

HERPETOFAUNA OF THE PEDREGAL DE SAN ANGEL,
D.F., MEXICO

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ABSTRACT

The herpetofauna of the Pedregal de San Angel, D.F., Mexico, now endangered by man's activities, is summarized for the first time. New records for this locality, amphibians among them, are included together with some notes on the Natural History and Ecology of the species occurring here.

The Pedregal de San Angel area, adjacent to Mexico City, in spite of its close proximity to the urban complex and its accessibility, has not yet been thoroughly investigated from the zoological point of view, although other biological aspects have received some attention.

Rzedowski (1954) defines the Pedregal de San Angel as all the lava field descending from the nearby Xitle volcano to the south and southwest of Mexico City. In the present study, it will be restricted to the vegetational community named by Rzedowski himself "Senecionetum praecoxis" in reference to the dominant plant species (*Senecio praecox*, Compositae). This association can be found up to 2500 m above sea level.

He characterizes the area as "Open heath with an heterogeneous structure, presenting great differences in its floristic composition. The arbustive, herbaceous and grazing strata are well represented, but the true arboreal stratum is absent". The annual mean temperature ranges from 14 to 15°C.

Diaz (1961) recognized some of the most conspicuous reptilian species in the locality; three saurians (Iguanidae: two *Scoloporus* and one *Phrynosoma*) and three snakes (Colubridae: *Pituophis* and *Salvadora*, and Crotalidae: *Crotalus*). She does not mention amphibians, and unfortunately, does not present direct data on the Natural History of the recorded species. Duellman (1970) cites a specimen of *Hyla arenicolor* from this locality, but does not discuss it.

Field work by the author and some associates between 1973 and 1978, as well as review of other previously collected material, have revealed the presence of additional species in the area.

Presently, the herpetofaunal list of the Pedregal de San Angel can be summarized as follows, with new records marked by an asterisk:

AMPHIBIA

Order Caudata

PLETHODONTIDAE

Pseudoeurycea cephalica cephalica (Cope) *

Order Salientia

LEPTODACTYLIDAE

Tomodactylus angustidigitorum Taylor *

HYLIDAE

Hyla arenicolor Cope

REPTILIA

Suborder Sauria

IGUANIDAE

Phrynosoma orbiculare orbiculare (Linnaeus)*Sceloporus grammicus microlepidotus* Wiegmann*Sceloporus torquatus torquatus* Wiegmann

Suborder Serpentes

COLUBRIDAE

Diadophis punctatus dugesi Villade **Pituophis deppoi deppoi* (Dumeril)*Rhadinaea laureata* (Günther) **Salvadora bairdi* Jan*Thamnophis dorsalis cyclides* Cope **Toluca lineata lineata* Kennicott *

CROTALIDAE

Crotalus molossus nigrescens Gloyd

It is not unlikely that additional field work, especially at night, when many species are active, could increase the number of species recorded. The rugged terrain makes it difficult to search for specimens in the numerous crevices by day.

Account of Species

The greatest part of the material examined belongs to the Herpetological Collection of the Instituto de Biología de la Universidad Nacional Autónoma de México (IBH), other specimens are deposited in the author's collection (OSH) and one in the collection of the Facultad de Ciencias, U.N.A.M. (LIHFC).

Measurements were taken to the nearest tenth-millimeter; the letters SVL are for snout-to-vent length. The data on the Natural History were obtained from direct observation in the field as well as in captivity.

Pseudoeurycea cephalica cephalica

One subadult female (IBH01023), collected 12 October 1976, measures 36.9 mm SVL and 28 mm tail length

The tips of the toes and fingers in maximal approximation are separated by four costal folds. This specimen has whitish flecks on the venter, closely resembling in this aspect *Pseudoeurycea cephalica manni* as described by Smith and Taylor (1948); but it is here assigned to *P. c. cephalica* based on geographical considerations. It was collected by day (1100 hrs) among leaf litter and pebbles clustered near the base of a "palo loco" (*Senecio praecox*).

This species has frequently been collected in nearby localities such as the Ajusco mountains and the lakes of Cempoala; but in these higher areas, the vegetation is mainly coniferous forest and the area has a different climatic regime, especially in relation to humidity. Thus, *P. c. cephalica* seems to be a more eurytopic (Udvardy, 1969) salamander than has been formerly thought.

Tomodaotylus angustidigitorum

One adult male (OSH0107), collected 13 June 1977, measures 28.6 mm SVL, tibia 11.4 mm and tympanum 1.7 mm.

