **ENCB:** 136-138, 469-471, 494, 2484, 5188, 41589-41592, 42211-42216; **UAMI:** 2741.
Corynorhinus townsendii australis (1): **ENCB:** 1677.
Idionycterys phyllotis (1): **CNMA:** 6145.
Myotis (1): **CFB-FB**: 2397.
Myotis californicus mexicanus (18): **CNMA:** 12198; **ENCB:** 40646, 40656, 40668, 40671, 40687, 41210, 41533-41534, 41819-41823, 42197-42198; **UAMI:** 5531, 14850.

Myotis occultus (4): **CNMA:** 474, 11461; **ENCB:** 4238, 18861.
Myotis thysanodes aztecus (4): **ENCB:** 41211-41212, 41535, 42378.
Myotis velifer velifer (74): **CNMA:** 475-476, 1134, 5169, 8241, 9069, 16867, 18523, 28854-28863, 45807-45808; **ENCB:** 1680-1694, 2008, 2312, 3848, 7641, 39121, 41213-41214, 41216-41217, 41536-41551, 42201, 42207, 42377; **INAH:** 748-749; **KU:** 28020; **MZFC:** 1340, 3307; **UAMI:** 2733, 3107, 3824, 4221.
Myotis volans amotus (121): **CFB-FB**: 2356; **ENCB:** S/N, 40634-40645, 40647-40667, 40669-40670, 40673-40686, 40688-40694, 41215, 41218-41250, 41252-41274, 41699, 41824, 42203-42206.
ORDER CARNIVORA
Canis latrans cagotis (3): **CFB-FB**: 1563, 1679, 1964.
Lynx rufus escuinapae (8): **CNMA:** 1129-1130; **CFB-FB**: 1564, 1660, 1671, 1674, 1693, 1722.
Urocyon cinereoargenteus nigrirostris (2): **CNMA**: 15636, **MZFC** S/N
Mustela frenata frenata (18): **CNMA:** 5209, 7200, 9623, 16886, 27265, 28414, 38937, 40183, 45937; **CFB-FB**: 1682, 1727, 2400; **INAH:** 7247; **USNM** : 1060, 3009, 50826-50827.
Taxidea taxus berlandieri (2): **CNMA:** 3798; **CFB-FB**: 1557.
Conepatus leuconotus leuconotus (4): **CNMA:** 3872, 18307, 28410; **CFB-FB**: 1701.
Mephitis macroura macroura (12): **CNMA:** 487, 14592, 15634, 16516, 16749-16750, 16887, 17054, 28915; **CFB-FB**: 1558; **UAMI:** 139; **UMMZ:** 96281.
Spilogale putorius angustifrons (13): **CNMA:** 481, 16885, 42772, 44069, 44089; **ENCB:** 520, 5875-5876; **USNM:** 50821-50825
Bassariscus astutus astutus (12): **CNMA:** 42913, 42917, 43383, 44067-44068; **CFB-FB:** 1643; **KU:** 28021; **USNM:** 3007, 50058-50061.
Procyon lotor (4): **USNM**: 51151; **CFB-FB:** 1617, 1706, 1713.
Nasua narica (1): **CFB-FB**: 1579.
ORDER ARTIODACTYLA
Odocoileus virginianus mexicanus (9): **CNMA:** 1131, 32074, 38261, 45936; **CFB-FB:** 1646, 1686, 1694, 2973; **USNM:** 50184
ORDER RODENTIA
Sciurus (1): **CFB-FB:** 1582.
Sciurus aureogaster nigrescens (60): **CNMA:** 489-490, 1374, 39693, 42915, 43381-43382; **ENCB:** 17169, 42802-42829, 42903-42904; **MZFC:** 4392-4397; **USNM:** 50081-50083, 50085-50088, 51153, 234276, 189462-189464; **UMMZ:** 88207-88208, 88645, 92234.
Spermophilus adocetus adocetus (3): **CNMA:** 15585, 16872; **UAMI:** 5551.
Spermophilus mexicanus mexicanus (18): **CNMA:** 484-486, 16056; **ENCB:** 7661; **INAH**: 7246, **KU:** 28022; **USNM:** 50095-50098, 188762; **UAMI:** 8914; **UMMZ:** 88203-88206, 108274.
Spermophilus variegatus variegatus (40): **CNMA:** 488, 4370, 4428, 8303, 15588-15589, 15643-15644, 16006, 16487, 16746, 16873-16875, 17040, 26147, 27271, 27693, 34648-34649, 39694, 42914, 43378-43380, 44070, 45809; **ENCB:** 34, 41, 787, 2016-2018, 10250; **KU:** 28024; **MZFC:** 189, 461-462, 5640; **UAMI:** 5552.
Dipodomys phillipsii phillipsii (29): **CNMA:** 522; **USNM:** 50297-50323, 50704.

Liomys irroratus alleni (63): **CNMA:** 515-517, 846, 4584, 11549; **ENCB:** 968; **FMNH:** 55791-55792; **KU:** 28052, 28056, 32027; **USNM:** 50357-50358, 51233**; UAMI:** 2781-2782, 5598, 12142-12144, 13391; **UMMZ:** 88729-88742, 88748-88774.
Perognathus flavus mexicanus (16): **FMNH:** 56002; **USNM:** 50706-507018; **UAMI:** 12169-12170
Cratogeomys merriami merriami (182): **CNMA:** 495, 498-511, 800, 3799, 5493, 5835, 7054, 8245, 10089-10090, 11513-11515, 14582, 15118, 16007, 16747-16748, 16870-16871, 27251, 27260, 27280-27287, 27290-27292, 34149-34179, 34700-34713, 38905, 45810; **ENCB:** 99, 323, 473, 2019-2022, 2125-2133, 16059, 22590-22597, 36422, 41596; **INAH:** 477; **KU:** 28035-28044; **MCZ:** 32150, 32403, 59211**; USNM**: 1S/#, 50111-50116, 59211, 115610, 143605, 148174, 148176-148178, 188763, 188765-188769, 189459, 203562; **UAMI:** 163, 937-938, 1932, 2768, 3834, 4249, 8364-8369, 10413-10416; **UMMZ:** 91710, 104630-104638.
Cratogeomys tylorhinus tylorhinus (19): **KU:** 66163; **UMMZ**: 88218-88228, 88649, 94628; **USNM**: 115611-115612, 143606, 148179, 204251.
Thomomys umbrinus peregrinus (4): **CNMA:** 39675; **KU:** 38367-38369.
Microtus mexicanus mexicanus (456): **CNMA:** 1S/#, 849-870, 872-875, 911, 3235, 3404, 4336, 8258-8259, 10744, 11532, 16045, 24248, 30948-30965, 31692, 39734, 45811-45889; **ENCB:** 16, 210, 212-225, 528-532, 534-541, 615-620, 2364, 2402, 2409, 16508-16520, 22663-22670; **FMNH:** 55810-55815, 56114-56116; **INAH:** 670; **KU:** 28266-28271, 28382, 35380-35386, 38767-38779; **MVZ:** 43232-43239, 100634-100635, 100695; **UAMI:** 111, 5667-5668, 10408-10409, 13395-13456, 14899-14918, 16523-16524, 16658-16701; **UMMZ:** 88484-88485, 89277-89309, 89311-89314, 92226-92228, 95529-95531, 107251-107257, 107376-107379; **USNM:** 50751-50756, 115613-115617, 148173, 148175, 188764, 188770-188776, 189458, 189460-189461.
Baiomys taylori analogus (219): **CNMA:** 200, 586-591, 594-619, 842-844, 11678-11686; **ENBC: 1S/#,** 27, 198-199, 201-202, 692, 831-832, 1161-1163, 1179, 22652-22662; **FMNH:** 55928-55941, 55969-55970, 56125-56131; **INAH:** 283; **KU:** 28075-28101, 66961-66968; **MVZ:** 100329-100330; **UAMI:** 10342, 12264-12275, 13563; **UMMZ:** 88909-88944, 88953-88954, 89405, 89625-89628**; USNM:** 50679-50703, 143550-143554, 143588, 204252.
Neotoma mexicana torquata (42): **CNMA:** 5471-5472, 8257, 12487, 15223, 16869, 30947, 31956, 34680-34682, 36475; **ENCB:** 22-25, 833, 5182, 10281-10285, 16505-16507; **MZFC:** 2378; **UAMI:** 5626, 12282-12283, 14945-14948, 16229-16234; **UMMZ:** 92225, 92408.
Neotomodon alstoni (512): **CNMA:** 801-805, 811-827, 830, 832-841, 8175-8177, 8386-8389, 11521-11525, 15402, 15610-15617, 16360, 19612-19645, 24238-24245, 30874-30919, 36476-36482, 45890-45900, 45902-45904; **BYU:** 15507-15510; **ENCB:** 37-38, 40, 1123-1128, 1497-1506, 4492-4496, 5212-5226, 5257-5270, 5344-5353, 10267-10280, 16497-16504, 22588-22589, 41292-41294, 41843; **KU:** 28256-28560, 28376, 41292-41294, 41843; **FMNH:** 55816-55821; **MCZ:** 59215**; MZFC:** 2369, 3382, 5159; **MSU:** 9699, 9698-9719, 9726-9732, 9737-9740; **TTU:** 35391-35393, 37957-37961, 41165. **UAMI:** 971, 5627-5628, 13589-13672, 13680-13708, 16235-16237, 17252-17255; **UMMZ:** 88999-89000, 89006, 89009, 89011-89013, 89015, 89018, 89041-89043, 89047, 89173-89177, 92219-92223, 92370, 95430-95442, 97669, 111934-111942; **USNM:** 50641, 50655-50662, 50665-50666, 143589-143592, 143596-143599, 143603, 143607-143610; **WNMU:** 6325
Oryzomys couesi crinitus (3): **USNM:** 50181-50183
Peromyscus sp. (22): **USNM**: 143199-143201, 204254-204461, 204463-204471, 249850.

