

THE SNAKES OF NUEVO LEON, MEXICO



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LOCATION

Nuevo Leon is located at the north-eastern edge of Mexico. It is found between the parallels of 23° 10' 27' and 27° 46' 06' North latitude, and the meridians 98° 26' 24' and 101° 13' 55' longitude west. The Tropic of Cancer passes through the southern part of the state at parallel 23° 27'. Nuevo Leon occupies an area of 64,555 square kilometres, making it the thirteenth largest state in Mexico.

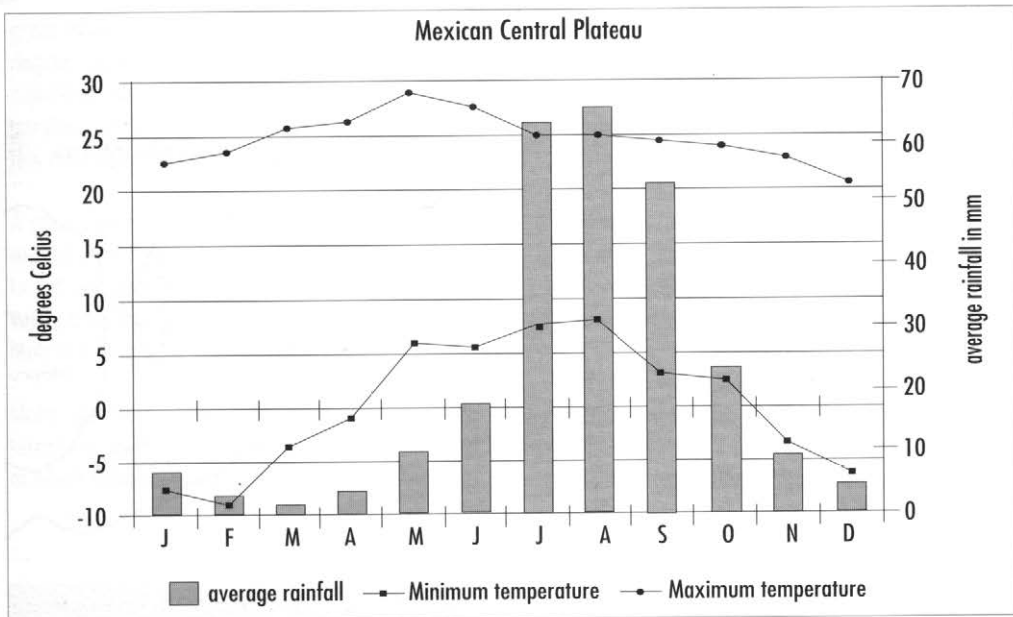
The states of Coahuila and Zacatecas to the North-west and Southwest, and the states of San Luis Potosi and Tamaulipas to the South and East border Nuevo Leon. It also shares a small portion of its northern border with Texas, USA. Nuevo Leon contains 51 municipalities, and has a current human population of 5,410,000.



Due to its latitude, Nuevo Leon falls within the great arid zone of the world. Nevertheless, the presence of mountain chains and its closeness to the Gulf of Mexico create a buffer and positive effect on its extreme climates. This allows for the existence of miscellaneous forms of forests and shrubs.

PHYSIOGRAPHIC AND VEGETATION

Nuevo Leon exhibits three well-defined morphological zones that correspond to the following physiographical provinces: Coastal Gulf Plains, Sierra Madre Oriental, and the Mexican Central Plateau. These exhibit diverse types of plant communities such as oak, pine-oak, pine-oak-agave, pine-oak-madroño-agave and cloud forests at the higher elevations, and desert, desert-shrub, grassland, and river vegetation at the lower elevations. The state harbours more than 2,300 species of native plants, which represents a little less than 10% of the total of species found in Mexico.



CLIMATE

The climate in Nuevo Leon is very extreme, with a dominance of hot and dry climatic conditions. It's associated with dry 'B' climates that are classified by Kööppen as 'Bw'- arid or very dry and 'Bs'- semiarid or dry. Most of the time it is hot in the lowlands, where as in mountain areas the temperatures are cooler due to altitude effect. Forty two percent of the total snake species in the state are found in the mountainous areas. The highest mountain peak in Nuevo Leon is called Cerro Potosi, 3,600 metres. Cerro Potosi is located in the south central area of the state, in Galeana- the largest municipality in Nuevo Leon. All of the contrasting geographical features define the landscape for specific characteristics, which in turn impact the distribution of different species. Air and soil temperature, relative humidity, and barometric pressure have an effect on a

snake's natural biology. Various microclimates dictate which species live where.