The two outer digits are neither truncate nor widened at the tip. Following Taylor (1939), the specimen has been determined to be *angustidigitorum*. Some coloration features (in life) include sparse dorsal pustules with a light apex, a dark canthal stripe extending to the insertion of arm, a light loreal surface continued to the tympanum, a bi-colored iris, the upper half of eye being golden bronze with dark reticulations, and the lower half dark brown.

The specimen was collected at night (1900 hrs) just after the first heavy rain, and seems to be the first reported from this physiographic area.

Many of these toads were calling, and several of them were discovered by our lights while perched on top of rocks, as described by Davis and Smith (1953) for *Tomodaotylus nitidus* and *T. fuscus* in warmer areas in the State of Morelos. The voice of this species is a single whistling, abruptly initiated and terminated, its intensity and tone remaining seemingly constant during the emission. This call lasts for almost a second and is followed by a silence of 4 to 6 seconds.

The extreme drought of several months during the year at San Angel could not be an obstacle for the reproduction of these toads if they share the direct developmental pattern recorded by Martin del Campo (1940) for *T. nitidus* from Tres Cruces, Morelos.

In relation to the species to which Martin del Campo's account refers; I believe that it is probably *T. fuscus* not *nitidus*, since Tres Cruces (Tres Cumbres) is not far from Huitzilac, near the type of locality of *fuscus* (Davis and Dixon, 1955). *T. nitidus* generally inhabits lower regions.

Hyla arenicolor

Two young individuals, females, IBH01777 and IBH01777-2, collected by Biol. Alberto Gonzalez R. on 29 August 1977. Another specimen (uncatalogued) is from LIHFC.

Measurements:

No.	SVL, mm	tibia, mm	tail, mm	tympanum, mm
IBH01777	20.4	10.9	reabsorbed	1.1
IBH01777-2	19.6	9.0	2	not apparent
LIHFC	45.0	24.0	---	2.1

The presence of *Hyla arenicolor* in the Pedregal was only known from one specimen in the collection of the Instituto Politecnico Nacional in Mexico City, as noted by Duellman (1970), but it is probably more common than records indicate. A sight record by the author in August 1973 (an adult observed in full activity in the evening, after a moderately intense rain) indicates crepuscular habits.

Duellman (op. cit.) states that "... In the mountains rising from and bordering the Mexican Plateau, this species occurs in pine and oak forest, and in the lower slopes of the highlands the frog occurs in scrub oak and dense thorn forest. However, throughout its range it is always closely associated with small rocky streams; *Hyla arenicolor* inhabits ravines and canyons."

The occurrence of *Hyla arenicolor* in our lava field is interesting since in the Pedregal there are no permanent water courses or temporary ones. There are also no canyons in the vicinity.

The great majority of the species of *Hyla* inhabiting temperate areas in Mexico need water to lay their eggs; but surface streams are lacking in the natural areas of the Pedregal, so the frogs must have another aquatic medium in which to lay the eggs. The seasonal accumulations of rainwater into the rock crevices could provide such a microhabitat, but the porous basalt tends to percolate this water, and thus the development of the young tadpoles must adapt to the short duration of these "ponds".

Zweifel (1961) afforded interesting data on the reproduction of the species. He records oviposition between 12-13 July and a span of 50-60 days for larval development. The newly metamorphosed individuals having a snout-vent length of nearly 15 mm.

The specimens from the Pedregal enhance the evidence for oviposition between June and July, but the smallest of the two young has a 19.6 mm SVL, plus 2 mm of still unabsorbed tail, as well as a poorly developed tympanum. These data differ from Zweifel's, but the wide distribution of the species could account for a greater intraspecific variability than expected.

Phrynosoma orbiculare orbiculare

Two specimens, females, IBH00781 and IBH 00782, collected in June 1959.

Apparently, this species has been dramatically reduced in numbers in the last several years. Since 1973 no additional individuals have been recorded from the area. This seems to be related to the accelerated rate of urban expansion, which increases the human interaction with this species (i.e. collecting, in order to keep the animals as children's pets). Due to the scarcity of material, I do not attempt to discuss its Natural History.

Sceloporus torquatus torquatus

Three males, IBH 00251, 1BH00927 and OSH0130; three females, OSH0127 to OSH0129.

These lizards are the most conspicuous element of the local herpetofauna. A few of their main ethological and reproductive features can be indicated.

They spend the early hours of the day basking on the rocks until they become fully active, displaying territorial behavior.

