

OBSERVATION OF OPHIOPHAGY AND POSSIBLE ARBORAL BEHAVIOR IN *MICRURUS DISTANS* (SQUAMATA: ELAPIDAE) ON *LEPTODEIRA SEPTENTRIONALIS* (SQUAMATA: DIPSADIDAE) AND COMMENTS ON ITS DISTRIBUTION IN SINALOA, MEXICO

OBSERVACIÓN DE OFIOFAGÍA Y POSIBLE COMPORTAMIENTO ARBÓREO EN *MICRURUS DISTANS* (SQUAMATA: ELAPIDAE) SOBRE *LEPTODEIRA SEPTENTRIONALIS* (SQUAMATA: DIPSADIDAE) Y COMENTARIOS SOBRE SU DISTRIBUCIÓN EN SINALOA, MÉXICO

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Resumen.– La serpiente coral *Micrurus distans* es una especie endémica de México, es principalmente de hábitos terrestres y se sabe poco sobre su dieta específica. Reportamos una observación de ofiofagía en *M. distans* sobre una *Leptodeira septentrionalis* y un posible comportamiento arbóreo de la especie. También comentamos sobre la distribución de *L. septentrionalis* y argumentamos a favor de su inclusión en las listas herpetofaunales de Sinaloa, a pesar de haber sido registrada en años anteriores y ser excluida en un último listado reciente. Además, verificamos la presencia de la especie en el municipio de Cosalá a partir de registros de ciencia ciudadana. Finalmente, concluimos que estas observaciones robustecen la idea de que *M. distans* es una serpiente depredadora oportunista de otras serpientes y adaptable a las circunstancias del medio.

Palabras clave.– Ciencia ciudadana, depredación, dieta, historia natural, *Leptodeira polysticta*, serpientes.

Abstract.– The coral snake *Micrurus distans* is a species endemic to Mexico. It inhabits mainly terrestrial habitats, and little is known about its specific diet. Herein, we report an observation of ophiophagy in *M. distans* on a *Leptodeira septentrionalis* and possible arboreal behavior of the species. We also comment on the distribution of *L. septentrionalis* and argue for its inclusion in the herpetofaunal lists of Sinaloa, despite having been recorded in previous years and excluded in a recent listing. In addition, we verify the presence of the species in the municipality of Cosalá based on citizen science records. Finally, we conclude that these observations support the idea that *M. distans* is an opportunistic predator of other snakes and adaptable to environmental circumstances.

Keywords.– Citizen science, diet, natural history, *Leptodeira polysticta*, predation, snakes.

Ophiophagy is a specialized form of feeding behavior of species that hunt and eat snakes. However, this behavior is common among snakes, but are generally considered occasional occurrences (Capula et al., 2014) and has been reported in many genera (e.g., *Cylindrophis*, *Agkistrodon*, *Lampropeltis*, *Drymarchon*, *Ophiophagus*,

Micrurus, *Atractaspis*, and many others; Greene, 1997). This may be due to climate-related stressors such as increasingly potent long periods of drought that will almost certainly have negative effects on populations (Becerra-López et al., 2022; Berriozabal-Islas et al., 2021). If common prey species become scarce due to these factors,