RESEARCH

Research, current and past, has been the primary focus of distribution and systematics of a species. Other aspects that deal with population dynamics, species management, conservation of biological diversity, and ethnoherpetological relationships have not been fully explored. The preparation of this list will allow us to establish defined strategies and priorities for future studies of the snakes of Nuevo Leon. But we strongly consider there is much to do in the field of Herpetology. As in many places around the world, habitat destruction, alteration of forest, and the never-ending population of man will definitely put more pressure on all species. The pressure is greater on those species that occupy





Crotalus lepidus morulus: like most rattlesnakes of the state, the rock rattlesnake is poorly understood by local countryman.



Pituophis deppei jani: one of the largest snakes of the state.

limited, specific microhabitats. Because mountain areas are becoming more accessible to human settlements, man's presence could have a catastrophic effect on mountain dwelling species. Any disruption in their reproductive or feeding behaviours could be catastrophic to their survival. There is currently no on-going research in Nuevo Leon concerning these issues. We have clearly identified destructive elements such as livestock overgrazing, and human alterations of land to have a dramatic effect on the continuation of a species in certain areas. North-eastern Mexico has been suffering from a severe drought during the past years. The shift in global rainfall patterns has affected areas that have traditionally been humid year round. Many forested areas have been subject to intense fires due to the change in rainfall patterns. Determining the intensity, duration, and damage caused by the fires to the plant and fauna communities will be a challenging goal for future studies. We have visited the incinerated areas and observed that only a small percentage of the plant community is left. What happens to a species that is dependent on an environment that has been severely changed? Would the animals be able to adapt? Would food needs be met? It is hoped through future studies these questions can be answered.

SPECIES

Many of the species have wide distributions in and out of the state. Some examples are: *Leptotyphlops dulcis*, *Drymarchon corais*, *Elaphe gutatta*, *Lampropeltis getula*, *Mastichophis schotti*, *Pituophis catenifer*, *Rhinocheilus lecontei*, *Salvadora grahami*, *Hypsiglena torquata*, *Leptodiera septentrionalis*, *Nerodia rhombifera*, *Storeria dekayi*, *Thamnophis marcianus*, *Thamnophis proximus*, *Crotalus atrox* and *Crotalus molossus*. Some species have a limited distribution within the state: *Oxybelis aeneus*, *Adelphicus quadrivirgatus* (one collected

specimen), *Amastridium veliferum* (has never been collected in the state, just in the bordering state of Tamaulipas), *Thamnophis exsul*, *Thamnophis eques*, *Agkistrodon bilineatus* and *Sistrurus catenatus* (one collected specimen). These species are documented by only one or two museum specimens, or by hypothesized literature distribution only. A recently collected *Agkistrodon bilineatus* makes it the third known specimen for the state. And similar examples are found with other species. Population studies have never been conducted on any species, except for *Crotalus lepidus*. Thanks to a non-governmental organisation, we have been doing fieldwork with the species throughout the states of Coahuila, Nuevo Leon, and Tamaulipas, with some interesting results. Past authors that have contributed to our knowledge of the herpetofauna of Nuevo Leon and surrounding areas include Martin del Campo (1953), Liner (1966,1996), Smith and Taylor (1966), Aseff (1967), Velasco (1970), Treviño (1978), Vallejo (1981), Benavides (1987), Contreras (1989), Liner and Dixon (1992), Lazcano (1992) Contreras et al (1995), Conant and Collins (1998). After a thorough bibliographic search and an inventory of specimens deposited in the herpetological laboratory of the Universidad Autonoma de Nuevo Leon, as well as more than 13 collections in the United States, we conclude that there are currently 59 species recognised in the state of Nuevo Leon. We are also conscious that this number and scientific names could change or be modified with time.

SPECIES LIST

Class: Reptilia
 Order: Squamata
 Suborder: Serpentes
 Family (8) Genus Species (59) Subspecies

(1) Typhlopidae

(1) *Rhamphotyphlops braminus*





(2) Leptotyphlopidae

- (2a) *Leptotyphlops dulcis dulcis*
- (2b) *Leptotyphlops dulcis dissecta*
- (2c) *Leptotyphlops dulcis myopicus*

(3) Colubridae

- (3a) *Arizona elegans arenicola*
- (3b) *Arizona elegans elegans*
- (4) *Bogertophis subocularis amplinotus*
- (5) *Coluber constrictor oaxaca*
- (6) *Drymarchon corais erebennus*
- (7) *Drymobius margaritiferus margaritiferus*
- (8) *Elaphe bairdi*
- (9) *Elaphe guttata meahllmorum*
- (10) *Ficimia streckeri*
- (11) *Gyalopion canum*
- (12) *Lampropeltis alterna*
- (13) *Lampropeltis getula splendida*
- (14) *Lampropeltis mexicana*
- (15) *Lampropeltis triangulum annulata*
- (16) *Leptophis mexicanus*
- (17a) *Masticophis flagellum lineatulus*
- (17b) *Masticophis flagellum testaceus*
- (18a) *Masticophis schotti ruthveni*
- (18b) *Masticophis schotti schotti*
- (19) *Opheodrys aestivus majalis*
- (20) *Oxybelis aeneus*
- (21) *Pituophis deppei jani*
- (22) *Pituophis catenifer sayi*
- (23) *Rhinocheilus lecontei tessellatus*
- (24) *Salvadora grahami lineata*
- (25) *Senticollis triaspis intermedia*
- (26) *Sonora semiannulata*
- (27) *Tantilla atriceps*
- (28) *Tantilla hobartsmithi*
- (29) *Tantilla nigriceps*
- (30) *Tantilla rubra rubra*
- (31) *Tantilla wilcoxi*
- (32) *Trimorphodon tau tau*