During the rainy season, they are frequently observed climbing among the branches of the tepozan plants (*Buddleia americana*, Loganiaceae) or the palo loco (*S. praecox*) where they pursue the insects attracted by the inflorescences.

Newly born individuals have been recorded in May and June, and the observed clutch sizes range from 4 to 6 young.

Sceloporus grammicus microlepidotus

One male, 1BH00898 collected on 6 May 1965, and 15 uncatalogued specimens in OSH; 6 males and 9 females collected throughout the year.

These lizards are common in the periphery of the area, and they are active through all seasons; unlike *S. t. torquatus*, which in the colder months is hardly detectable.

S. g. microlepidotus, in other localities, is frequently found active on the trunks of live trees; while in the Pedregal, due to the scarcity of suitable perches, the species utilizes some areas where the rocks covered by bushes offer adequate protection. However, if any trees are present, such as pirules (*Schinus molle*, Anacardiaceae) or eucalyptus (*Eucalyptus globulus*, Myrtaceae) the lizards will make use of them preferentially. The fact that both of these trees are introduced, and are spreading, indicates the possibility of this lizard spreading into areas of the lava not yet colonized by them.

Diadophis punctatus dugesi

One male, 1BH00949, collected in a Campus building in February 1970.

This specimen agrees well with *dugesi*, and its general scutellation follows: 17 dorsal rows, 179 ventrals, 60 subcaudals.

Measurements were not recorded due to the poor condition of the specimen available.

It seems to be a rather uncommon snake in the study area, or at least an inconspicuous one. Nevertheless, an observation in June 1975, appears to indicate crepuscular or nocturnal habits.

In captivity one *D. p. dugesi* consumed a ground snake (*Toluca lineata lineata*) at night, while during the day it showed no interest in it.

Besides the typical defensive attitude of this genus (coiling up the tail above soil and showing the red-orange color of the underside) *dugesi* exhibits abundant salivation when roughly handled. The reasons for this behavioral trend, observed in several released individuals, are not clear but it is also evident when the snakes are swallowing prey.

Pituophis deppoi deppoi

Two females, IBH00735 and IBH 00982; and eight males, IBH00736-738, IBH00866, IBH00872, IBH00979 and IBH00983.

All the specimens can be readily assigned to *P. d. deppoi* as defined by Smith and Taylor (1945). Very little is known about its local ecology and habits, except that they are extremely wary.

Thadina laureata

Two specimens: IBH00985, male, collected 20 July 1976 (field no. OSH0056) and another whose label reads only "Pedregal de San Angel" (IBH00986).

The general squamation follows:

<u>nos.</u>	<u>dorsal rows</u>	<u>ventrals</u>	<u>subcaudals</u>
IBH00985	17	155	91
IBH00986	17	160	96

This snake had been recorded from the vicinity, but always in ecologically different areas.

Myers (1974) in his careful revision of the genus gives no data on the natural history of the species. The male collected in July was found near a rock in the evening. Another caged juvenile snake showed signs of activity only near the end of daylight.

T. laureata kept in the laboratory refused all food except small frogs (*Hyla picta*); thus, in the study area it probably preys on *Hyla arenicolor* and/or *Tomodactylus angustidigitum*.

Salvadora bairdi

Four males (IBH00786, IBH00931, IBH00972 and IBH1078) and one female: IBH00776.

These snakes are not commonly seen, although they must be abundant. In adjacent localities, lizards comprise the main food for this snake, but in captivity some specimens readily accepted newly born laboratory mice. In the Pedregal, *Sceloporus t. torquatus* is likely to be the selected prey species owing to its abundance. *Salvadora bairdi* is diurnal in habits, and I have recorded these snakes actively chasing lizards and devouring them while still alive.

Thamnophis dorsalis cyclides

One specimen, OSH0126, male, collected 14 August 1976. This snake measured 570 mm total length, 156 mm tail length and had dorsal scale rows of 19-19-17, 164 ventrals and 94 subcaudals.

Some problems still exist concerning the identification of some Mexican *Thamnophis*, particularly those in the *dorsalis* group. Thus several populations can not be referred with certainty to any subspecific entity. In the present case, considering Smith (1942 and 1951), Smith and Taylor (1945), Conant (1963) and Smith and Smith (1976), this specimen has been tentatively identified as *T. d. cyclides* Cope.

The snake was collected in a vertical crevice on a cloudy, rainy afternoon. It readily crawled into the crevice when discovered. The activity patterns of these snakes and their amphibian prey may well coincide, but data are scarce indicating only similar hours of activity for *Hyla* and *Thamnophis*.