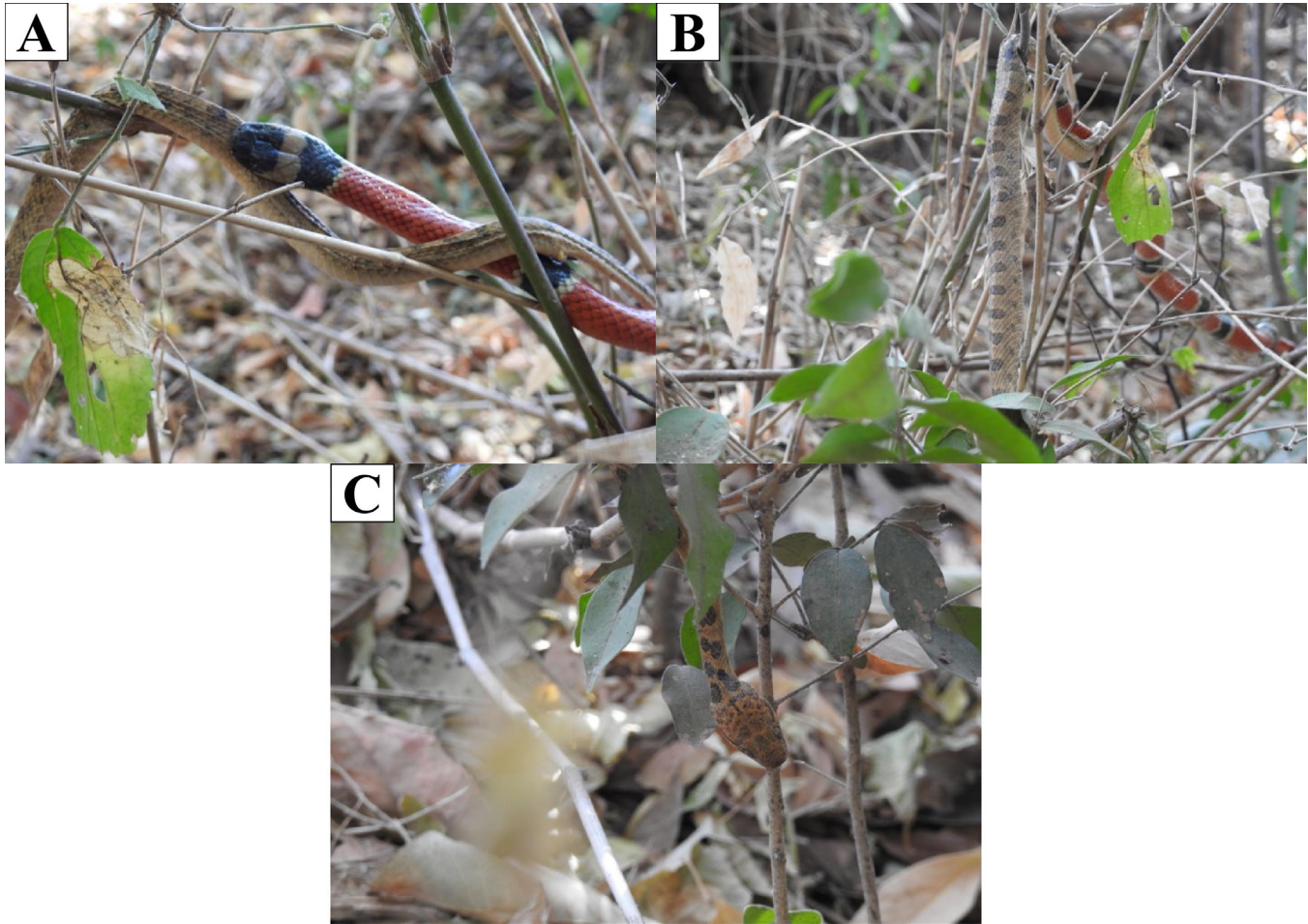


Figura 1. A) Individuo de *Micrurus distans* mordiendo a *Leptodeira septentrionalis* (registro fotográfico MZFC-IMG88); B) Ambas serpientes interactuando sobre un arbusto (MZFC-IMG87); y C) Un individuo de *L. septentrionalis* como presa de *M. distans* (MZFC-IMG85). Fotografías tomadas por MAZ.

Figure 1. A) Individual of *Micrurus distans* biting *Leptodeira septentrionalis* (photographic voucher MZFC-IMG88); B) Both snakes interacting on a bush (MZFC-IMG87); and C) An individual of *L. septentrionalis* as prey of *M. distans* (MZFC-IMG85). Photographs by MAZ.

some snakes that prey on other snakes may be forced to take risk, in this type of behavior. Some published observations indicate that some of these may ingest other snakes that equal or exceed their own body length (Jackson et al., 2004).

Micrurus distans is a terrestrial snake endemic to Mexico belonging to the family Elapidae that inhabits tropical deciduous forests, thorn forests and desert scrub from southwestern Chihuahua to central Guerrero (Ernst & Ernst, 2011). The diet of *M. distans* is known to consist of frogs, lizards and predominantly other snakes (Ramírez-Bautista, 1994; Roze, 1996), however, specific dietary records are exceptional in the literature. Therefore, only four snake species (*Lampropeltis triangulum*, *Drymarchon melanurus*, *Rhinocheilus lecontei* and *Leptodeira maculata*) have been

reported in the diet of *M. distans* (Santana, 2011; Warfel et al., 2015; Loc-Barragán et al., 2023). Here we report an observation of Ophiophagy in *M. distans* on a *Leptodeira septentrionalis* and a possible arboreal behavior of the species, in addition, comments on the distribution of *L. septentrionalis*.

