



# New Prey Records for the Mexican Pygmy Rattlesnake, *Crotalus ravus* (Squamata: Viperidae), with an Update on Prey Species

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Predation can play an important part in the evolution of life-cycle traits (e.g., Steen et al. 2014). Nevertheless, it is rarely observed in nature and much of the available information is from anecdotal observations (e.g., Blanco et al. 2019). Detailed studies of predation (e.g., Carbajal-Márquez et al. 2020) or compilations of available information (e.g., Vásquez-Cruz 2020) are available for only a few species. The

identification of prey species and knowing the frequency at which different prey items are taken is necessary for a better understanding of predator-prey relationships.

The Mexican Pygmy Rattlesnake (*Crotalus ravus*) is endemic to Mexico, where it is distributed in the states of Morelos, Estado de Mexico, Ciudad de México (CDMX), Tlaxcala, Hidalgo, Puebla, Veracruz, Oaxaca, and Guerrero



**Fig. 1.** Remains of a Trans-volcanic Bunchgrass Lizard (*Sceloporus bicanthalis*) and the tail of a Short-nosed Skink (*Plestiodon brevirostris*) taken from the stomach of a Mexican Pygmy Rattlesnake (*Crotalus ravus*) (ITSZ-R-0200) from Santa Cruz Muyuapan, Nogales, México. Photograph by Alejandra Vásquez-Cruz.

**Table 1.** List of dietary items recorded for the Mexican Pygmy Rattlesnake *Crotalus ravus*.

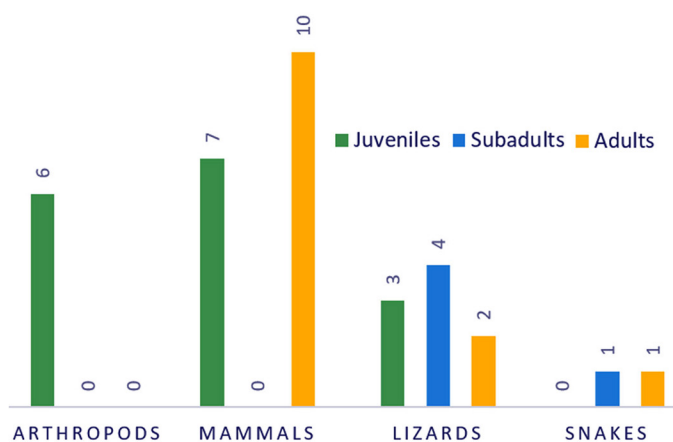
Prey	No.	Observation	State	Age	Reference
ANURA					
Unidentified anuran	1	Dissection	—	—	Campbell and Armstrong 1979
REPTILIA					
PHRYNOSOMATIDAE					
<i>Sceloporus aeneus</i>	2	In situ	Tlaxcala	2 subadult	Díaz de la Vega-Pérez et al. 2016
<i>Sceloporus bicanthalis</i>	1	Dissection	Veracruz	Subadult	This study
<i>Sceloporus grammicus</i>	1	Dissection	Estado de México	Juvenile	Mendoza-Hernández et al. 2004
<i>Sceloporus grammicus</i>	1	Dissection	Tlaxcala	—	Sánchez-Herrera 1980
<i>Sceloporus megalepidurus</i>	1	Dissection	Tlaxcala	—	Sánchez-Herrera 1980
<i>Sceloporus spinosus</i>	1	Dissection	Tlaxcala	Adult	Domínguez-Godoy et al. 2017
<i>Sceloporus spinosus</i>	1	Dissection	Puebla	—	Solano-Savaleta et al. 2008
<i>Sceloporus</i> sp.	1	Dissection	—	Juvenile	Campbell and Armstrong 1979
SCINCIDAE					
<i>Mabuya</i> sp.	1	—	—	—	Klauber, 1972
<i>Plestiodon brevirostris</i>	1	Dissection	Veracruz	Subadult	This study
<i>Plestiodon</i> sp.	1	Dissection	—	Juvenile	Campbell and Armstrong 1979
ANGUIDAE					
<i>Barisia imbricata</i>	1	Dissection	—	Adult	Campbell and Armstrong 1979
COLUBRIDAE					
<i>Storeria storerioides</i>	1	Dissection	Estado de México	Subadult	Mendoza-Quijano et al. 2008
NATRICIDAE					
<i>Thamnophis scalaris</i>	1	Dissection	CDMX	Adult	Solano-Savaleta et al. 2008
AVES: CERTHIIDAE					
<i>Certhia americana</i>	1	In situ	Tlaxcala	—	Bucio-Jiménez and Pérez-Mendoza 2016
MAMMALIA: MURIDAE					
<i>Microtus mexicanus</i>	1	Dissection	Tlaxcala	—	Sánchez-Herrera, 1980
<i>Mus musculus</i>	1	Dissection	Tlaxcala	—	Sánchez-Herrera, 1980
<i>Peromyscus mexicanus</i>					
Unidentified rodent	2	In situ	Oaxaca	Adult	Calzada-Arcienega et al. 2016
Unidentified rodent	1	Dissection	—	Adult	Campbell and Armstrong 1979
Unidentified rodent	7	Dissection	—	7 Juveniles	Campbell and Armstrong 1979
Rodent hair	—	Feces	—	7 adults	Campbell and Armstrong 1979
Unidentified mammals	2	Dissection	—	—	Klauber 1972
INSECTA: ORTHOPTERA					
Gryllidae	1	Dissection	Tlaxcala	Juvenile	Sánchez-Herrera 1980
GRYLLACRIDIDAE					
<i>Stenopelmatus</i>	4	Dissection	—	2 Juveniles	Campbell and Armstrong 1979
INSECTA: HEMIPTERA					
Hemiptera	1	Dissection	Estado de México	Juvenile	Mendoza-Hernández et al. 2004

