

## Notes on Mexican Herpetofauna 18: Herpetofauna of Cerro El Topo Chico Natural Protected Area, Nuevo León, Mexico

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### Abstract

Cerro El Topo Chico is a protected Natural area at a state level. This Cerro is located within the Metropolitan Area of Monterrey in the municipalities of Monterrey and Escobedo. It is completely surrounded by city, now considered an artificial island. This is the first study herpetofauna in the area based on sampling and distribution maps. A recent forest fire severely affected much of the Cerro El Topo Chico, and a herpetological study was conducted to determine the status of populations. A total of 66 species are distributed in the general area: 16 amphibians and 50 reptiles. Five are endemic to Mexico and 20 are under a category of protection. It is important to continue with sampling subsequent to the forest fire in the area. Human impacts on the ecology of this artificial island can be expected to diminish genetic diversity and lead to extirpation of some species.

### Resumen

El Cerro El Topo Chico, es un Área Natural Protegida a nivel estatal. Este cerro se ubica dentro del Area Metropolitana Area de Monterrey en los municipios de Monterrey y Escobedo. Se encuentra completamente rodeado por ciudad considerándose una isla artificial. Este es el primer estudio herpetofaunístico en el área en base a muestreos y mapas de distribución. Recientemente ocurrió un incendio que consumió casi en su totalidad el cerro, es por esto que realizar un estudio herpetológico es de importancia para determinar el estado de las poblaciones. Se reportaron 66 especies, repartidas en 16 anfibios y 50 reptiles. 5 son endémicas a México y 20 se encuentran bajo una categoría. Es de importancia continuar con los muestreos ya que el incendio sucedido, los impactos causados por el hombre y la condición de isla en que se encuentra es posible que las especies se encuentren en vías de extinguirse o una disminución de su pool genético.

### Introduction

The Sierra Madre Oriental is a chain of mountains running north-south throughout eastern Mexico. This mountainous system occupies an area of 160,220.4 km<sup>2</sup>, which is equivalent to about 8.2% of the country's territory, and varies in elevation from 200 to 3600 m (Luna et al., 2004). Several regionalization systems of Mexico, based on both physical and biotic criteria, show the Sierra Madre Oriental to have unique geographical and biological diversity (Lazcano et al., 2009). Canseco-Márquez et al. (2004) reported 207 species of amphibians and reptiles for the Sierra Madre Oriental: 44 frogs, 20 salamanders, 49 lizards, 88 snakes and 6 turtles.

Cerro El Topo Chico, part of the Sierra Madre Oriental, is located in the center of the state of Nuevo Leon. It has a total surface area of 1093.30 ha (10.933 km<sup>2</sup>), with a width of 2 km. It is a Protected Natural Area (ANP) at the state level (Anonymous, 2000). It can be viewed as a representative and emblematic symbol of the *regiomontano* landscape and an ecologically important zone that provides a diversity of environmental services and forms a refuge for the wildlife of our state (Anonymous, 2000). It is vital to intensely study this area.

No research on the amphibians and reptiles of Cerro El Topo Chico has been previously conducted and this is the first documentation on herpetofauna for this important State Protected Natural Area. Herpetologists who have worked very close to the site, now located within the Metropolitan Area of Monterrey, are: Martín del Campo (1953), Aseff-Martínez (1967), Velasco (1970), Contreras-Balderas et al. (1995), Lazcano et al. (2010); information and data have also been presented by Benavides-Ruiz (1987) for the municipality of Santiago; Banda-Leal (2002) and Lazcano et al. (2006) for Chipinque Ecological Park; and Gallardo-Valdez (2006) and Lazcano et al. (2009) for La Silla (Saddleback Mountain).

As a result of poor urban planning Cerro El Topo Chico is completely surrounded by the Metropolitan Area of Monterrey. Some urban development has encroached on the slopes. In addition, this *cerro* and the nearby Cerro las Mitras in the past have been exploited by the mining of construction material (limestone). This resulted in extreme erosion of some of the slopes. Mining had to be stopped because of flooding after strong hurricanes hit the city. Currently there is a minimum of industrial exploitation going on. Fortunately for the herpetofauna, the threat of flooding has stopped urban and industrial



A satellite view of Cerro El Topo Chico and the Monterrey Metropolitan Area. Source Google Earth 2012.

growth. However, urbanization has trapped the wildlife living here.

A recent threat was the fire that took place on the days of 25–28 April 2011, consuming 120 ha (nearly 11% of Cerro El Topo Chico), mainly microphyll scrub. It was a typical surface fire (Juan Carlos Pouda, pers. com.) strongly affecting flora and fauna. The response of amphibians and reptiles to anthropogenic disturbance to their microhabitats is scarcely studied and while most of the ecological relationships among these organisms are unknown, it is important to generate basic information about these communities to design management strategies (Osorno-



Cerro El Topo Chico in the distance, as seen from Escobedo, Nuevo León, Mexico. Photograph by Manuel Nevárez de los Reyes.