On April 30, 2023 around 9:30 h one of the authors (MAZ) observed the interaction between a *M. distans* on a *L. septentrionalis* in the locality of Las Mimbres (24.293476 °N, 106.763378 °W; WGS84; Elev. 262 m a.s.l.) belonging to the municipality of Cosalá, Sinaloa, Mexico. The individual of *M. distans* was observed biting the individual of *L. septentrionalis* (Fig. 1A), without ceasing to do so during the time it was observed. The individual of *M. distans* apparently moved to the bush where

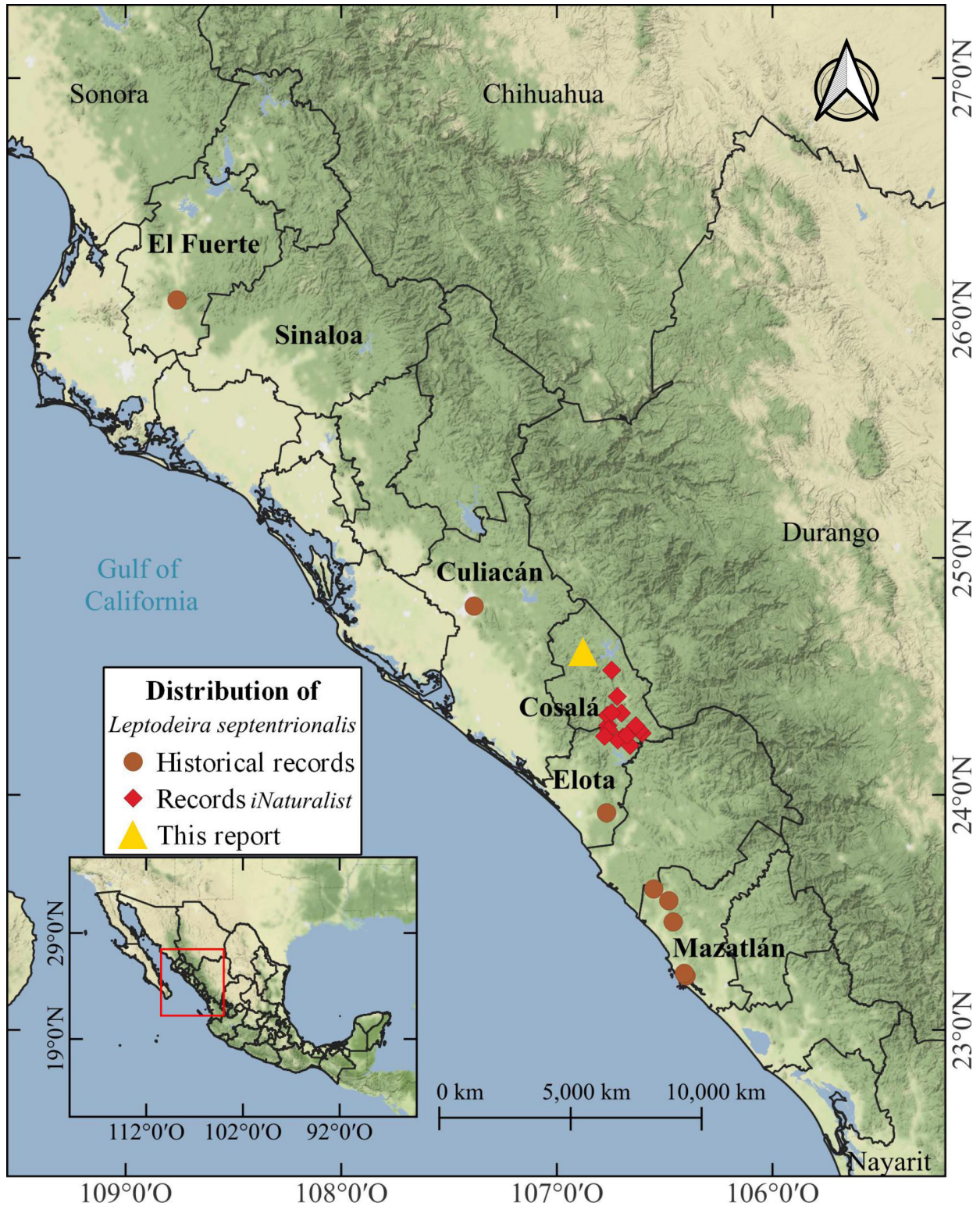


Figure 2. Mapa de distribución en puntos de *Leptodeira septentrionalis* sobre la división política municipal de Sinaloa, México.

Figura 2. Point distribution map of *Leptodeira septentrionalis* over the municipal political division from Sinaloa, Mexico.

L. septentrionalis was located until it bit it (Fig. 1B). Photographs were then taken of the two snakes as they interacted. In order not to interrupt the predation event, the first author left the site after taking the photographs. After approximately three hours, the author returned to the scene and found none of the snakes. Therefore, we assume that the predation event may have been successful and that the individual *M. distans* took refuge to digest its prey. Additionally, the photographs taken were deposited in the Museo de Zoología “Alfonso L. Herrera” belonging to the Universidad Nacional Autónoma de México (UNAM): photographic vouchers MZFC 84-8.

Coral snakes are mainly terrestrial with fossorial and elusive habits, although arboreal behavior has been reported in several species (*M. circinalis*, *M. fulvius*, *M. nigrocinctus*, *M. surinamensis* and *M. diastema*; Dávila et al., 2014; Valencia-Herverth et al., 2016). Thus, the behavior in the effort of this individual of *M. distans* to prey on *L. septentrionalis* may have been occasional in this case. Although expected Ophiophagy is not always successful (Johnson & Blais, 2021), it is likely that this encounter between *M. distans* and *L. septentrionalis* did prove conclusive due to *M. distans*' adaptive strategies of venom inoculation. Ophiophagous predators have also been reported to become ophiophagous prey, and this appears to be the case in *L. septentrionalis* (see McKelvey et al., 2013; Nuñez-Escalante et al., 2021).