Toluca lineata lineata

Two specimens: OSH0418, female; and OSH0419, male, collected 26 June 1978.

These fossorial snakes are rather common in the neighborhood of Mexico City, though in the Pedregal they have been collected only in empty lots to which the basalt extends.

They are only conspicuous during the rainy months, when they hide under loose stones which they leave at night to go in search of prey (mainly orthopterans and some coleopteran larvae).

T. lineata never attempts to bite; at most it coils up into a ball around one's fingers or tries to escape.

Crotalus molossus nigrescens

Four males, IBH00745, IBH00747, IBH00748, OSH0105; and four females, IBH00742, IBH00743 and IBH00844.

These rattlesnakes are fairly common in the area and can be encountered roughly from March to October. They are not especially aggressive, and usually retreat into hiding at the slightest indication of danger.

One stomach (of OSH0105) contained the remains of *Rattus rattus*, the common rat. Due to the size of newly born and adult snakes of this species (about 300 and 900 mm respectively) it seems likely that many other mammals in the area could serve as suitable prey. Among the most probably we can include the following (pers. comm. M.S. William Lopez-Forment C.): *Baiomys musculus*, *Microtus mexicanus*, *Mus musculus*, *Neotoma mexicana*, *Peromyscus boylii*, *Peromyscus maniculatus*, *Peromyscus truei*, *Reithrodontomys megalotis*, *Spermophilus mexicanus*, *Spermophilus variegatus*, and *Sylvilagus floridanus*.

The mammalian predators are comparatively scarce in the Pedregal, including skunks (*Spilogale*, *Mephitis* and *Conapatus*) and opossums (*Didelphis*). The only avian predators are the barn owls (*Tyto alba pratincola*) and occasionally a red tailed hawk (*Buteo jamaicensis*). Thus, the *Crotalus* and *Pituophis* must be responsible for much of the predation on small mammals in this ecosystem.

The habitacula of *C. m. nigrescens* frequently include horizontal crannies under basaltic plates, which on a sunny day readily warm up as to permit the snakes to become active thigmothermally. Nevertheless, some individuals can be found basking in direct sunlight.

On 24 June 1973 an adult female gave birth to six young whose total lengths at birth ranged between 270 and 310 mm ($X = 290.8$), three more were born dead. The young snakes increased in length between 10 and 40 mm in two months. Six years after its birth, one of these snakes has attained a length of 870 mm. Other gravid females have been recorded on 13 June 1977, as almost ready to give birth. All the snakes born in 1973 shed the skin for the first time one week after birth, and shortly after, they began to eat suckling albino mice. On the contrary, rattle-snakes collected as adults or as juveniles in the field, seldom are white mice, but quickly accepted wild *Mus* and *Microtus*; still others completely refused food.

Conclusions

The Pedregal de San Angel is a good example of how some apparently well known areas can harbor several additional species than those previously recorded.

Some of the species recorded in this paper are present in many locations: in the vicinity of Mexico City, but others such as *Thamnophis dorsalis* and *Hyla arenicolor* seem to be restricted to the biotic community of the Pedregal.

Among the ^{locally}herpetological species of the area, only *Crotalus molossus* could represent some potential danger to the nearby human population, but the only two known cases of envenomation were produced by irresponsible handling of the snakes.

C. molossus exists in its local habitat, away from man, and has no important interactions with him, except for the help it offers devouring rodents.

Oppositely, some species tend to be more or less anthropophilous, *Sceloporus grammicus* colonizing even fences and trees in house gardens and *Toluca lineata* inhabiting idle ground in the city.

The near future is all that is left to attempt ecological studies on this interesting herpetofauna; so close to one of the greatest urban concentrations on Earth, and threatened by the unrestricted growth of this human aggregation; which carries forward an ever increasing alteration of the environment.

Acknowledgments

I am indebted to the Instituto de Biología of the Universidad Nacional Autónoma de México, and especially to the following staff members: M. S. Zeferino Uribe for his permission to utilize the Herpetological Collection and the loan of laboratory space to develop this study, Dr. Rafael Martín del Campo, who provided some literature otherwise difficult to obtain, M. S. William Lopez-Forment C. for his valuable information on mammals, and finally, I must recognize the kindness of Biol. Alberto Gonzalez R. (Forestry and Wildlife Subsecretary biologist) and Mr. Guillermo Lara G. for their permission to include data from specimens collected by them.

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Received 5 November 1979
Accepted 22 February 1980