Muñoz, 1999).

It is crucial to assess the present herpetofauna for this important ANP Cerro El Topo Chico along elevation and vegetation zones. This will allow us to determine the current state of this *cerro*, which has been heavily impacted by human activities and isolated by population growth. It has become an artificial island and surely genetic variability and species are being lost.

#### Study site

The ANP Cerro El Topo Chico, is near the center of the state of Nuevo León. Politically it is part of the municipalities of Monterrey and General Escobedo. (INEGI, 1986); geographically it is located between 25°44'35" and 25°48'08" N latitude, and between 100°19' and 100°22'21" W longitude with elevation from 600 to 1170 m. It is located in the Sierra Madre Oriental.

Cerro El Topo Chico harbors a variety of vegetation types, mainly represented by submontane shrubs and microphyll. The representative elements of the vegetation in the natural area are: barreta (*Helietta parvifolia*), coyotillo (*Karwinskia humboldtiana*), hieba del potro (*Caesalpinia mexicana*), tenzon (*Pithecellobium pallens*), anacahuita (*Cordia boisieri*) and lechuguilla (*Agave lecheguilla*) (Anonymous, 2000).

According to the Köppen climate classification, modified by García (1981), the entire State Protected Natural Area is included in dry climate. This type of climate is characterized by evaporation exceeding precipitation; rains occurring in the summer

and scarce in the rest of the year. The total annual rainfall ranges between 300 and 500 mm, and the average annual temperature fluctuates between 18 and 22 °C.

Field trips were conducted during the months of March, April, and July 2009–2011. We also reviewed the existing material in the preserved collection of the Laboratory of Herpetology of the Faculty of Biological Sciences/UANL and the distribution maps of species for their possible presence in Cerro El Topo Chico.

Individuals were captured and identified, and the following data were recorded: sex, date, time of observation, altitude, plant community, activity, substrate, geo-reference and the condition of the day.

Specimens were identified using the criteria of Smith and Taylor (1945, 1948, 1950), Conant and Collins (1998), Lazcano et al. (2010), Lemos-Espinal and Smith (2007) and the common and scientific names as updated by Liner and Casas-Andreu (2008).

## Results

Seven species were recorded during the field trips to Cerro El Topo Chico. No additional material collected in the study area was found in the scientific preserved collection of the Laboratory of Herpetology of the Faculty of Biological Sciences/UANL. The latest information on the species occurring in the state of Nuevo León and distribution maps indicate the possible presence of 16 species of amphibians and 50 species of reptiles, which would be equivalent to the 49.62% of herpetofauna present in the state (Table 1).

Of the species listed in Table 1, three are exotic and five are endemic to Mexico. Twenty of the species have protected status under NOM-059-SEMARNAT-2010: eight as species of special concern and 12 as threatened species (SEMARNAT, 2010).

## Discussion

Our research provides the first documentation of the herpetofauna on Cerro El Topo Chico. The list of 66 species in Table 1 was based on our sampling and on the distribution maps of Conant and Collins (1998), Lazcano et al. (2010), Lemos-Espinal and Smith (2007), López et al. (2009) and Elliott et al. (2009).



A milksnake, *Lampropeltis triangulum*, from Cerro El Topo Chico. Photograph by Javier Banda-Leal.

Many of the species of amphibians and reptiles listed in Table 1 have been documented for the Chipinque Ecological Park by Banda-Leal (2002) and Lazcano et al. (2006: 47 species); for the Cerro de la Silla (Saddleback Mountain) by Gallardo-Valdez (2006: 46 species) and Lazcano et al. (2009: 46 species); for the Sierra de Picachos by Contreras-Lozano et al. (2007: 47 species); for the Sierra San Antonio Peña Nevada by Lazcano et al. (2004: 32 species); and for Cerro El Potosí by Contreras-Lozano et al. (2010: 24 species).

With the fire that happened on 25–28 April 2011 it is possible that many of the species have suffered a decline in their populations. Fires create a mosaic of diverse wildlife habitat conditions, since they alter biotic and abiotic features of habitat (Cruz-Sáenz, 2008), resulting in sites with high species richness and others with very low diversity (Shipman et al., 2004). It is known that the main causes of extinction of amphibians and reptiles come from loss of habitat, changes in weather patterns, the introduction of exotic species and environmental pollution (Young et al., 2001). When optimum conditions are modified by the fragmentation of the forest, and is high intensity long-lasting disturbances to microhabitats occur, this can endanger amphibians that possess low ability of adaptation and dispersal (Blaustein and Wake, 1995; Pough, 1999; Rueda-Almonacid, 1999).