Peromyscus difficilis felipensis (354): **CNMA:** 766, 768, 787-789, 24326-24350, 27818-27819, 31930-31932, 45901, 45933-45934; **BYU:** 15514-15526; **ENCB:** 449, 2393, 4491, 5255, 5256, 10265, 16496; **KU:** 28242-28243; **USNM:** 50663-50664, 50671, 148013-148014, 148158, 148172; **UAMI:** 12398-12416, 13673-13679, 13709-13712, 14204, 14979-13989, 16257-16258, 17050-17251; **UMMZ:** 89026-89034, 89036-89038, 89045-89046, 89182, 92194-92203, 92364-92369, 95405-95412, 96360-96361.
Peromyscus gratus gratus (645): **CNMA:** 686-687, 689-735, 737-749, 752-754, 756-760, 797-798, 845, 3804, 9479, 10113-10122, 11556-11565, 11567-11677, 14863-14864, 15123-15124, 15208-15209, 15608, 15650, 28098, 33517-33525, 33591, 34650-34676, 42916, 44071-44082, 44086-44088, 45905-45908; **ENCB:** 26, 29, 182-196, 204-205, 574-580, 694, 1140-1160, 1236, 16492, 16495, 22622-22650; **FMNH:** 55833-55848, 55861-55865, 55968, 56034-56043, 56050, 56084, 56144; **INAH:** 224, 282; **KU:** 28169-28186, 28188-28241, 32028, 66925-66934; **MVZ:** 100510-100541; **MZFC:** 184-186; **TTU:** 40745-40746; **UAMI:** 2788-2789; **UMMZ:** 89093-89117, 89119-89132, 89135, 89138-89155, 89157-89165, 89407, 89494-89496, 90714, 93442-93443; **USNM:** 50602-50621, 50626-506227, 50629-50630, 50635-50636, 50638, 50640, 51178, 307646-307647, 143202-143209, 143549, 143555-143561, 143563-143564, 143574-143583, 143585, 188761.
Peromyscus hylocetes (6): **CNMA:** 1118-1123.
Peromyscus levipes levipes (28): **CNMA:** 688, 750, 755, 761, 3013, 10720-10725, 10727-10730, 11566, 15648-15649; **ENCB:** 2406-2408, 16369, 16411; **FMNH:** 56045; **UAMI:** 2787; **UMMZ:** 89025, 89039, 89054; **USNM**: 143562.
Peromyscus maniculatus fulvus (97): **CNMA:** 684, 1108, 1110, 1112, 1127, 19646-19657, 39719-39727; **ENCB:** 545, 557-568, 1094, 1111-1115, 1117-1119, 5209-5211, 5248-5249; **TTU:** 39850-39852, 40901-40903; **UAMI:** 99-101; **UMMZ:** 89048-89053, 89055-89063; **USNM:** 13888, 115618-115619, 148180-148181, 172247-172247, 174848-174849, 188751-188760.
Peromyscus maniculatus labecula (238): **CNMA:** 629, 632-635, 637-661, 663, 685, 736, 751, 1125-1126, 15422-15429, 15601, 15604-15607, 15622-15624, 15647, 15651-15652, 16864, 24278-24322, 24325; **FMNH:** 55831-55832, 55857-55860, 55892, 55967, 55971, 56044, 56046-56049, 56075-56083, 56111; **KU:** 28116-28143, 28232, 28348, 66799; **MZFC:** 2925, 5160; **USNM**: 50622-50625, 50631-50634, 50642-50643, 50647, 189465-189466, 204253; **UMMZ:** 89001-89002, 89019, 89021-89022, 89035, 89040, 89044, 89118, 89133-89134, 89136-89137, 89156, 89166, 89169, 89179-89181, 89183-89188, 89190-89218, 89408, 89491, 90713, 92356-92358, 93644-93645.
Peromyscus melanophrys melanophrys (7): **CNMA:** 32015, 44510-44512, 45932; **ENCB:** 22651; **UMMZ:** 89189.
Peromyscus melanotis (1176): **CNMA:** 631, 636, 786, 1106-1107, 1109, 1111, 1113-1117, 10704-10706, 10708-10719, 10726, 10732-10741, 10743, 15621, 24249-24277, 30927-30946, 31934-31940, 45909-45918; **BYU:** 15533-15569. **ENCB:** 17-20, 35, 36, 39, 116, 167, 2346-2354, 2394-2401, 4235, 4489, 5236-5247, 5250-5254, 5331-5343, 12395, 16335-16336, 16338-16368, 16370-16410, 16412-16478, 16493-16494. **FMNH:** 55871-55782. **KU:** 28156-28157, 28361-28362; **UAMI:** 97-98, 2853-2855, 5657-5659, 14065-14408, 15034-15067, 16288-16295, 16702-17049; **UMMZ** 88994-88998, 89003-89005, 89007-89008, 89010, 89014, 89016-89017, 89020, 89023, 89024, 89167-89168, 89170-89172, 89178, 89492-89493, 92073-92078, 92359-92360, 95015-95027, 96234-96238, 111931-111933; **USNM:** 50644, 50646, 50648-50654, 50667-50670, 50672, 50820, 148159-148161, 204462, 270510.

Reithrodontomys chrysopsis chrysopsis (74): **CNMA:** 557-561, 13740, 24246-24247, 30966-30967, 30969-30971, 30974, 30976-30979; **BYU:** 15571-15574, 15582; **ENCB:** 16487-16488; **FMNH:** 56133; **USNM:** 50747-50750; **UAMI:** 14501-14518, 15068, 15071, 15080-15088, 16312; **UMMZ:** 88808, 89629, 91812-91814, 91816, 94193-94200.
Reithrodontomys fulvescens toltecus (60): **CNMA:** 541-542, 546, 580, 693, 5941, 11550-11555, 19658, 34677-34679, 44083-44084; **ENCB:** 21, 28, 351, 1137-1139; **FMNH:** 55917; **KU:** 28067-28069; **UAMI:** 5664, 13086-13093, 15069; **UMMZ:** 88807, 88810-88811, 88813-88814, 88821, 88827-88829, 88833, 88843, 88846-88847, 88849, 88857, 92311, 95924-95926; **USNM:** 50745-50746, 143586-143587.
Reithrodontomys megalotis saturatus (202): **CNMA:** 524-529, 531-540, 543-545, 547, 563-571, 576-579, 8173, 8305, 10707, 10731, 10742, 11520, 15593-15599, 30968, 30972-30973, 30975, 39348, 39728-39733, 45919-45921; **BYU:** 15593-15595; **ENCB:** 1491-1493, 2355, 2392, 2404-2405, 4233-4234, 4485-4488, 5206-5208, 5230-5235, 5317-5330, 16482-16486, 16489-16491, 22598-22617; **FMNH:** 55918-55927, 55942-55947, 61829-61831; **KU:** 28058-28066, 28317-28318, 66667; **MVZ:** 100270-100272; **UAMI:** 1167, 15070, 15072, 16313; **UMMZ:** 88809, 88812, 88822-88826, 88830-88832, 88834-88842, 88844-88845, 88848, 88850-88856, 88858, 89401, 92309-92310, 94144; **USNM**: 146899-146900; **YPM:** 4737.
Reithrodontomys microdon wagneri (3): **UMMZ:** 91815, 94186, 95923.
Reithrodontomys sumichrasti sumichrasti (7): **ENCB:** 2403; **KU:** 35393; **UAMI:** 2896; **UMMZ:** 92312-92313, 93643, 94201.
Sigmodon hispidus (4): **CNMA:** 3425-3426; **ENCB:** 5873-5874.
Sigmodon leucotis (12): **CNMA:** 18303, 19659-19662, 30920-30926.

Table 1. Museum specimens that document the presence of mammals in Mexico City and other localities in The Distrito Federal. The total number of specimens per species is shown in parenthesis; the other numbers correspond to catalogue numbers. CNMA = Colección Nacional de Mamíferos, Instituto de Biología, UNAM; UAMI = Universidad Autónoma Metropolitana, Iztapalapa; ENCB = Colección de Cordados, Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional. MZFC = Museo de Zoología "Alfonso L. Herrera", Facultad de Ciencias, UNAM; CFB = Colección de Fotocolectas Biológicas del Instituto de Biología, UNAM; INAH = Instituto Nacional de Antropología e Historia; MADUG-MA = Museo Dugès, Universidad de Guanajuato, Gto, Mexico; UMMZ = Museum of Zoology, University of Michigan; USNM = Smithsonian Institution National Museum of Natural History; KU = Natural History Museum, University of Kansas; FMNH = Field Museum of Natural History; BYU = Brigham Young University, Monte L. Bean Life Science Museum; MVZ = Museum of Vertebrate Zoology, University of California, Berkeley; MSU = Michigan State University Museum; YPM= Yale University Peabody Museum; MCZ=Harvard University Provider and TTU = Texas Tech University, Museum of Texas Tech University.

3.2 Updated list and taxonomic composition of wild mammals in The Distrito Federal

The updated list (Table 2) only registers the species that were supported by voucher specimens stored in biological collections, except *Canis latrans cagotis*, and *Nasua narica* which present footprints and photographs as evidence which are deposited at the Colección de Fotocolectas Biológicas del Instituto de Biología, UNAM. The records of probable occurrence were not mentioned in this study. The historical records were not included. Only wild species were

considered, the domestic species like cats and dogs *(Felis silvestres* and *Canis familiaris*) were eliminated, as well as the exotic as rats and mice (the gray rat and the black rat; *Rattus norvegicus, Rattus rattus;* and the domestic mouse, *Mus musculus).*

Species	Condition	Distribution	NOM-059	UICN	CITES
Class Mammalia					
Subclass Theriformes					
Infraclass Metatheria					
ORDER DIDELPHIMORPHIA Guill, 1872					
Family Didelphidae Gray, 1821					
Subfamily Didelphinae Gray, 1821					
Didelphis virginiana californica Bennett, 1833				LC	
ORDER CINGULATA Illiger, 1811					
Family Dasypodidae Gray, 1821					
Subfamily Dasypodinae Gray, 1821					
Dasypus novemcinctus mexicanus Peters, 1864				LC	
ORDER LAGOMORPHA Brandt, 1855					
Family Leporidae Fisher de Waldheim, 1817					
Romerolagus diazi (Ferrari-Pérez, 1893)	Mo	E	D	EN	I
Sylvilagus cunicularius cunicularius (Waterhouse, 1848)				LC	
Sylvilagus floridanus orizabae (Merriam, 1893)				LC	
ORDER SORICOMORPHA Gregory, 1910					
Family Soricidae G. Fisher, 1814					
Subfamily Soricinae G. Fisher, 1814					
Tribe Blarinini Kretzoi, 1965					
Cryptotis alticola (Merriam, 1895)	Mo	E*	SP	DD	
Cryptotis parva soricina (Merriam, 1895)		E*	SP	LC	
Tribe Soricini G. Ficher, 1814					
Sorex oreopolus Merriam, 1892	Mo	E*		LC	
Sorex orizabae Merriam, 1895	Mo	E*			
Sorex saussurei saussurei, Merriam, 1892				LC	
Sorex ventralis Merriam, 1895	Mo			LC	
Sorex veraecrucis altoensis Carraway, 2007	Mo				
ORDER CHIROPTERA Blumenbach, 1779					
Family Phyllostomidae Gray, 1825					
Subfamily Glossophaginae Bonaparte, 1845					
Tribe Glossophagini Bonaparte, 1845					
Anoura geoffroyi lasiopyga (Peters, 1868)				LC	
Choeronycteris mexicana Tschudi, 1844	Mo		E	NT	
Glossophaga soricina handleyi Webster and jones, 1982	Mo			LC	
Leptonycteris nivalis (de Saussure, 1860)	Mo		E	EN	
Leptonycteris yerbabuenae Martínez y Villa-R., 1940	Mo**		E	V	