It should be noted that Hardy and McDiarmid (1969) made the first record of *L. septentrionalis* for Sinaloa, but Lemos-Espinal and Smith (2020) did not include it in their list. In a taxonomic revision of the group, Barrio-Amorós (2019) elevated *L. septentrionalis polysticta* to species, so that individuals from western Mexico were considered *L. polysticta* until that time. Subsequently, Costa et al. (2022) again made a phylogenetic study of the genus *Leptoderia* where they concluded that their study does not support the elevation to species of *L. polysticta* and argued that maintaining the subspecific level for both morphotypes represents a more conservative approach.

On the other hand, historical records of *L. septentrionalis* have been reported only for the municipalities of El Fuerte, Culiacán, Elota and Mazatlán (Hardy & McDiarmid, 1969; VertNet, 2023). However, the individual reported in this work was found in the municipality of Cosalá, so, it is also important to highlight additional citizen science records of *L. septentrionalis* in the iNaturalist platform (GBIF, 2023). Some diagnostic features that distinguish *L. septentrionalis* from other species of the genus in the state are: more than 50 dorsal spots anterior to the cloaca extending laterally to the dorsal scale rows; more than 25 dorsal blotches on the tail that united distally; a single median stripe

on the nape extends posteriorly three to four scales from the parietals (Hardy & McDiarmid, 1969). Therefore, the individual of *Leptoderia* reported in this work we consider *L. septentrionalis* (Fig. 1C), even due to the disagreement of some authors and the confusion of databases that do not include this species in the state of Sinaloa (Antúnez-Fonseca et al., 2023; Uetz et al., 2023). Therefore, the distribution of the species is extended to of Cosalá region in Sinaloa (Fig. 2).

In conclusion, we report two possible natural history cases on the knowledge of *M. distans*. Therefore, these observations strengthen the idea that *M. distans* is an opportunistic predator of other snakes and adaptable to environmental circumstances. In addition, we argue for the inclusion of *L. septentrionalis* in the herpetofaunal lists of Sinaloa and verify the presence of the species in the municipality of Cosalá based on citizen science records.

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