For species highly dependent on water such as amphibians and some reptiles, the effects of forest fires may be particularly severe, since after a fire the soils have reduced water storage capacity (due to the repellent layers that develop). Also compaction and erosion may occur and cause fluctuating surface temperatures (Kozłowski et al., 1991).

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Another inhabitant of Cerro El Topo Chico, a patch-nosed snake, *Salvadora grahamiae*. Photograph by Javier Banda-Leal.

**Table 1.** Possible species for Cerro El Topo Chico, Nuevo León, México, based on latest information and distribution maps († indicates species observed). Status codes: Pr = protected (special concern), A = threatened, SE = without status, NE = not endemic, EN = endemic, EX = exotic.

Taxon	Common Name	Status
<b>Amphibia: Anura</b>		
<b>Family Bufonidae</b>		
<i>Anaxyrus cognatus</i> (Say, in James, 1813)	Great Plains Toad	SE, NE
<i>Anaxyrus debilis</i> (Girard, 1854)	Green Toad	Pr, NE
<i>Anaxyrus punctatus</i> (Baird & Girard, 1851)	Red-spotted Toad	SE, NE
<i>Anaxyrus speciosus</i> (Girard, 1854)	Texas Toad	SE, NE
<i>Incilius nebulifer</i> (Girard, 1854)	Common Toad	SE, NE
<i>Rhinella marina</i> (Linnaeus, 1758)	Cane Toad	SE, EX
<b>Family Craugastoridae</b>		
<i>Craugastor augusti</i> (Dugès, in Brocchi, 1879)	Barking Frog	SE, NE
<b>Family Leptodactylidae</b>		
<i>Leptodactylus fragilis</i> (Brocchi, 1877)	White-lipped Frog	SE, NE
<b>Family Eleutherodactylidae</b>		
<i>Eleutherodactylus cystignathoides</i> (Cope, 1877 [1878]) †	Rio Grande Chirping Frog	SE, NE
<i>Eleutherodactylus longipes</i> (Baird, in Emory, 1869)	Long-footed Chirping Frog	SE, NE
<b>Family Hylidae</b>		
<i>Smilisca baudinii</i> (Duméril & Bibron, 1841)	Mexican Treefrog	SE, NE
<b>Family Microhylidae</b>		
<i>Gastrophryne olivacea</i> (Hallowell, 1857(1856))	Western Narrow-mouthed Toad	SE, NE
<b>Family Ranidae</b>		
<i>Lithobates berlandieri</i> (Baird, 1854)	Rio Grande Leopard Frog	Pr, NE
<b>Family Rhinophrynidae</b>		
<i>Rhinophrynus dorsalis</i> A.M.C. Duméril & Bibron, 1841	Mexican Burrowing Toad	Pr, NE
<b>Family Scaphiopodidae</b>		
<i>Scaphiopus couchii</i> Baird, 1854	Couch's Spadefoot	SE, NE
<i>Spea multiplicata</i> (Cope, 1863)	Western Spadefoot	SE, NE
<b>Reptilia: Testudines</b>		
<b>Family Testudinidae</b>		
<i>Gopherus berlandieri</i> (Agassiz, 1857) †	Texas Tortoise	A, NE
<b>Reptilia: Squamata—Lizards</b>		
<b>Family Crotaphytidae</b>		
<i>Crotaphytus collaris</i> (Say, 1813)	Eastern Collared Lizard	A, NE
<b>Family Eublepharidae</b>		
<i>Coleonyx brevis</i> Stejneger, 1893	Texas Banded Gecko	Pr, NE
<b>Family Gekkonidae</b>		
<i>Hemidactylus turcicus</i> (Linnaeus, 1758) †	Mediterranean House Gecko	SE, EX
<b>Family Phrynosomatidae</b>		
<i>Cophosaurus texanus</i> Troschel, 1852(1850)	Greater Earless Lizard	A, NE
<i>Phrynosoma cornutum</i> (Harlan, 1824 [1825])	Texas Horned Lizard	SE, NE
<i>Phrynosoma modestum</i> Girard, 1852	Round-tailed Horned Lizard	SE, NE
<i>Sceloporus consobrinus</i> Baird & Girard, 1853	Prairie Lizard	SE, NE
<i>Sceloporus couchii</i> Baird, 1859(1858)	Couch's Spiny Lizard	SE, EN
<i>Sceloporus grammicus</i> Wiegmann, 1828	Graphic Spiny Lizard	Pr, NE
<i>Sceloporus marmoratus</i> Hallowell, 1852	Northern Rose-bellied Lizard	SE, NE
<i>Sceloporus olivaceus</i> H. M. Smith, 1934	Texas Spiny Lizard	SE, NE
<i>Sceloporus ornatus</i> Baird, 1859 (1858)	Ornate Spiny Lizard	A, EN

Table 1 (cont'd).