Species	Condition	Distribution	NOM-059	UICN	CITES
Subfamily Phyllostominae Gray, 1825					
Macrotus waterhousii mexicanus de Saussure, 1860				LC	
Subfamily Stenodermatinae Gervais, 1856					
Tribe Stenodermatini Gervais, 1856					
Artibeus lituratus palmarum J. A. Allen and Chapman, 1897				LC	
Family Mormoopidae de Saussure, 1860					
Mormoops megalophylla megalophylla (Peters, 1864)				LC	
Pteronotus parnellii mexicanus (Miller, 1902)				LC	
Family Natalidae Gray, 1866					
Natalus stramineus saturatus Dalquest and Hall, 1949				LC	
Family Molossidae Gervais, 1856					
Subfamily Molossinae Gervais, 1855					
Eumops perotis californicus (Merriam, 1890)				LC	
Molossus rufus E. Geoffroyi St-Hilaire, 1805	Mo			LC	
Nyctinomops laticaudatus ferruginea (Goodwin, 1954)				LC	
Nyctinomops macrotis (Gray, 1839)	Mo			LC	
Tadarida brasiliensis mexicana (de Saussure, 1860)				LC	
Family Vespertilionidae Gray, 1821					
Subfamily Vespertilioninae Miller, 1897					
Tribe Eptesicini Volleth y Heller, 1994					
Eptesicus fuscus miradorensis (H. Allen, 1866)				LC	
Tribe Lasiurini Tate, 1842					
Lasiurus blossevillii teliotis (H. Allen, 1891)				LC	
Lasiurus cinereus cinereus (Palisot de Beauvois, 1796)				LC	
Lasiurus ega panamensis (Thomas, 1901)				LC	
Lasiurus intermedius intermedius H. Allen, 1862				LC	
Tribe Plecotini Gray, 1866					
Corynorhinus mexicanus G. M. Allen, 1916	Mo	E*		NT	
Corynorhinus townsendii australis Handley, 1955				LC	
Idionycterys phyllotis (G. M. Allen, 1916)					
Subfamily Myotinae Tate, 1942					
Myotis californicus mexicanus (de Saussure, 1860)				LC	
Myotis occultus Hollister, 1909	Mo			LC	
Myotis thysanodes aztecus Millar and G.M. Allen, 1928				LC	
Myotis velifer velifer (J.A. Allen, 1890)				LC	
Myotis volans amotus Miller, 1914)				LC	
ORDER CARNIVORA Bowdish, 1821					
SUBORDER FELIFORMIA Kretzoi, 1945					
Family Felidae Fischer von Waldheim, 1817					
Subfamily Felinae Fischer von Waldheim, 1817					

Species	Condition	Distribution	NOM-059	UICN	CITES
Lynx rufus escuinapae J. A. Allen, 1903				LC	
SUBORDER CANIFORMIA Kretzoi, 1943					
Family Canidae Fischer von Waldheim, 1817					
Canis latrans cagotis C. E. H. Smith, 1839					
Urocyon cinereoargenteus nigrirostris (Lichtenstein, 1850)				LC	
Family Mustelidae Fischer von Waldheim, 1817					
Subfamily Mustelinae Fischer, 1817					
Mustela frenata frenata Lichtenstein, 1831				LC	
Taxidea taxus berlandieri Baird, 1858			E	LC	
Family Mephitidae Drago and Honeycutt, 1997					
Conepatus leuconotus leuconotus (Lichtenstein, 1832)				LC	
Mephitis macroura macroura Lichtenstein, 1832				LC	
Spilogale putorius angustifrons Howell, 1902				LC	
Family Procyonidae Gray, 1825					
Bassariscus astutus astutus (Lichtenstein, 1830)				LC	
Nasua narica (Linnaeus, 1766)					
Procyon lotor hernadezii Wagler, 1831					
ORDER ARTIODACTYLA Owen, 1848					
Family Cervidae Goldfuss, 1820					
Subfamily Capreolinae Brookes, 1828					
Odocoileus virginianus mexicanus (Gmeil, 1788)				LC	
ORDER RODENTIA Bowdich, 1821					
SUBORDER SCIUROMORPHA Brandt, 1855					
Family Sciuridae Fischer de Waldheim, 1817					
Subfamily Sciurinae Fischer de Waldheim, 1817					
Tribe Sciurini Fischer de Waldheim, 1817					
Sciurus aureogaster nigrescens Bennett, 1833				LC	
Subfamily Xerinae Osborn, 1910					
Tribe Marmotini Pocock, 1923					
Spermophilus adocetus adocetus (Merriam, 1903)				LC	
Spermophilus mexicanus mexicanus (Erxleben, 1777)				LC	
Spermophilus variegatus variegatus (Erxleben, 1777)				LC	
SUBORDER CASTORIMORPHA A.E. Word, 1955					
Family Heteromyidae Gray, 1868					
Subfamily Dipodomyinae Gervais, 1853					
Dipodomys phillipsii phillipsii Gray, 1841		E	E	LC	
Subfamily Heteromyinae Gray, 1868					
Liomys irroratus alleni (Coues, 1881)				LC	
Subfamily Perognathinae Coues, 1875					
Perognathus flavus mexicanus Merriam, 1894				LC	
Family Geomyidae Bonaparte, 1845					

Species	Condition	Distribution	NOM-059	UICN	CITES
Cratogeomys merriami merriami (Thomas, 1893)				LC	
Cratogeomys tylorhinus tylorhinus (Merriam, 1895)					
Thomomys umbrinus peregrinus (Richardson, 1829)				LC	
SUBORDER MYOMORPHA Brandt, 1855					
SUPERFAMILY DIPODOIDEA Fischer, 1817					
Family Cricetidae Fischer, 1817					
Microtus mexicanus mexicanus (de Saussure, 1861)				LC	
Subfamily Neotominae Merriam, 1894					
Baiomys taylori analogus (Osgood, 1909)				LC	
Neotoma mexicana torquata Ward, 1891				LC	
Neotomodon alstoni Merriam, 1898	Mo	E*		LC	
Oryzomys couesi crinitus					
Peromyscus difficilis felipensis Merriam, 1898				LC	
Peromyscus gratus gratus Merriam, 1898				LC	
Peromyscus hylocetes Merriam, 1898	Mo	E*		LC	
Peromyscus levipes levipes Merriam, 1898				LC	
Peromyscus maniculatus fulvus Osgood, 1904				LC	
Peromyscus maniculatus labecula Elliot, 1903				LC	
Peromyscus melanophrys melanophrys (Coues, 1874)				LC	
Peromyscus melanotis J. A. Allen and Chapman, 1897	Mo	E*		LC	
Reithrodontomys chrysopsis chrysopsis Merriam, 1900				LC	
Reithrodontomys megalotis saturatus J. A. Allen and Chapman, 1897				LC	
Reithrodontomys microdon wagneri Hooper, 1950			E	LC	
Reithrodontomys sumichrasti sumichrasti (de Saussure, 1861)				LC	
Subfamily Sigmodontinae Wagner, 1843					
Sigmodon hispidus Say y Ord, 1825				LC	
Sigmodon leucotis Bailey, 1902		E*		LC	

Table 2. Taxonomic list of the mammals of Mexico City and other localities of The Distrito Federal following the nomenclature and classification of Wilson & Reeder (2005) and Ramírez-Pulido (2005). Condition: Mo= Monotypic. Distribution: E= endemic taxon. * Endemic condition follows Carraway (2007) and Wilson & Reeder (2005). The category of extinction risk and the range of geographical distribution follow the Norma Oficial Mexicana 059 (SEMARNAT, 2010). D = Danger of extintion, E= endangered and SP= special protection. The categories used by the International Union for Conservation of Nature and Natural Resources (IUCN, 2004) are: LC= least concern, NT= near threatened, Vu= vulnerable, EN= endangered, DD= deficient data. According to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 2009), Appendix I= Endangered species that are or could be affected by commerce. It is also indicated when the taxa is monotypic. The mammals recorded by first time with in the political boundaries of Mexico City are marked with two asterisks.

Our data show that the taxonomic composition of the mammals of Mexico City and other localities of The Distrito Federal is 8 orders, 19 families, 51 genera, 80 species and 81 subspecies (Tables 2 and 3). The best documented orders were Chiroptera (35% = 28 species) and Rodentia (35% = 28 species) followed by Carnivora (13.75% = 11species), Soricomorpha (8.75% = 7 species), and Lagomorpha (3.70% = 3 species). The orders Didelphimorphia, Cingulata and Artiodactyla are represented with one species (1.23%) each.

Order	Family	Genus	Species
DIDELPHIMORPHIA	1	1	1
CINGULATA	1	1	1
LAGOMORPHA	1	2	3
SORICOMORPHA	1	2	7
CHIROPTERA	5	18	28
CARNIVORA	5	11	11
ARTIODACTYLA	1	1	1
RODENTIA	4	15	28
TOTAL	**19**	**51**	**80**

Table 3. Taxonomic composition of mammals from Mexico City and other localities in Distrito Federal.

3.3 Type specimens

The literature reports are 13 holotype specimens for Mexico City corresponding to 5 type localities in The Distrito Federal (Álvarez *et al.*, 1997). The taxa are *Mustela frenata* (*Mustela frenata frenata*), *B*[*assaris*] *astuta* (*Bassariscus astutus astutus*), *Cratogeomys tylorhinus arvalis* (*Cratogeomys tylorhinus tylorhinus*), *Mephitis macroura* (*Mephitis macroura macroura*), *Nyctinomus drepressus* (*Nyctinomops macrotis*), *S. a. angustifrons* (*Spilogale putorius angustifrons*), *Blarina soricina* (*Cryptotis parva soricina*), *Pr*[*ocyon*] *hernandezii* (*Procyon lotor hernandezi*), *Oryzomys crinitus* (*Oryzomys couesi crinitus*), *Perognathus flavus mexicanus, Peromyscus gratus* (*Peromyscus gratus gratus*), *Reithrodontomys levipes toltecus* (*Reithrodontomys fulvescens toltecus*), *Liomys irroratus pullus (Liomys irroratus alleni).* One of these type specimens *N. macrotis,* is deposited at CNMA.

3.4 Endemic species

There are no species endemic to México City or The Distrito Federal. However, 11 species of mammals endemic to Mexico ocurr within The Distrito Federal: a rabbit (*Romerolagus diazi*), 4 shrews (*Cryptotis alticola, Cryptotis parva soricina, Sorex oreolopus* and *Sorex orizabae)*, 1 bat (*Corynorhinus mexicanus)*, and 5 rodents (*Dipodomys phillipsi, Neotomodon alstoni, Peromyscus hylocetes, Peromyscus melanotis* and *Sigmodon leucotis* (Table 3).

3.5 Monotypic species

Our database showed that 17 species found in México City and other localities in The Distrito Federal are monotypic. They are conformed by a rabbit (*Romerolagus diazi*), 4 shrews (*Cryptotis alticola, Sorex oreolopus, Sorex orizabae,* and *Sorex ventralis*), 9 bats (*Choeronycteris mexicana, Glosophaga soricina Leptonycteris nivalis, Leptonycteris yerbabuenae, Molossus aztecus,*

Molossus rufus, Nyctinomops macrotis, Corynorhinus mexicanus and Myotis occultus), and 3 rodents *(Neotomodon alstoni, Peromyscus hylocetes and Peromyscus melanotis,* Table 1).

3.6 Species protected by the Mexican government

We found out that 8 mammal species ocurring in México City and other localities of The Distrito Federal are within a category of extinction risk as defined by the Mexican government (SEMARNAT, 2010, Table 1). The zacatuche rabbit (*Romerolagus diazi*) is an endangered species; three species of phyllostomid bats (*Choeronycteris mexicana, Leptonycteris yerbabuenae,* cited in NOM-059, 2010 as *L. curasoae),* and *Leptonycteris nivalis,* one carnivore (*Taxidea taxus berlandieri*), two rodents, the kangaroo rat (*Dipodomys phillipsii phillipsii*), and *Reithrodontomys microdon wagneri,* and two species of shrews (*Cyptotis alticola* and *Cryptotis parva)* are listed under the category of special protection status (Table 2). The kangaroo rat ocurred throughout the Valley of México.

