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SHORT COMMUNICATION

Contribution to the natural history of *Ninia sebae* (Serpentes: Dipsadidae) from an urban area in Veracruz, Mexico

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The redback coffee snake, *Ninia sebae* (Duméril, Bibron, and Duméril, 1854) is widely distributed from central Veracruz on the Atlantic slope and from southern Oaxaca on the Pacific side, extending southward to Costa Rica (Heimes 2016). It can be found in rainforests, savannas, cloud forests, and even marginally in pine-oak forests (Heimes 2016). It also inhabits peri-urban and urbanized areas (Köhler *et al.* 2016), occurring in small green islands within cities such as gardens, parks, and vacant lots (V. Vásquez-Cruz pers. observ.). It seeks refuge under any natural cover, such as logs, rocks, and leaf litter, as well as under artificial cover, including rubble, tarps, tires, and plastic (Pérez-Higareda *et al*. 2007). *Ninia sebae* exhibits a Batesian mimetic pattern with bright colors (Hinman *et al*. 1997) that resemble specimens of coral snakes of the genus *Micrurus* (De la Torre-Loranca *et al*. 2006). The coffee-colored snake is nocturnal and is often observed at night on roads after heavy rains. Reproduction occurs during the rainy season (July–September), when females lay 1 to 4 eggs (Burger and Werler 1954, Álvarez del Toro 1982). The incubation period is approximately 75 to 79 days, and the hatchlings measure between 85 and 135 mm in total length at birth (Greene 1975).

In the scientific literature, a few cases of which *N. sebae* are included in trophic chains, being reported as prey of tarantulas (*Schizopelma* sp.; Aguilar López *et al*. 2014), birds [*Quiscalus mexicanus* (Gmelin, 1788) (Vásquez-Cruz 2019)], coral snakes [*Micrurus diastema* (Duméril, Bibron, and Duméril, 1854) and *M. nigrocinctus* (Girard, 1854) (Savage 2002, West et al. 2019)], and false coral snakes [*Erythrolamprus mimus* (Cope, 1868)

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and *Lampropeltis polyzona* Cope, 1860 (Schmidt 1932, Villegas-Castillo and Vásquez-Cruz 2024)]. As a predator, it specializes in invertebrates such as earthworms, leeches, slugs, and snails (Greene 1975, Seib 1985), and arthropods (Köhler *et al*. 2016). Landy *et al*. (1966) reported a caecilian in the stomach of a specimen from Chiapas, which remains the only known vertebrate prey for *N. sebae*.

In this study, we document two relevant observations that contribute to the understanding of the trophic and adaptive ecology of *N. sebae* in urban environments, and we briefly discuss their possible relationship to the species' adaptation to anthropogenic settings. These records were obtained near train tracks, close to the old railway station in the municipality of Fortín de las Flores, in the central-western region of the state of Veracruz, Mexico (18°54'06.1" N, 97°00' 00.4" W; WGS 84; 1010 m a.s.l.).

On 22 January 2025, around 17:00 h, we found a "dead on road" (DOR) adult specimen of *N. sebae*, which had part of its stomach exposed due to crushing (Figure 1A). From the stomach, we extracted an individual (apparently subadult) of the Brahminy blindsnake, *Indotyphlops braminus* (Daudin, 1803) (Figure 1B-C). *Indotyphlops*

Figure 1. (**A**) Dorsal view of the DOR specimen of *Ninia sebae* with its stomach exposed. (**B**) *Ninia sebae* with its prey. (**C**) The specimen of *Indotyphlops braminus* found in the stomach of *Ninia sebae*. Photos: VVC.

Figure 2. (**A**) Dorsal view of *Ninia sebae* with melanism of. (**B**) Dorsal view of the typical coloration of *Ninia sebae*. Photos: VVC.

braminus was recognized by its ocular scale separated from the lip by a supralabial and 20 scale rows around the body (Canseco-Márquez and Gutiérrez-Mayén 2010, Heimes 2016). This specimen was deposited in the vertebrate collection of the Facultad de Ciencias Biológicas y Agropecuarias at Universidad Veracruzana (collection code: FCBA-CH-503).