(4) Dipsadidae

- (33) *Adelphicos quadrivirgatus newmanorum*
- (34) *Amastridium veliferum sapperi*
- (35) *Hypsiglena torquata jani*
- (36) *Leptodeira septentrionalis septentrionalis*
- (37) *Rhadinaea montana*
- (38) *Sibon sartori sartori*

(5) Xenodontidae

- (39) *Diadophis punctatus regalis*
- (40) *Heterodon nasicus kenneerlyi*

(6) Natricidae

- (41) *Nerodia erythrogaster transversa*
- (42a) *Nerodia rhombifer blanchardi*
- (42b) *Nerodia rhombifer rhombifer*
- (43) *Storeria dekayi texana*
- (44) *Storeria hidalgoensis*
- (45) *Thamnophis cyrtopsis cyrtopsis*
- (46) *Thamnophis eques*
- (47) *Thamnophis exsul*
- (48) *Thamnophis marcianus marcianus*
- (49) *Thamnophis proximus diabolicus*
- (50) *Thamnophis pulchrilatus*

(7) Elapidae

- (51) *Micrurus tenere tenere*

(8) Viperidae

- (52) *Agkistrodon bilineatus taylori*
- (53) *Crotalus atrox*
- (54) *Crotalus durissus totonacus*
- (55a) *Crotalus lepidus castaneus*
- (55b) *Crotalus lepidus lepidus*
- (55c) *Crotalus lepidus morulus*
- (56a) *Crotalus molossus molossus*
- (56b) *Crotalus molossus nigrescens*
- (57) *Crotalus pricei miquihuanus*
- (58) *Crotalus scutulatus scutulatus*
- (59) *Sistrurus catenatus edwardsi*



Coluber constrictor oaxaca: a poorly collect snake in the state



Elaphe bairdi: an inhabitant of the central and southern parts of the state in the mountain area with oak-pine forest.



Salvadora grahami lineata: a snake found through the state.



Agkistrodon bilineatus taylori: a very rare snake found in the state, it can also be found in the state of Tamaulipas to the east in much larger numbers.

ACKNOWLEDGMENTS

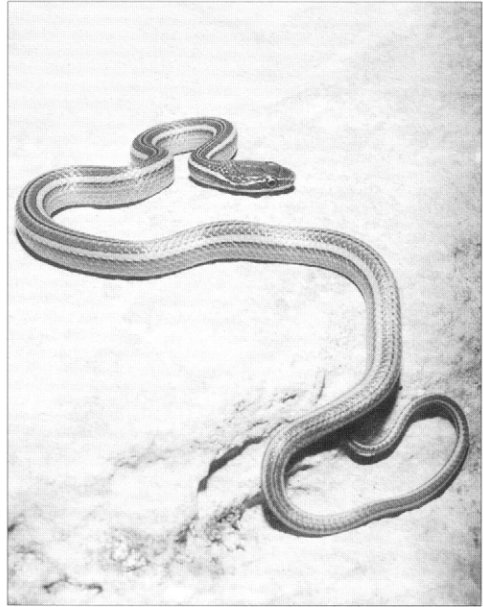
This article could not have been conceived if not for many of the past herpetologists who dedicated much of their time, money, and effort in building a representative collection (now up to nearly 6,000 specimens). Since the formation of the collection back in 1966, some of these hard-working people include Alejandro Aseff Martinez, Carlos Humberto Treviño Saldaña, Jose Luis Vallejo Gamero, Rita Yolanda Benavidez Ruiz, and Arturo Contreras Arqueta. Enormous help was also received from some of the experts on our local herpetofauna: James R. Dixon, Ernest A. Liner and Hobart M. Smith, who were always there when we needed them. We would also like to thank two non-governmental organizations, The Comision Nacional Para el Uso y Estudio de la Biodiversidad and Fondo Mexicano Para la Conservación de la Naturaleza, for providing funds for field trips and equipment for the herpetological lab. And last but not least Katy Kardon for reviewing the English composition of the manuscript.

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English corrections by Chris Mattison