Taxon	Common Name	Status
<i>Sceloporus parvus</i> H.M. Smith, 1934	Blue-bellied Lizard	SE, EN
<i>Sceloporus serrifer</i> Cope, 1866 †	Rough-scaled Lizard	SE, NE
<b>Family Scincidae</b>		
<i>Plestiodon brevirostris</i> (Günther, 1860)	Short-nosed Skink	SE, NE
<i>Plestiodon tetragrammus</i> Baird, 1858	Four-lined Skink	SE, NE
<b>Family Teiidae</b>		
<i>Aspidoscelis scalaris</i> (Cope, 1892)	Texas Spotted Whiptail	SE, NE
<b>Reptilia: Squamata—Snakes</b>		
<b>Family Colubridae</b>		
<i>Arizona elegans</i> Kennicott in Baird, 1859	Glossy Snake	SE, NE
<i>Bogertophis subocularis</i> (A.E. Brown, 1901)	Southern Trans-Pecos Ratsnake	SE, EN
<i>Coluber constrictor</i> Linnaeus, 1758	North American Racer	A, NE
<i>Coluber flagellum</i> Shaw, 1802	Coachwhip	A, NE
<i>Coluber schotti</i> (Baird & Girard, 1853)	Schott's Whipsnake	SE, NE
<i>Coluber taeniatus</i> Hallowell, 1852	Striped Whipsnake	SE, NE
<i>Diadophis punctatus</i> (Linnaeus, 1766)	Ring-necked Snake	SE, NE
<i>Drymarchon melanurus</i> (A.M.C. Duméril, Bibron & A.H.A. Duméril, 1854)	Central American Indigo Snake	SE, NE
<i>Ficimia streckeri</i> E.H. Taylor, 1931	Tamaulipan Hook-nosed Snake	SE, NE
<i>Gyalopion canum</i> Cope, 1861 (1860)	Chihuahuan Hook-nosed Snake	SE, NE
<i>Heterodon kennerlyi</i> Kennicott, 1860	Mexican Hog-nosed Snake	SE, NE
<i>Hypsiglena jani</i> (Dugès, 1865)	Texas Nightsnake	SE, NE
<i>Lampropeltis alterna</i> (A.E. Brown, 1901)	Gray-banded Kingsnake	A, NE
<i>Lampropeltis getula</i> (Linnaeus, 1766)	Common Kingsnake	A, NE
<i>Lampropeltis triangulum</i> (Lacépède, 1789) †	Milksnake	A, NE
<i>Leptodeira septentrionalis</i> (Kennicott, in Baird, 1859)	Northern Cat-eyed Snake	SE, NE
<i>Ophedrys aestivus</i> (Linnaeus, 1766)	Rough Greensnake	SE, NE
<i>Pantherophis emoryi</i> (Baird & Girard, 1853)	Great Plains Ratsnake	SE, NE
<i>Pituophis catenifer</i> (Blainville, 1835)	Gopher Snake	SE, NE
<i>Rhinocheilus lecontei</i> Baird & Girard, 1853	Long-nosed Snake	SE, NE
<i>Salvadora grahamiae</i> Baird & Girard, 1853 †	Eastern Patch-nosed Snake	SE, NE
<i>Sonora semiannulata</i> Baird & Girard, 1853	Western Groundsnake	SE, NE
<i>Storeria dekayi</i> (Holbrook, 1836)	Texas Brownsnake	SE, NE
<i>Tantilla atriceps</i> (Günther, 1895 in Salvin & Godman, 1885-1902) †	Mexican Black-headed Snake	A, NE
<i>Thamnophis marcianus</i> (Baird & Girard, 1853)	Checkered Gartersnake	A, NE
<i>Thamnophis proximus</i> (Say, in James, 1823)	Arid Land Ribbonsnake	A, NE
<b>Family Elapidae</b>		
<i>Micrurus tener</i> (Baird & Girard, 1853)	Texas Coralsnake	SE, NE
<b>Family Leptotyphlopidae</b>		
<i>Rena dulcis</i> (Baird & Girard, 1853)	Texas Threadsnake	SE, NE
<i>Rena myopicus</i> (Garman, 1884[(1883)])	Tampico Threadsnake	SE, EN
<b>Family Typhlopidae</b>		
<i>Ramphotyphlops braminus</i> (Daudin, 1803)	Brahminy Blindsnake	SE, EX
<b>Family Crotalidae</b>		
<i>Crotalus atrox</i> Baird & Girard, 1853	Western Diamondback Rattlesnake	Pr, NE
<i>Crotalus lepidus</i> (Kennicott, 1861)	Rock Rattlesnake	Pr, NE
<i>Crotalus molossus</i> Baird & Girard, 1853	Black-tailed Rattlesnake	Pr, NE

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