3.7 Species protected by international regulations

According to the International Union for the Conservation of Nature and Natural Resources (IUCN, 2004) there are several mammals ocurring in México City and other localities of The Distrito Federal that are included in the Red List of Threatened Species. Two bat species are in the category of near threatened (*Choeronycteris mexicana* and *Corynorhinus mexicanus)*, one bat as vulnerable (*Leptonycteris yerbabuenae),* and two species are listed as endangered (*Romerolagus diazi* and *Leptonycteris nivalis)*. According to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 2009) our list only contains one species: *Romerolagus diazi,* this rabbit is listed in appendix I (Fig. 4).



Fig. 4. *Romerolagus diazi* is monotipic and endemic specie from Mexico, endangered by NOM-059, (2010) and IUCN, and in Appendix 1 in CITES (2009)

3.8 Representation by counties in Distrito Federal

The representation by political delegations varies from 1 to 55 species and the number of specimens goes from 3 to 2,035. The Tlalpan delegation had the highest diversity with 55 species, 67.9% (2035 specimens, 35.55%), Coyoacan in second place with 46 species, 56.79% (821 specimens, 14.34%). Xochimilco and Milpa Alta with 29 species each, 35.80% (304 specimens, 5.31%, 461 specimens, 8.05% respectely). Other delegations with a high diversity were La Magdalena Contreras and Álvaro Obregón with 28 species, 34.56% (547 specimens, 9.56% and 856 specimens 14.94% respectely) and those that followed were Cuajimalpa de Morelos, with 25 species, 30.86% (312 specimens, 5.45%). There are other delegations with very low diversity: Iztapalapa, with 18 species, 22.22% (128 specimens, 2.23%), Miguel Hidalgo with 17 species, 20.99% (117 specimens, 2.04%), Cuauhtémoc with 14 species, 17.28% (39 specimens, 0.68%), Tláhuac with 12 species, 14.81% (28 specimens , 0.49%), Benito Juárez with 11 species, 13.58% (30 specimens, 0.50%), Gustavo A. Madero with 9 species, 11.11% (21 specimens, 0.37%). The delegations with the lowest diversity and the lowest number of specimens collected are Venustiano Carranza with 3 species, 3.70% (16 specimens, 0.28%) and Iztacalco with 3 species, 3.70% (5 specimens, 0.09%). Azcapoptzalco did not have any specimen or species collected.

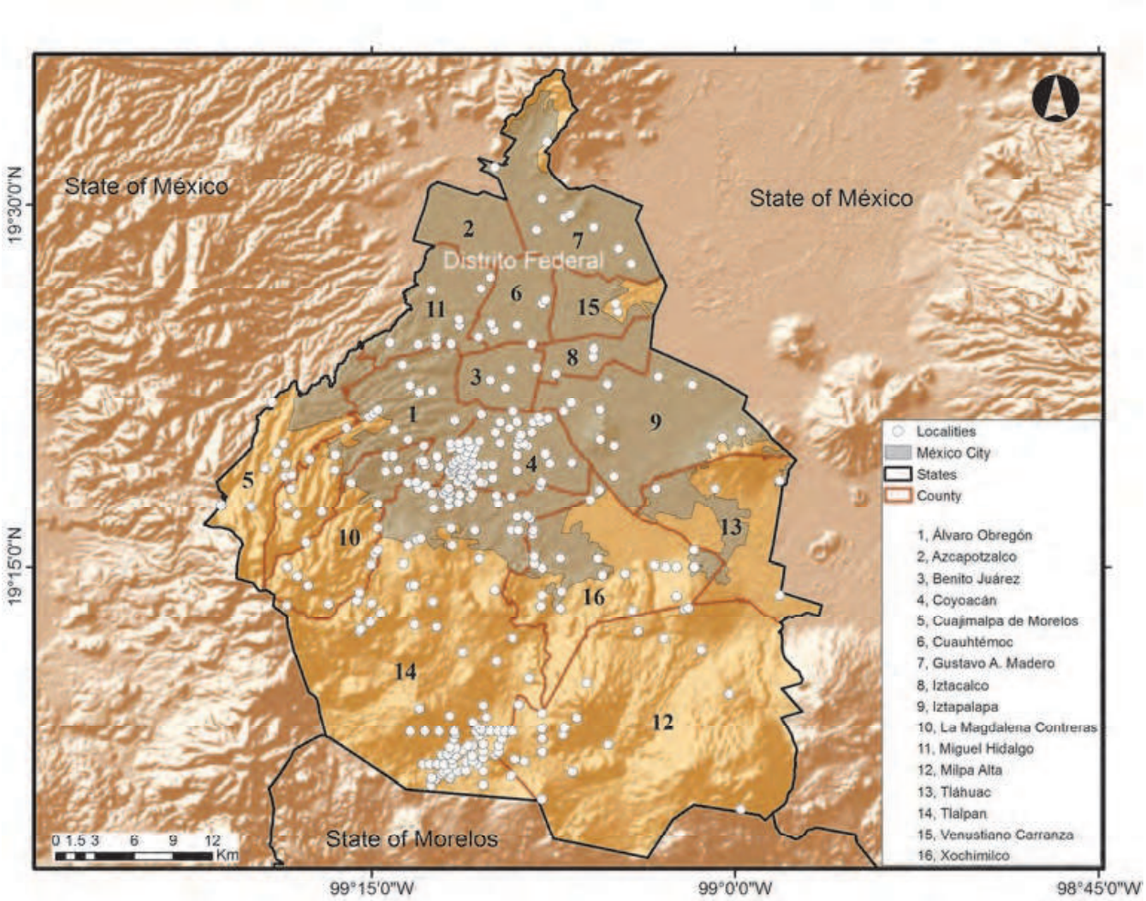


Fig. 5. Collecting localities of mammals in Mexico City and other localities of Distrito.

The political delegations showing the highest diversity were those within the conservation area such as Tlalpan, Xochimilco, Milpa Alta, La Magdalena Contreras, Álvaro Obregón and Cuajimalpa de Morelos. The exception is Coyoacán, which is found inside the limits of Mexico City. The explanation for Coyoacán is that the Ecological Reserve of Pedregal de San Ángel is found within this political delegation, and it is one of the last relicts of natural vegetation inside Mexico City (Hortelano-Moncada *et al*., 2009). The delegations with the lowest diversity were Iztapalapa, Gustavo A. Madero, Iztacalco and Venustiano Carranza, which are found inside the limits of Mexico City and which also happen to be the driest part of the Distrito Federal.

3.9 Mammal distribution in different vegetation types

Mammal distribution in different vegetation types (CONABIO, 1999) shows that 32 % of the species are found in Oyamel coniferous forests (*Abies religiosa*). The species found in these forests are: opossum, rabbit *Sylvilagus cunicularius*, almost all species of shrews except *C. parva*, three bats, *Tadarida brasiliensis*, *Corynorhinus mexicana* and *Myotis velifer*, deer *Odocoileus virginianus* and several species of rodents. In Pine coniferous forests (*Pinus*) we find 43% of the mammal species among which we have one opossum, four species of shrews, three species of rabbits, 8 species of bats, one deer, two species of squirrels and 16 species of mice. A smaller percentage (13%) of mammals is found in Oak (*Quercus*) forests: one rabbit, *Sylvilagus cunicularius* one shrew, one weasel, one skunk and 7 species of rodents. In Sarcocrassicaule (Xerophitic) thickets we have: *Liomys irroratus*, *Neotoma mexicana torquata*, *Neotomodon asltoni*, *Peromyscus difficilis* and *Reithrodontomys fulvescens*. In halophytic and gypsophytic vegetation there are 3 species of rodents: *Liomys irroratus*, *Microtus mexicanus* and *B. taylori*. An analysis of records also showed that 76% of mammal species from the Distrito Federal is distributed within areas used for agriculture, cattle ranching and forest management, a fact that is not surprising if one considers that these types of area comprises much of the conservation area. A high percentage (71%) of the mammals are distributed within the urban area that comprises most of Mexico City. The Ecological Reserve of El Pedregal de San Ángel, with 33 described species, is found inside this same urban area.

We compared the updated list obtained from our research with the previous published lists of wild mammals from the Distrito Federal (Table 4), including 20 regional, state, national and North American list. From the North American reports we carefully selected only those records showing that the collection site was within the boundaries of the entity. However , we did not considered publications with records for the Distrito Federal with only one or few records although they are analyzed and mentioned in our research. This paper describes almost two century of mammal records; all the specimens are housed in Mexican and North American scientific collections and the oldest records are probably hold in Europe.The taxonomic composition of wild mammals from the Distrito Federal included 80 species. The published lists vary from having 39 up to 77 species. Hall (1981) reported 77, Ceballos & Galindo (1984), and Villa & Cervantes (2003), reported 74, Ramírez-Pulido *et al.* (1986) reported 64 and Villa-R, 1952 reported 39. Four species were heretofore unrecognized such as the hare, *Lepus callotis callotis* (Hall, 1981; Ramírez-Pulido *et al*., 1986; López-Forment, 1989 and Villa & Cervantes, 2003), two bats *Dermanura azteca* (Hall,1981, for the Basin of Mexico (Sánchez *et al*., 1989; Monroy-Vilchis *et al*., 1999), *Eumops u. underwoodi* (Ceballos & Galindo,

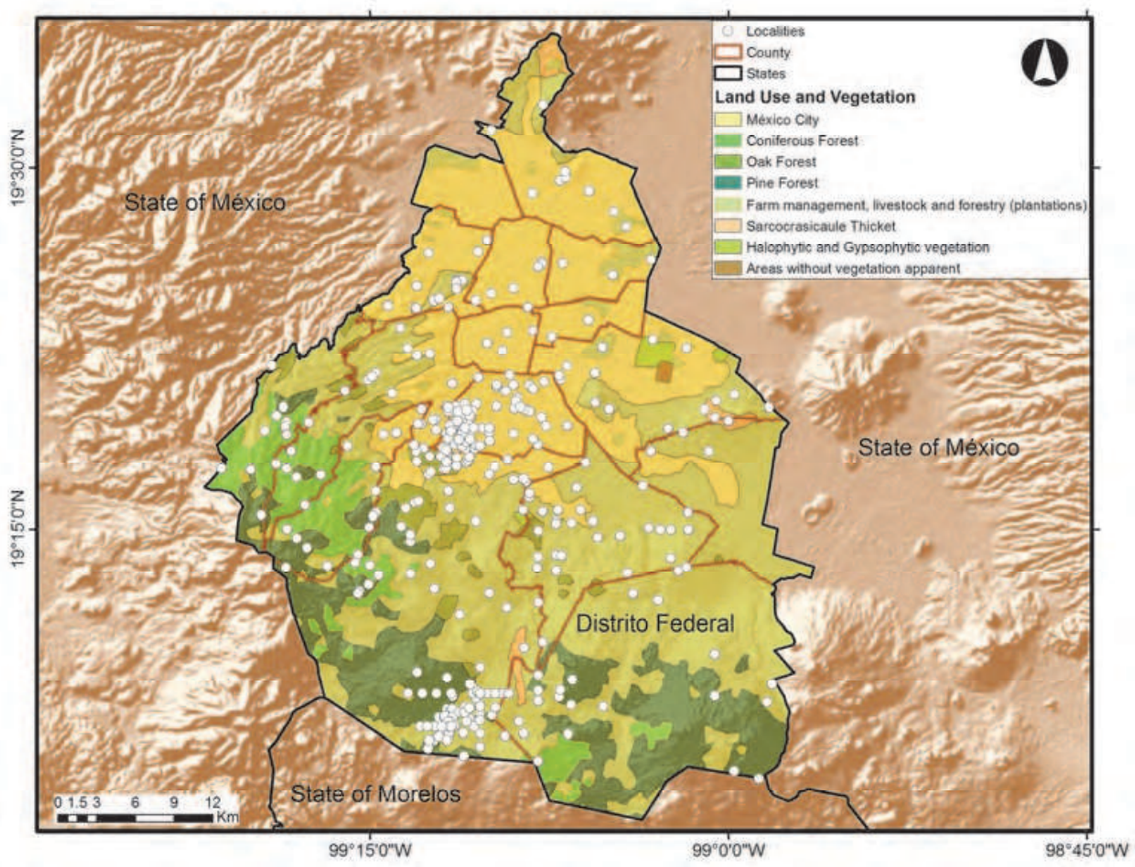


Fig. 6. Geographical distribution of mammals by vegetation type and land use.