On 13 July 2025, around 11:00 h, we found approximately 12 individuals of *N. sebae*; one of them exhibited a noticeably dark coloration on its body (Figure 2A). This adult individual had a black head; with a faint collar of dark yellow tones; the body had dark red and black dorsal scales. In contrast, the typical coloration of *N. sebae* (Figure 2B) shows a yellow band around the back of the head and the beginning of the dorsal scales, sometimes extending to the labial scales; the body features intense red scales that may be immaculate, blotched, or have small black bands occasionally bordered by yellow hues (Heimes 2016). A photovoucher was deposited in the digital herpetological collection of the Facultad de Ciencias Biológicas y Agropecuarias at Universidad Veracruzana (collection code: FCBA-CHD-111).

Habitat loss and modification caused by the expansion of urban sprawl has not only resulted in the local extinction of species but also in the adaptation of some individuals, possibly leading to changes in their behavior, life cycles, or diet (e.g. Caspi *et al*. 2022). Previously, Ariano-Sánchez (2024) reported the first case of melanism in *N. sebae* and hypothesized that the survival of cryptic individuals (such as melanistic ones) may be present—and even favored—in populations where the aposematic venomous species, *Micrurus diastema* in this case, has been extirpated from the study area. Our observations may be consistent with the hypothesis proposed by Ariano-Sánchez (2024), which suggests that in urban environments without *Micrurus,* cryptic individuals could have a selective advantage. It is also possible that cryptic individuals have a camouflage advantage against visual predators such as birds and domestic species like cats.

Additional hypotheses have been proposed to explain melanism in snakes. The thermal melanism hypothesis—although recent evidence suggests that this mechanism has limited support—proposes that darker individuals gain an advantage by warming more efficiently in cold environments (Sahlean *et al*. 2025). Another alternative hypothesis is Gloger's rule, which predicts that melanistic forms are more common in humid regions (Delhey 2019), with precipitation recently identified as a significant predictor of melanism prevalence (Sahlean *et al*. 2025). Neutral evolutionary forces such as phenotypic plasticity or genetic drift could also contribute to the occurrence of melanistic individuals. While our observation is consistent with the hypothesis proposed by Ariano-Sánchez (2024), multiple ecological and evolutionary mechanisms could influence the persistence of melanistic morphs in urban landscapes.

Regarding diet, vertebrate consumption appears to be unusual in *N. sebae;* nevertheless, the caecilians prey (Dermophiidae) and the blindsnake *I. braminus* share certain similarities with a common prey of *N. sebae* (earthworms), which could explain these occurrences as cases of mistaken prey identity under conditions of limited foraging or reduced availability of invertebrates. It is worth noting that *I. braminus* is an introduced species in Mexico, and recent reports indicate an increase in populations of this species in the country. All these reports were made in urban areas (e.g., Vásquez-Cruz *et al*. 2021, Vásquez-Cruz and Vásquez-Espinoza 2025), suggesting that *I. braminus* may represent a food resource for *N. sebae* in anthropogenic environments. Although this idea requires additional study, it could constitute an example of a novel interaction facilitated by urbanization.

Other cases of predation on *I. braminus* have been documented and have shown that the predator has difficulty digesting this snake; it has even been reported that *I. braminus* can be expelled through the predator's cloaca (O'Shea *et al*. 2013, Zlotnik *et al*. 2017, Yang and Mori 2018). The Loggerhead shrike, *Lanius ludovicianus* Linnaeus, 1766, also preys on *I. braminus*, which may be impaled for up to 85 days, the longest retention time reported, similar to that observed with hard-bodied insects (Zerega-Contreras and Sánchez-Velázquez 2024). Yang and Mori (2018) hypothesized that *I. braminus* may have specialized scaly structures that delay digestion by predators, giving it time to escape the predator's digestive system. In contrast, our observation suggests partial digestion of *I. braminus* by *N. sebae;* however, we cannot rule out the possibility that the apparent "damage" to the prey was caused by the predator. These observations highlight the need to document cases of predation on *I. braminus* and its potential role in the food chain outside of its distribution area.

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