(Heimes 2016). Three subspecies are currently recognized: *C. r. ravus* Cope 1865, *C. r. brunneus* Harris and Simmons 1978, and *C. r. exiguus* Campbell and Armstrong 1979. *Crotalus ravus* (*sensu lato*) is terrestrial and usually diurnal, but can be found at night (Armstrong and Murphy 1979; Campbell and Lamar 2004). Little information is available on the natural history of *C. ravus*, including its diet; it preys primarily on lizards and small mammals, although arthropods, anurans, snakes, and birds also have been reported (Bucio-Jiménez and Pérez-Mendoza 2016; Heimes 2016). The majority of these reports are from isolated events and no definitive list of prey species exists for *C. ravus*. Herein, we present two new items in the natural diet of *C. ravus* in west-central Veracruz, México, and provide a literature review of prey recorded in the diet of *C. ravus* (*sensu lato*) (Table 1).

At about 1300 h on 1 December 2016, in the cemetery in Santa Cruz Muyuapan (18°53'15.54"N, 97°12'44.68"W; WGS; elev. 2,395 m), Municipality of Nogales, Veracruz, we found a dead subadult *Crotalus ravus* (SVL 365 mm, TL 30 mm) that contained the remains of a Trans-volcanic Bunchgrass Lizard (*Sceloporus bicanthalis*) and the tail of a Short-nosed Skink (*Plestiodon brevirostris*) in its stomach (Fig. 1). We recovered only the posterior half of the *S. bicanthalis*, which indicates that it was consumed earlier than the *P. brevirostris* tail, which showed no signs of digestion. This snake was deposited in the herpetological collection of the Instituto Tecnológico Superior de Zongolica (ITSZ-R-0200).

Based on our observation and our survey of the literature, the diet of *C. ravus* consists of seven types of prey (Fig. 2): Anurans (1), lizards (13), snakes (2), birds (1), rodents (22), orthopterans (5), and hemipterans (1). Nevertheless, the identity of the prey species was not determined even to the generic level in all instances; consequently, only 15 prey items have been identified to species (Table 1).

In general, *C. ravus* appears to feed most frequently on rodents and lizards, with the majority of those identified



**Fig. 2.** Types of prey in the diets of juvenile, subadult, and adult Mexican Pygmy Rattlesnakes (*Crotalus ravus*).

in the genus *Sceloporus*. Except for the arthropod records (Campbell and Armstrong 1979), one case of two rodents reported by Calzada-Arcienega et al. (2016), and the two lizards recorded herein, only single prey items have been recovered from or observed in individual *C. ravus* (Table 1).

Although, our sample is small, we noted that prey selection appeared to depend on the maturity (or size) of the predator (Fig. 3). Juvenile *C. ravus* (SVL <300 mm) appear to be generalists, taking a variety of small prey, including small rodents, lizards, and arthropods, and supporting the suggestion of Campbell and Armstrong (1979). On the other hand, subadults and adults appear to limit their prey to rodents and lizards. Although ophiophagy has been reported, these were likely opportunistic rather than indicative of a recurring food source.

This apparent plasticity in prey selection should enhance the probability of survival of *C. ravus*, since, as has been suggested for the Mexican Small-headed Rattlesnake (*C. intermedius*) (Schramer et al. 2020), dietary specialization can render a species more vulnerable to extinction.

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