1984; López-Forment, 1989; Álvarez *et al.*, 1997), this last record had not been recognized in previous publications (Sánchez-H *et al.*, 1989; Hortelano-Moncada *et al.*, 2009). One squirrel, *Sciurus occulatus* (Villa-R, 1952; Hall, 1981; Ceballos & Galindo, 1984; Ramírez-Pulido *et al.*, 1986; Villa & Cervantes, 2003) which is a specimen from Parres, Tlalpan, was wrongly identified, it is *S. aureogaster* indeed. Two shrews, *Sorex orizabae* and *S, veraecrucis altoensis,* are reported for the Distrito Federal in a relatively recent study (Carraway, 2007), *S. veraecrucis altoensis* is recorded as a new species. On the other hand, one more bat record was incorporated, *Nyctinomops laticaudatus ferruginea* is mentioned in previous publications as a record of probable occurrence (Hall, 1981; Polaco *et al.*, 1992, Villa & Cervantes, 2003; Bárcenas & Medellín, 2007).

4. Discussion

Most mammal records from the Distrito Federal are found in two Mexican collections: CNMA and UAMI, nevertheless, the type specimens and some of the oldest records are found in collections outside the country, which makes their study difficult, although access through electronic means has helped with this problem. Although there are several studies by regions and by groups, some taxa still need to be studied as a result of which there are still some poorly represented species. Another problem is that some areas have been visited only sporadically. The species accumulation graphs support this problem: in general, those periods with the higher number of collections were also the best represented regarding number of species. Some of the oldest records of the Distrito Federal belong to 4 specimens of *Oryzomys couesi*, collected in 1892 (*Oryzomys crinitus*, Merriam, 1901, NMNH: 50181), nevertheless, there is one paper reporting specimens of this species collected in Xochimilco, Distrito Federal, but it does not specify where this biological material is found theefore a verification is not possible (González-Romero, 1980). Other old records correspond to *Dipodomys phillipsii* whose first records date from 1892 and the last ones to 1944. On the other hand the Distrito Federal has 14 species with only one record, and some are very old; some of these correspond to *Molossus rufus* 1960, *Idionycteris pyllotis* 1962, *Corynorhinus townsendii* 1965, *Sorex orizabae* 1971, *Eumops perotis* 1976, *Lasiurus intermedius* 1977, *Nyctinomops laticaudatus* in 1983 and *Natalus stramineus*, 1985. Records not older than 25 years correspond to the rabbit *Sylvilagus cunicularius*, last collected in 1986; the shrew *Cryptotis parva* is represented by only 5 specimens in collections and the last record dates from 1987, whereas the one for *C. alticola* corresponds to 1998, the last record in scientific collections of the skunk *Mephitis macroura* dates from 1990, and *Perognathus flavus*, *Baiomys taylori* and *Spermophilus mexicanus* are from 1991.There are other species with old records, but recent revisions document their presence in certain areas of the Distrito Federal, a fact that underlines the importance of periodical revisions of the lists. As an example, we have the weasel *Mustela frenata* whose last record dates from 1991, but there is, nevertheless, a photographic record from 2009, from Tlalpan; and there is also one specimen, of an individual hit by a car in 2011, in Milpa Alta. The last record of *Liomys irroratus* dates from that same year but there is a photographic record from 2009 (Guevara *et al*.2010) that indicates its presence in this entity. The last record for *Spilogale putorius* dates from 1979, nevertheless, it was found in collections from 2004-2006; two squirrels, *Sciurus aureogaster* and *Spermophilus variegatus*, also have recent records (2006). Many species were recently documented for the Distrito Federal; these are: one opossum *Didelphis virginiana*, five species of shrews: *Cryptotis alticola*, *Sorex oreopolus*, *S. ventralis*, *S. veraecrucis* and *S. saussurei*; 13 bats *Anoura geoffroyi*, *Choeronycteris mexicana*, *Leptonycteris yerbabuenae*, *Corynorhinus mexicanus*, *Tadarida brasiliensis*, *Eptesicus fuscus*, *Lasiurus cinereus*, *L. ega*, *L. blossevillii*, *Myotis californicus*, *M. thysanodes*, *M. velifer* and *M. volans*; 15 rodents *Sciurus aureogaster*, *Spermophilus variegatus*, *Cratogeomys merriamii*, *Thomomys umbrinus*, *Perognathus flavus*, *Neotomodon alstoni*, *Microtus mexicanus*, *Baiomys taylori*, *Neotoma mexicana*, *Peromyscus difficilis*, *P. Melanophrys*, *P. melanotis*, *P. maniculatus*,*Reithrodontomys chrysopsis*, *R. fulvescens* and finally one deer, *Odocoileus virginianus* and three carnivores, *Spilogale putorius*, *Bassariscus astutus* and *Mustela frenata*.

Non-invasive tools, such as photographs or prints have also contributed to species´ records (Aranda, 2010, Bárcenas & Medellín, 2007, Farías, 2010, Guevara-López, *et al* 2010, Ortega, 2010). This is especially useful regarding medium- and large-sized species. One of these records belongs to *Procyon lotor*, one of the first species recorded in the Distrito Federal in 1830, another specimen was collected 52 years later (NMNH 51151) and its presence was recently documented through prints. Several authors mention in their papers having heard *Canis latrans* howling, but have not provided any records, and no record of their presence has been found in biological collections. Their presence has been recently documented through prints. Recent records, prints, include those of *Lynx rufus*, *Mustela frenata*, *Taxidea taxus*, *Conepatus leuconotus*, *Mephitis macroura*, *Bassariscus astutus*, *Nasua narica* (Aranda, 2010), *Odocoileus virginianus* (Aranda, 2010, Guevara-López, 2010) in sites belonging to Álvaro Obregón, Benito Juárez, Cuajimalpa de Morelos, La Magdalena Contreras, Milpa Alta and Tlalpan.

There were 80 wild mammals in the Distrito Federal which represent 17 % of the national biodiversity of land mammals (Ramírez-Pulido *et al*., 2005) and the highest number of species reported for Mexico´s basin (79 species, Ceballos & Galindo, 1984) and southern part of Mexico´s basin (59 species, Monroy-Vilchis *et al*., 1999). The number reported in this paper is high when compared with less diverse states in the country, such as Aguascalientes (61 species, Alvarez-Castañeda et al., 2008) and Querétaro, 67 species, and it is low compared with the most diverse states which are Oaxaca (190 species, Briones et al., 2004) and Chiapas (204 species, Lorenzo et al., 2008). Nevertheless, the surface of Mexico´s basin must be compared with that of these last states and, also, the fact that the Distrito Federal has, within its borders, one of the cities with the largest population in the planet, not only today but historically speaking: Cuicuilco was one of the first cities in the basin with a large population (Pérez-Campa, 2007).

In this paper we also record the highest number of species for the Distrito Federal compared with previous studies of the entity: 40 species in Villa (1952), 74 species in Ceballos & Galindo (1984), 62 species in Ramírez-Pulido (1986), 78 species in Hall (1981) and 74 in Villa & Cervantes (2003). These last authors only have 29 and 44 species with their locality recorded within the borders of the Distrito Federal, the rest are potential records.

On the other hand, the highest distribution of mammals in the Distrito Federal concentrated in two delegations: Tlalpan and Coyoacán, this last one found within the border of Mexico City. Species with the largest distribution were *Microtus mexicanus* and *Lasiurus cinereus*, the first one with numerous records/delegation and the second one with one or five records/delegation. Other species with a wide distribution were: one opossum *Didelphis virginiana*, one rabbit *Sylvilagus floridanus*, seven rodents *Cratogeomys merriami*, *Peromyscus maniculatus*, *Peromyscus difficilis*, *Neotomodon alstoni*, *Peromyscus gratus*, *Peromyscus melanotis* and *Reithrodontomys fulvescens*, and six bats: *Tadarida brasiliensis*, *Eptesicus fuscus*, *Myotis velifer*, *Nyctinomops macrotis*, *Leptonycteris yerbabuenae* and *Corynorhinus mexicanus*. The latter analysis shows that the Distrito Federal is an entity the preserves a large mastofaunistic diversity and that in order to preserve it, it is necessary to preserve the natural habitats that still exist. Another fact to be considered is that the species with more restricted habitat requirements are also the most vulnerable to human actions such as agriculture, fires and poaching.

Species	Synonymous	RS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Didelphis virginiana californica	*D. virginiana* [7, 5,18]	R(63)	R		P	R	X		X	X	X			X		R	R		X	X
Dasypus novemcinctus mexicanus	*D. novemcinctus* [7,5,18]	R(5)	R		P	R	X		X						R	R	R	X		X
**Lepus callotis callotis*					P		X		X						P					
Romerolagus diazi		R(159)	R		R	R	X		X						P	R		X		
Sylvilagus cunicularius cunicularius	*S. cunicularius*[5]	R(17)	R		P	R	X		X		X				P			X		X
Sylvilagus floridanus orizabae	*S. orizabaeL, S.floridanus*[12,5, 14]	R (67)	R		P	R	X			X	X			X	P	R	R	X		X
Cryptotis alticola	*C. goldmani*[5] ,*C. g. aticola*[3,4,15];	R (12)			R	R	X								R		R			X
Cryptotis parva soricina	*C. parva* [7,5]	R (3)			R	R	X		X						R	R				
Sorex oreopolus	*S. o. ventralis* [4]	R (6)			P	R			X						R				X	
Sorex orizabae		R (1)																		
Sorex saussurei saussurei	*S. vagrans* [7]; *S. saussurei* [7,5,18]	R (102)	R		P	R	X		X	X		X		X	R		R		X	X
Sorex ventralis	*S.vagrans* [7] , *S. oreopolus ventralis* [10]	R (19)			P	R				X					R	R				
Sorex veraecrucis altoensis	*S. oreopulus* [6]	R (9)																		
Anoura geoffroyi lasiopyga	*A. geoffroyi* [5,18]	R (7)		R	R	R	X	R	X	X				X	P				X	X
Choeronycteris mexicana	*C. mexicana* [5]	R (16)			P	R	X	R	X	X				X	P	R				X
Glossophaga soricina handleyi	*G. soricina* [7,5]; *G. s. morenoi* [1] , *G. s. leachii* [2], *G. morenoi* [2]	R (35)	R	R		R	X	R	X						R	R				
Leptonycteris nivalis		R (4)		R	P	R	X	R	X	X				X	R					
Leptonycteris yerbabuenae	*L. yerbabuenae* [4,12,3,15]; *L. sanborni* [6, 5],	R (44)			P	R	X	R	X	X				X		R				
Macrotus waterhousii mexicanus		R (3)			P										P				X	
**Artibeus aztecus*	*Dermanura azteca* [18]				P			P												X
Artibeus lituratus palmarum	*A. l. intermedius* [3, 6]	R (1)			P			R												
Mormoops megalophylla megalophylla	*M. megalophylla*[5], *Aello m. megalophyla*[3]	R (7)			P	R	X	R		X				X	P					
Pteronotus parnellii mexicanus	*P. parnellii* [5], *P. p. mexicana* [12]	R (1)			R	R	X	R	X					X	R				X	
Natalus stramineus saturates	*N. stramineus* [5, 15]	R(1)			P	R	X	P							P					
Eumops perotis californicus		R (1)						R							P					
**Eumops underwoodi underwoodi*						R			X					X						
Molossus rufus	*M. ater*[*5], *M. a. nigricans*[2,6]	R(1)		R	P	R	X	R	X						P					
Nyctinomops laticaudatus ferruginea		R(1)																		
Nyctinomops macrotis	*Tadarida molossa*[1,2] *T. macrotis*[12,4]	R (28)	R	R	P	R	X	R	X	X				X	R	R				
Tadarida brasiliensis Mexicana	*T. mexicana*[1], *T. brasiliensis*[7,5]	R (39)	R	R	P	R	X	R	X	X	R			X	R	R	R			
Eptesicus fuscus miradorensis	*E. fuscus* [5, 14, 7]	R (28)		P	P	R	X	R	X	X					P	R	R			
Lasiurus blossevillii teliotis	*L. borealis teliotis*[2, 6] , *Nycteris borealis teliotis* [3]	R (9)		P	P			R							P	R				

Table 4. (Continued)

Species	Synonymous	RS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Lasiurus cinereus cinereus	*L. cinereus*[5, 18]; *Nycteris cinerea cinerea* [3]	R (19)	R	X	P	R	X	R	X	X				X	P	R				X
Lasiurus ega panamensis	*Nycteris ega panamensis*[3], *L. e. xantiurus* [2, 4,6], *L.e.xanti* [3]	R(2)		P	P	R		R	X											
Lasiurus intermedius intermedius	*Nycteris i. intermedia* [3]	R(1)						R												
Corynorhinus mexicanus	*Plecotus mexicanus*[2, 12, 8, 11, 4, 6, 7, 5]; *P. rafinesqui, C. rafinesqui mexicanus*[1]	R (25)	R	R	P	R	X	R	X	X				X	R	R	R			X
Corynorhinus townsendii australis	*Plecotus townsedi*[5], *P. t. australis*[2,3,4,6]	R (1)		R	P	R	X	R	X						P	R				
Idionycteris phyllotis	*Plecotus phyllotis*[2]	R (1)		R	R	R	X	R	X	X					R					
Myotis californicus mexicanus	*M. californica mexicana* [13]; *M. californica*[18]	R (18)		P	P	X		R	X					X	R					X
Myotis keaysi pilosatibialis		R(1)																		
Myotis occultus	*M. lucifugus* [5, 7]; *M. l. occultus*[15, 6, 12]; *M. lucifuga occulta* [13], *M. auriculus* [5]	R (4)			R	R	X	R	X					X	R					
Myotis thysanodes aztecus		R (4)		P	P	X			X						P					
Myotis velifer velifer	*M. velifer* [5, 14], *M. v. velifera* [13]	R (75)	R		P	R	X	R	X	X				X	P	R	R			
Myotis volans amotus		R (120)		P	P	X		P							P	R				
Myotis yumanensis lutosus					P			P	X						P					
Lynx rufus escuinapae	*L. rufus*[1, 16, 18]	R (2)	R		P	R	X		X						R	R	R	X		X
Canis latrans cagottis		R	P		P	X	X		X						P	R	R	X		X
Urocyon cinereoargenteus nigrirostris	*U. cinereoargenteus*[7, 18]	R (1)			P	R			X	X				X	P	R				X
Mustela frenata frenata	*M. f. perotae*[8], *M. frenata* [7, 16, 18]	R (10)	R		R	R	X		X	X				X	R		R	X		X
Taxidea taxus berlandieri		R (1)			P	R			X						R					
Conepatus leuconotus leuconotus	*C. m. mesoleucus* [3, 4,15]	R (3)			P	X			X							R		X		
Mephitis macroura macroura	*M. macroura* [5, 7, 16, 18]	R (12)	R		P	R	X		X	X	R			X	P	R	R	X		X
Spilogale putorius angustifrons	*S. angustifrons*[12], *S. putorius*[7]; *S, a. angustifrons*[1]	R (9)	R		R	R	X		X	X				X	R	R	R			
Bassariscus astutus astutus	*B. astutus*[5,12, 18]	R (6)	R		R	R	X			X				X	R		R			X
Procyon lotor hernandezii	*P. lotor*[18]	R			P	R	X		X						R			X		X
Nasua narica	*N. n. molaris* [13]	R							X						R					
Odocoileus virginianus mexicanus	*Dama virginiana mexicana* [3], *O. virginianus* [5, 7, 16, 18]	R (4)	R		R	R	X		X						R	R	R	X		X
Sciurus aureogaster nigrescens	*S. aureogaster* [4, 5, 7, 14, 18]; *S. n. nelsoni*[1]	R (51)	R		P	R	X		X		X				P	R				X
***Sciurus oculatus toluca*e	*S. oculatus* [5]		R		R	R	X								R					

Table 4. (Continued)

Species	Synonymous	RS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Spermophilus adocetus adocetus		R (3)													R					
Spermophilus mexicanus mexicanus	*S. mexicanus*[7], *Citellus m. mexicanus*[1]	R (3)	R		R	R	X		X	X				X	R	R				
Spermophilus variegatus variegates	*S. variegatus*[5,14,18]; *Citellus v. variegatus*[1]	R (40)	R		P	R	X		X	X	X	X	X	X		R		X		X
Dipodomys phillipsii phillipsii	*D. phillipsii* [5,7]	R (1)	R		R	R	X		X						R					
Liomys irroratus alleni	*L. irroratus* [5,7, 18]; *L. i. pullus*[1]	R (60)	R	R	R	R	X		X	X	R				R					X
Perognathus flavus mexicanus	*P. flavus*[5,7]	R (3)	R		P	R	X		X		R				R					
Cratogeomys merriami merriami	*Pappogeomys merriami* [5, 7, 8, 10, 12]; *P. m. irolonis*[4], *P. m.merriami*; *C. merriami* [18]	R (161)	R		R	R	X		X	X	R			X	R	R	R			X
Cratogeomys tylorhinus tylorhinus	*Pappogeomys tylorhinus* [5], *P.t.tylorhinus* [4], *C, t. arvalis*[1]	R (14)	R		R	R	X		X						R					
Thomomys umbrinus peregrinus	*T. umbrinus*[5, 7, 18]; *T. u. peregrinus*[3,4,]	R(5)	R		R	R	X		X						R	R				X
Microtus mexicanus mexicanus	*M. mexicanus*[5, 18]	R (433)	R		P	R	X		X	X				X	P			X		X
Baiomys taylori analogus	*B. taylori*[5,7]	R (195)	R		R	R	X		X	X	R			X	R	R				
Neotoma mexicana torquata	*N. mexicana* [5,7, 16, 18]	R (42)			P	R	X		X	X	R	X	X	X	P	R		X		X
Neotomodon alstoni	*N. a. alstoni* [3, 4]	R (500)	R		R	R	X		X						P	R	R	X		X
Oryzomus couesi crinitus	*O. palustris crinitus* [3]	R**			R	R	X		X						R					
Peromyscus difficilis felipensis	*Peromyscus difficilis*[5,7,18]	R (347)	R		R	R	X		X		R				R	R				X
Peromyscus gratus gratus	*P. truei gratus* [1, 3, 4, 12]; *P. gratus*[6, 11]; *P. truei* [5]	R (588)	R		R	R	X		X	X		X	X	X	R	R				
Peromyscus hylocetes	*P. aztecus* [5, 7]	R (6)	R		P	R	X		X						P					
Peromyscus leucopus leucopus	*P.leucopes*[9,18] *P. boylii leucopes*[3,] *P. boylii*[5,7]	R (29)			P	R	X		X		R				R	R				X
Peromyscus maniculatus fulvus	*P. maniculatus*[5, 18]	R (80)	R		R	R	X		X						R	R	R			X
Peromyscus maniculatus labecula		R (222)	R		R	R				X	R			X	R	R	R			
Peromyscus melanophrys melanophrys	*P. melanophrys* [5]	R (7)			R	R	X		X						R		R			
Peromyscus melanotis		R(1163)	R		RP	R	X		X	X					P	R	R			X
Reithrodontomys chrysopsis chrysopsis	*R. chrysopsis*[5,7, 18]	R(70)			R	R	X		X						R	R	R			X
Reithrodontomys fulvescens toltecus	*R. fulvescens* [5, 7, 18]	R(46)	R		R	R	X		X	X		X	X	X	R		R			X
Reithrodontomys megalotis saturatus	*R. megalotis* [5, 18]	R (208)	R		P	R	X			X	R			X	R	R	R			X
Reithrodontomys microdon wagneri	*R. microdon*[5,7, 18]	R (3)			R	R	X		X						R					X
Reithrodontomys sumichrasti sumichrasti	*R.sumichrasti*[5, 6, 18]	R (19)			P	R	X		X						P	R				X
Sigmodon hispidus	*S. h. berladieri* [3,4,8,10,13], *S. h. obvelatus*[3]	R (4)			P	R			X	X					R					
Sigmodon leucotis	*S. l. leucotis* [4]	R (12)			P	R			X											

Table 4. Updated list and previous records of wild mammals in The Distrito Federal. One asterisk indicates that is a new record and two asterisks that are not recognized by the

authors of this study, because they were not documented. Synonyms used in previous works are mentioned, and a superindex indicates in which publication appeared RS= recent study, number of specimes in parentheses, 1. Villa-R, 1952; 2. Villa-R, 1966; 3. Aranda *et al.*, 1980; 4. González-Romero, 1980; 5. Hall, 1981; 6. Ceballos & Galindo, 1984; 7. Ramírez-Pulido, 1986; 8. López-Forment, 1989; 9. Sánchez *et al.*, 1989; 10. Negrete, 1991; Negrete & Soberón, 1994; 11. Castro-Campillo, 1992; 12. Chávez & Ceballos, 1992,1994; 13. Chávez, 1993a, b; 14. Álvarez *et al.*, 1997; 15. Monroy-Vilchis *et al.*, 1999; 16. Villa & Cervantes, 2003; 17. CONANP-SEMARNAT, 2006; 18. Bárcenas & Medellín, 2007; 19. Navarro *et al.*, 2007; 20. Gómez-Jiménez, 2009. R = documented record, P = records indicating expected (or presumable) occurrence, X= record cited in the literature.

5. Conclusions

The Distrito Federal has a great biological diversity. The best represented groups of mammals are bats and rodents and, in smaller numbers there are also groups of opossums, shrews, rabbits, armadillos, carnivores and deer. Some of these mammals are protected by International and Mexican legislation. The type localities of 13 species of Mexican mammals are found in Mexico. Species found in almost all of the vegetation types were: opossum *Didelphis viginiana*, shrew *S. saussurei*, rodents *Liomys irroratus*, *Microtus mexicanus*, *Neotoma mexicana*, *Neotomodon alstoni*, *Peromyscus difficilis*, *P. maniculatus labecula* and *R. fulvescens*. Records obtained in this database show that the species restricted to only one type of vegetation are *Romerolagus diazi* and *Sorex veraecrucis*.

With this study we have found species that have adapted to the new conditions of the city, and they now live in parks, buildings and green areas; some of these species are bats, opossums (*Didelphis*) and squirrels (*Sciurus* and *Spermophilus*), while other species, such as rodents, shrews (*Sorex* and *Cryptotis*), one rabbit (*Romerolagus*) and deer (*Odocoileus*), carnivores like (*Lynx*, *Canis*, *Urocyon*, *Mustela*, *Procyon* and *Nasua*) can only be found in protected areas. On the other hand we have found many historical records of mammals but, in this research, we did not find any evidence of their distribution in Mexico City. This study underlines the importance of updating inventories, of having them well documented and verifiable. It is of the utmost relevance to update the nomenclature. The study also demonstrates the value of the information obtained from biological collections, of the way it contributes to knowledge regarding past and present distribution of species in a region. Our study demonstrates that, for some taxa, collections are the only source of information, and this is especially useful regarding areas that have undergone drastic vegetation changes. Inventories are, undoubtedly, basic tools in the studies, monitoring, and management and conservation plans of wild fauna and, in this case, when used in Mexico City. Conservation of biodiversity is strongly linked to society´s welfare.

6. Acknowledgments

Sandra Mote, Vania Rivera and Gerardo Guerra helped in bench work, Gibran Hoffmann made the maps and helped in the validation of some localities. The sampling was realized with the collecting permit FAUT002 and FAUT070 expedite by SEMARNAT. We also thank curators of national collections of mammals José Ramírez-Pulido, Juan Carlos López, Livia León, Fabiola Guzmán and Gloria Magaña. The Unidad de Informática para la

Biodiversidad (UNIBIO), Instituto de Biología, UNAM, supported part of the project as being part of the "Megaproyecto Universitario del Sistema de Informática para la Biodiversidad y el Ambiente (SIBA), programa IMPULSA (Investigación Multidisciplinaria de Proyectos Universitarios de Liderazgo Académico)".

7. References

Álvarez; F. J.; Carabias, J. L.; Meave del Castillo, J.; Moreno Casasola, P.; Nava Fernández, D.; Rodríguez Zahar, F.; Tovar González, C. & Valiente-Banuet, A. (1994). Proyecto para la creación de una reserva en el Pedregal de San Ángel. In*: Reserva Ecológica "El Pedregal de San Ángel". Ecología, Historia Natural y Manejo, A. Rojo (ed.).* p. 343-353. Universidad Nacional Autónoma de Mexico, Mexico, Distrito Federal.

Álvarez, T. & Ramírez Pulido, J. (1972). Notas acerca de murciélagos mexicanus. *Anales de la Escuela Nacional de Ciencias Biológicas.*, Mexico. 19:167-178.

Álvarez, T.; Álvarez-Castañeda, S. T. & González-Escamilla, M. (1997). Localidades Típicas de Mamíferos Terrestres en Mexico. *Centro de Investigaciones Biológicas del Noroeste, S. C. y Escuela Nacional de Ciencias Biológicas*. 175 pp.

Aranda, J. M.; Martínez del Río., C.; Colmenero, L. C. & Magallón, V. M. (1980) *Los mamíferos de la Sierra del Ajusco*. Comisión Coordinadora para el desarrollo agropecuario del Departamento del Distrito Federal (COCODA), 146pp.

Aranda, M. (2010a) *Canis latrans* URN:catalog:IBUNAM:CFB:FB1563, IBUNAM CFB:FB1679; *Nasua narica* URN:catalog:IBUNAM:CFB:FB1579; *Mustela frenata* URN:catalog:IBUNAM:CFB:FB1682, URN:catalog:IBUNAM:CFB:FB1727; *Taxidea taxus* URN:catalog:IBUNAM:CFB:FB1557; *Conepatus leuconotus* URN:catalog:IBUNAM:CFB:FB1701; *Mephitis macroura* URN:catalog:IBUNAM:CFB:FB1558; *Procyon lotor* URN:catalog:IBUNAM:CFB:FB1617; *Procyon lotor* URN:catalog:IBUNAM:CFB:FB1706; *Procyon lotor* URN:catalog:IBUNAM:CFB:FB1713; Aranda, M. (2010i) *Odocoileus virginianus* URN:catalog:IBUNAM:CFB:FB1646; *Odocoileus virginianus* URN:catalog:IBUNAM:CFB:FB1686; URN:catalog:IBUNAM:CFB:FB1694

Bárcenas, H. & Medellín, R. (2007) Registros notables de mamíferos en el sur del Distrito Federal, Mexico. *Revista Mexicana de Mastozoología* 11:73-79.

Brinkhoff, T. (2011). The Principal Agglomerations of the World. http://www.citypopulation.de. *2011-07-17*

Briones-Salas, M. & Sánchez-Cordero, V. (2004). Mamíferos pp 423-447. In: *Biodiversidad de Oaxaca*. García-Mendoza, A.; Ordoñez, M. J. & Briones-Salas, M. (eds). Instituto de Biología, UNAM, Fondo Oaxaqueño para la Conservación de la Naturaleza, World Wildlife Foundation, Mexico,

Carraway, L. N. (2007). Shrews (*Eulypotuphla:Soricidae*) of Mexico,In*: Monographs of the Western North American Naturalist.* M.C.Belk (Ed)1-91ISBN 0-8425-2531-9, Provo, Utah.

Castro-Campillo, A.; Silva T,B & Ramírez-Pulido,J.(1992) Notas sobre los mamíferos de la Sierra de Santa Catarina, Distrito Federal ,Mexico. *Revista de la Sociedad Mexicana de Historia Natural* 43:33-42

Castro-Campillo, A.; Salame-Méndez, A.; Vergara-Huerta, J.; Castillo, A & Ramírez-Pulido, J. (2008). Fluctuaciones de micromamíferos terrestres en bosques templados aledaños a la Ciudad de Mexico, Distrito Federal. In: *Avances en el estudio de los mamíferos de Mexico*. Lorenzo, C.; Espinoza E. & Ortega J. (eds). Publicaciones Especiales, Vol. II, Asociación Mexicana de Mastozoología, A.C. Mexico, D.F. 391-410p.

Ceballos, G. & Galindo, C. (1984). *Mamíferos Silvestres de la Cuenca de Mexico*. Limusa; MAB. Mexico, Distrito Federal. 299 p.

Chávez, T. J. C. & Ceballos, G. (1992). Los mamíferos silvestres del Pedregal. *Oikos* 13:4.

Chávez, T. J. C. (1993a). Dinámica Poblacional y uso de hábitat por roedores en un matorral de palo loco (*Senecio praecox*). *Tesis de Licenciatura, Facultad de Ciencias, Universidad Nacional Autónoma de Mexico.*

Chávez, T.J. C. (1993b). Los roedores silvestres de El Pedregal. *Oikos* 21:4.

Chávez, J. C. & Ceballos, G. (1994). Historia Natural Comparada de los Pequeños Mamíferos de la Reserva El Pedregal. In: *Reserva Ecológica "El Pedregal de San Ángel: Ecología, Historia Natural y Manejo", A. Rojo (eds.). Universidad Nacional Autónoma de Mexico.* p. 229-238.

Chávez. & Ceballos,G. (2009). Implications for the Conservation of the Species Diversity and Population Dynamics of Small Mammals in an Isolated Reserve in Mexico City. *Natural Areas Journal.* 29:27-41.

CITES. (2009). (Conservation on Internacional Trade in Endangered Species of Wild Fauna and Flora). The CITES Appendices I, II y III. Ginebra, Suiza. World Wide Web http://www.cites.org/eng/append/index.html

Colección Nacional de Mamíferos (CNMA). (2006). Portal UNIBIO Instituto de Biología, Universidad Nacional Autónoma de Mexico. //unibio.ibunam.mx. Dirección General de Planeación. Unidad de Informática para la Biodiversidad. 2006. Colecciones en Línea, Instituto de Biología, Universidad Nacional Autónoma de Mexico. Mexico, D. F.

CONABIO (1999). Uso de suelo y vegetación modificado por Conabio. Scale 1,000,000

CONANP-SEMARNAT. (2006). Programa Programa de conservación y manejo "Parque Nacional Desierto de los Leones" Mexico. Delegación Cuajimalpa, *Secretaria del Medio Ambiente, Gobierno del Distrito Federal, Comisión Nacional de Áreas Naturales Protegidas*, 172pp

Farías, V. (2010) *Canis latrans* URN:catalog: IBUNAM CFB:FB1964

Godínez G.E., González-Ruiz, N. & Ramírez-Pulido J.(2011) Actualización de la lista de los mamíferos de Jalisco, Mexico: implicaciones de los cambios taxonómicos. *Therya*.07-35.

Gómez –Jiménez. Y. A. (2009). Mastofauna del suelo de conservación contrerense, Mexico, D.F. Tesis para obtener el título de Biólogo, Facultad de Ciencias UNAM. 94 p.

González-Romero, A. (1980). Roedores plaga en las zonas agrícolas del Distrito Federal. *Instituto de Ecología. Museo de Historia Natural de la Ciudad de Mexico.*

Guevara-López, L. (2010) *Odocoileus virginianus* URN:catalog:IBUNAM:CFB:FB2973

Guevara, L. Rosado M., Nolasco L., 2010. Liomys irroratus. URN:catalog:IBUNAM:CFB:FB2378

Hafner, S. M.; Gannon, W. L.; Salazar-Bravo, J. & Álvarez Castañeda, S. T. (1997). Mammal Collections in the Western Hemisphere. *American Society of Mammalogists.* Allen Press. Lawrence, Kansas, United States. 93 p.

Hafner, J. C.; Light, J. E.; Hafner, D. J.; Hafner, M. S.; Reddington, E.; Rogers, D.S. & Riddle, B. R. (2007). Basal Clades and Molecular Systematics of Heteromyid Rodents. *Journal of Mammalogy*, 88 (5): 1129-1145.

Hall, E. R. (1981). *The mammals of North America*. John Wiley and Sons, United States of America. 1181 p.

Herrera L., A.(1895) *Catalogo de la Colección de mamíferos del Museo Nacional*. Imprenta del Museo Nacional Mexico. Segunda Edición. 1-46

Hortelano-Moncada, Y; Cervantes A, F; & Trejo Ortiz, A.(2009) Mamíferos silvestres de la Reserva Ecológica del Pedregal de San Ángel en Ciudad Universitaria, Universidad Nacional Autónoma de Mexico, Mexico D.F. *Revista Mexicana de Biodiversidad*: 80:507-520.

Howell A. H., 1902. Three New Skunks of the genus *Spilogale* . *Proceedings of the Biological Society of Washington*. 15:242.

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2010). Principales Resultados por Localidad, *XII Censo de Población y Vivienda*.

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2001). Ciudad de Mexico. E14A39. *Dirección General de Geografía. Instituto Nacional de Estadística, Geografía e Informática*. Mexico. Carta topográfica 1:50 000.

IUCN. (2004). (The International Union for Conservation of Nature). *Red List of Threatened Species Version 2010.4*. Gland, Suiza. Sobre el Word Wide Web (www.iucnredlist.org)

Lichtenstein, von H. (1830). Erläuterungen der nachrichten des Franc. Hernandez von den vierfüfsigen Thieren Neuspaniens. *Abhandlungen der Königlichen Akademic der Wissenschaften, Berlin,* 1827, p.119.

López- Forment, C. W. (1989). La situación actual de los Mamíferos en el Valle de Mexico. In: *Ecología Urbana*. Gio-Argaéz, R, Hernández, R. I. y E. Saínz-Hernández (eds.). 167-170 p. Mexico, D. F.

Lorenzo, C.; Espinoza, E.; Briones, M. & Cervantes, F. A. (eds.). (2006). *Colecciones mastozoológicas de Mexico*. Instituto de Biología, UNAM y Asociación Mexicana de Mastozoología, A.C. Mexico, D.F. 572 pp.

Lorenzo, C., Espinoza, E. & Ortega, J. 2008. Mamíferos Terrestres de la Frontera Sur de Mexico. 147-164 in Avances en el Estudio de los Mamíferos de Mexico II. Lorenzo, C., E. Espinoza & J. Ortega (eds). Asociación Mexicana de Mastozoología., A. C. Mexico D. F.

Mammal Networked Information System. (2006). Portal Home of Mammal Networked Information System. http://manis.mvz.berkeley.edu/

Medellín, R. A.; Arita, H. T. & Sánchez, O. H. (1997). Identificación de los Murciélagos de Mexico. *Clave de Campo. Asociación Mexicana de Mastozoología, A. C., Publicaciones especiales* Número 2. Mexico. D. F. 83 p.

Merriam, C. H. (1901). Synopsis of the rice rats (Genus *Oryzomys*) of the United States and Mexico. *Proceedings of the.Washington Academy of Sciences* 3:273-295

Merriam, C. H. (1901). Descriptions of 23 New harvest mice (Genus *Reithrodontomys*). *Proceedings of the.Washington Academy of Sciences* 3:555

Merriam, C. H. (1895). Revision of the Shrews of the American Genera *Blarina* and *Notiosorex*. *North American Fauna*. 10:22.

Merriam, C. H. (1898). Description on twenty new species and new genus of *Peromyscus* from Mexico and Guatemala. *Proceedings of the.Biological Society of Washington,* 12:123

Miller, A. S., Jr. & Allen, G.M. (1928) The American bats of the genera Myotis and Pinzonyx. *Bull.U.S. Nat. Mus*., 144:I-VIII+1-218.

Miranda, F. & Hernández-X., E. (1963). Los tipos de vegetación de Mexico y su clasificación. *Bol. Soc. Bot. Mexico* 28:29-179.

Monroy-Vilchis, O. & Rubio, R. (1999). Identificación de mamíferos de la Sierra de Nanchititla a través del pelo. *Cuadernos de Investigación (7).* Universidad Autónoma del Estado de Mexico. Mexico. 39pp.

Monroy-Vilchis, O.; Rangel-Cordero, H.; Aranda, V.; Velázquez, A. & Romero, J.F. (1999). Los mamíferos de hábitat templado del sur de la Cuenca de Mexico. In: *La Biodiversidad de la Región de Montaña del sur de la Cuenca de Mexico*. Pp. 141-159 Universidad Autónoma Metropolitana. Mexico.

Naranjo, P. E., Lorenzo M. C. & H. Hovart (2005). La diversidad de Mamíferos en Chiapas. Pp. 221-264 in*: Diversidad Biológica en Chiapas* González-Espinosa M, Ramírez-Marcial N. Ruiz- Montoya L. (eds). El Colegio de la Frontera Sur (ECOSUR), COCYTECH, Plaza y Valdes S.S de C. V .Mexico D. F.

Navarro, F. J.; González Ruiz, N. & Álvarez Castañeda, S. T. (2007). Los Mamíferos Silvestres de Milpa Alta, D. F.: Lista Actualizada y Consideraciones para su conservación. *Acta Zoológica Mexicana (n. s.)* 23(3):103-124.

Negrete, Y. A. (1991). Los mamíferos silvestres de la Reserva Ecológica "El Pedregal". *Tesis de Licenciatura, Facultad de Ciencias, Universidad Nacional Autónoma de Mexico*. p

Negrete, Y. A. & Soberón, J. (1994). Los mamíferos silvestres de la Reserva Ecológica El Pedregal de San Ángel. In: *Reserva Ecológica "El Pedregal de San Ángel: Ecología, Historia Natural y Manejo*", A. Rojo (eds.). p. 219-228. Universidad Nacional Autónoma de Mexico.

Ortega, R. (2010) *Mustela frenata* URN:catalog:IBUNAM:CFB:FB2400

Pérez-Campa, M. A. (2007). La Cuenca de Mexico. Preclásico tardío (400 a.C.-200 d.C.). In: *Arqueología mexicana*. La Cuenca de Mexico. Mexico, D.F. Julio-Agosto. 40-43p.

Polaco, O. J.; Arroyo-Cabrales, J. & Jones, J. K. (1992). Noteworthy of some bats from Mexico.*The Texas Journal of Science*. 44(3): 331-338.

Portal Darwin Core V. 3.0. http://darwincore.calacademy.org/

Ramírez-Pulido, J.; Britton, M. C.; Perdomo, A. & Castro, A. (1986). *Guía de los Mamíferos de Mexico*. Universidad Autónoma Metropolitana unidad Iztapalapa, Mexico, D. F., 720 p.

Ramírez-Pulido, J.; Arroyo-Cabrales, J. & Castro-Campillo, A. (2005). Estado actual y relación nomenclatural de los mamíferos terrestres de Mexico. *Acta Zoológica Mexicana* (n. s.) 21(1):21-82.

Reiche, C. (1926). *Flora excursoria en el Valle Central de Mexico*. Talleres gráficos de la Nación. Mexico, DF. 303 pp.

Rivera, J.E. & Espinosa, A. H. (2007). Flora y vegetación del Distrito Federal. In: *Biodivesidad de la faja volcánica transmexicana*. Luna, I.; Morrone, J.J. & Espinosa, D. (eds). P. 231-253. UNAM, Mexico, DF.

Rzedowski, G.C. de; & Rzedowski, J. (2001). *Flora fanerogámica del Valle de Mexico*. 2º ed. Instituto de Ecología, A.C. y Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. Pátzcuaro, (Michoacán). 1406pp.

Sánchez-H, O.; López-Ortega, G. & López-Wilchis, R. (1989). Murciélagos de la Ciudad de Mexico y sus alrededores. In: *Ecología Urbana*. Gio-Argaéz, R, Hernández, R. I. y E. Saínz-Hernández (eds.). p. 141-165. Mexico, D. F.

Secretaría de Comunicaciones y Transportes (SCT). (1987). Carta topográfica del Distrito Federal, escala 1:100 000.

Secretaria de Medio Ambiente, Gobierno del Distrito Federal. (2011) http://www.sma.df.gob.mx

Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT). (2010). Norma Oficial Mexicana. NOM-059-ECOL-2010. Protección ambiental- Especies nativas de Mexico de flora y fauna silvestres-Categorías de Riesgo y especificaciones por su inclusión, exclusión o cambio- Lista de especies en riesgo. *Diario Oficial de la Federación, Segunda sección, Mamíferos*, Págs. 136-147, miércoles 17 de enero de 2010.

Unidad de Informática para la Biodiversidad. www.unibio.unam.mx.

Valdéz, A. M. & Ceballos, G. (2005). *Spermophilus adocetus* (Merriam, 1903). In: *Los Mamíferos Silvestres de Mexico.* Ceballos, G y G. Oliva (eds). Comisión Nacional para el conocimiento y Uso de la Biodiversidad y Fondo de Cultura Económica, Mexico, p. 559-560.

Villa-R, B. (1952). Mamíferos Silvestres del Valle de Mexico. *Anales del Instituto de Biología, Universidad Nacional Autónoma de Mexico.* 23:269-492.

Villa-R, B. (1966). Los Murciélagos de Mexico. In: *Su importancia en la economía y la salubridad-Su clasificación sistemática*. 491 p. Instituto de Biología, Universidad Nacional Autónoma de Mexico.

Villa, R. B. & Cervantes, F. A. (2003). *Los Mamíferos de Mexico*. Grupo Editorial Iberoamérica, S. A. de C. V. e Instituto de Biología, Universidad Nacional Autónoma de Mexico, 140 p.

Villa, R. B & Sánchez C., V. (1991). La ardilla terrestre o cuiniqui *Spermophilus adocetus* Merriam,1905 (Rodentia: Sciuridae) en la región central de Mexico y su status taxonómico. *Anales del Instituto de Biología, Universidad Nacional Autónoma de Mexico, Serie Zoología, 62(1):511-519*.

Wagler. (1831). Isis von Oken, 24:514.

Wieczorek, J. (2001). *MaNIS/HerpNet/ORNIS Georeferencing Guidelines*. University of California, Berkerleley. http://manis.mvz.berkeley.edu/

Wilson, D. & Reeder, D.M (2005) *Mammal species of the world a Taxonomic and Geographic Reference*. 3th Edition, Volume 1 & 2. The Johns Hopkins University Press, Baltimore, United States of America

Wilson, D. E. (1991) Especímenes tipo de Mamíferos mexicanos en el National Museumof Natural History, Washington D. C. EUA. *Anales del Instituto de Biología, Universidad Nacional Autónoma de Mexico, Serie Zoología, 62(2):287-318.*



Changing Diversity in Changing Environment
Edited by PhD. Oscar Grillo

ISBN 978-953-307-796-3
Hard cover, 392 pages
Publisher InTech
Published online 14, November, 2011
Published in print edition November, 2011

As everybody knows, the dynamic interactions between biotic and abiotic factors, as well as the anthropic ones, considerably affect global climate changes and consequently biology, ecology and distribution of life forms of our planet. These important natural events affect all ecosystems, causing important changes on biodiversity. Systematic and phylogenetic studies, biogeographic distribution analysis and evaluations of diversity richness are focal topics of this book written by international experts, some even considering economical effects and future perspectives on the managing and conservation plans.

How to reference
In order to correctly reference this scholarly work, feel free to copy and paste the following:

Yolanda Hortelano-Moncada and Fernando A. Cervantes (2011). Diversity of Wild Mammals in a Megalopolis: Mexico City, Mexico, Changing Diversity in Changing Environment, PhD. Oscar Grillo (Ed.), ISBN: 978-953-307-796-3, InTech, Available from: http://www.intechopen.com/books/changing-diversity-in-changing-environment/diversity-of-wild-mammals-in-a-megalopolis-mexico-city-mexico

INTECH
open science | open minds

InTech Europe
University Campus STeP Ri
Slavka Krautzeka 83/A
51000 Rijeka, Croatia
Phone: +385 (51) 770 447
Fax: +385 (51) 686 166
www.intechopen.com

InTech China
Unit 405, Office Block, Hotel Equatorial Shanghai
No.65, Yan An Road (West), Shanghai, 200040, China
中国上海市延安西路65号上海国际贵都大饭店办公楼405单元
Phone: +86-21-62489820
Fax: +86-21-62489821

© 2011 The Author(s). Licensee IntechOpen. This is an open access article distributed under the terms of the Creative Commons Attribution 3.0 License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

IntechOpen

IntechOpen