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The snake *Lampropeltis annulata*, Kennicott, 1861, in Hidalgo, Mexico

The genus *Lampropeltis* (Colubridae) ranges widely in North America, from southern Ontario and southwestern Quebec, Canada, west to southern Washington, in the United States, and southward to Colombia, Ecuador, Peru, and Venezuela in South America (Blaney, 1973). In Mexico, this group of snakes is represented by 12 species (Heimes, 2016), of which three are distributed in the state of Hidalgo: *L. mexicana*, *L. polyzona*, and *L. ruthveni* (Ramírez-Bautista et al. 2010; 2014; Roth-Monzón et al., 2013; Lemos-Espinal and Smith, 2015; Fernández-Badillo et al., 2016; Hansen et al., 2016; Lemos-Espinal and Dixon, 2016; Fernández-Badillo et al., 2017). Based on the known distribution of *L. annulata*, Ruane et al. (2014) suggested that this species likely is found in Hidalgo. Further, Heimes (2016: 84) indicated that *L. annulata* is found in “adjacent areas of northern Querétaro and northwestern Hidalgo,” although, the references cited therein do not support its presence in Hidalgo. Consequently, no accurate records are available to confirm the occurrence of *L. annulata* in the state.

During a study conducted in the Reserva de la Biosfera Barranca de Metztitlán (RBBM) from 2010 until the present, four individuals of *L. annulata* were encountered in the municipalities of Eloxochitlán, Metztitlán, and San Agustín Metzquititlán, Hidalgo (Fig.1). The first specimen (CH-CIB 4525: Fig. 2A) was found dead in Venados, along the border between the municipalities of Metztitlán and San Agustín Metzquititlán (20.47404°N; -98.67585°W; WGS 84); elev. 1,365 m; 14 September 2014; Guillermo Sánchez-Martínez. The second (CH-CIB 4861: Fig. 2B)

was found dead in the town of San Juan Altzonzintla, Municipio de Metztlán (20.602755°N; -98.814588°W; WGS 84); elev. 1,268 m; 10 May 2015; Cristian R. Olvera-Olvera. A third individual (CH-CIB 82; Fig. 2C) was found alive by local residents at Rancho Alegre, Municipio de San Agustín Metzquitlán (20.466646°N; -98.665964°W; WGS 84); elev. 1,338 m; 20 September 2015. This snake was photographed and released where it was found. The fourth specimen (CH-CIB 83, 84; Fig. 2D, E) was found dead on a dirt road in at Chacaya, Municipio de Eloxochitlán (20.726428°N; -98.938821°W; WGS 84) elev. 961 m; 21 May 2016; local resident.

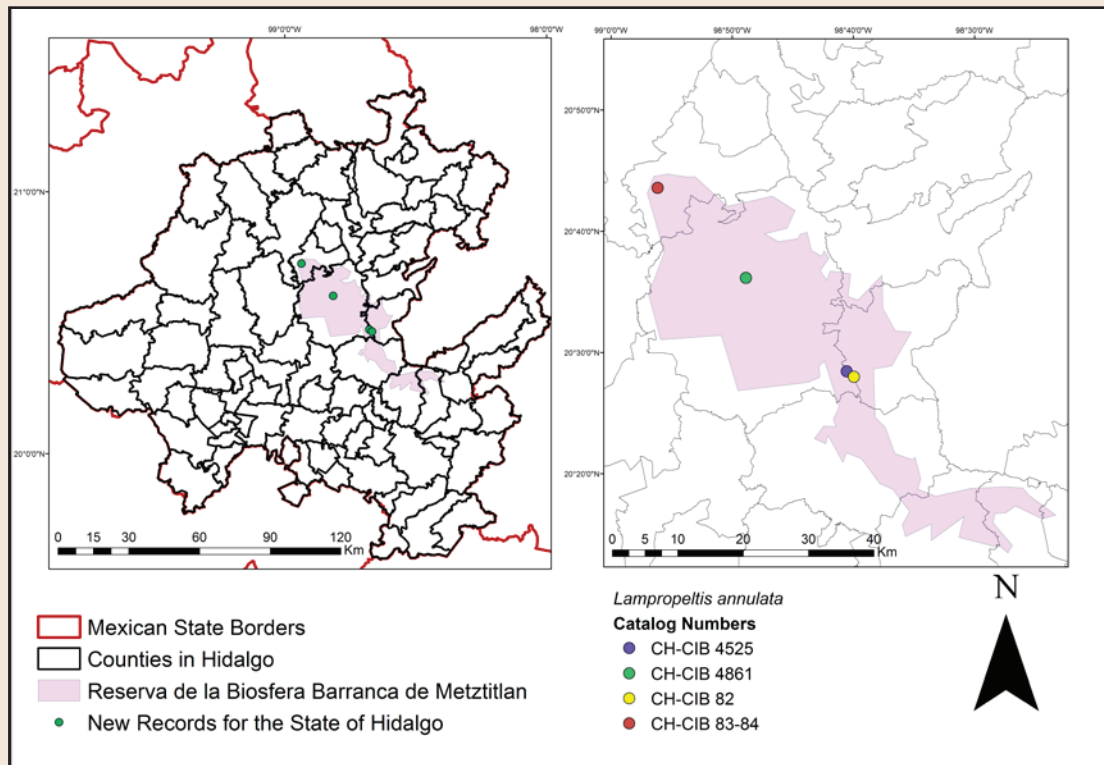


Fig. 1. Map of the records of *Lampropeltis annulata* in Reserva de la Biósfera Barranca de Metztlán, Hidalgo, Mexico.

All of the above snakes were identified as *L. annulata* based on the morphological characteristics indicated by Williams (1988; 1994), Ruane et al. (2014), and Heimes (2016). *Lampropeltis annulata* exhibits a black head and snout, and the coloration of the body consists of incomplete red rings, which are interrupted by black pigment on the venter (Williams, 1988; Heimes, 2016), in contrast to the other three species of *Lampropeltis* found in Hidalgo (Williams, 1988, 1994; Ruane et al., 2014; Fig. 1E); in addition, the number of ventrals in *L. annulata* ranges from 181 to 207 (Williams, 1988; Heimes, 2016). Conversely, the head of *L. mexicana* (Fig. 3A) is dark gray and contains a pair of orange blotches bordered by black, the dorsal region consists of red bars with black borders (instead of rings), and the ventral coloration is white with black or opaque orange spots (Ramírez-Bautista et al., 2014); the number of ventrals in this species ranges from 190 to 212. The head of *L. ruthveni* (Fig. 3B) is black (Roth-Monzon et al., 2013), similar to that of *L. annulata* (Williams, 1988; Williams, 1994; Ruane et al., 2014; Heimes, 2016), but occasionally contains small white or red markings, and the red rings usually extend across the venter; the ventral scales range from 182 to 196 (Dixon and Lemos-Espinal, 2010; Heimes, 2016). The head of *L. polyzona* (Fig. 3C) is black and contains a white band or spot on the snout that crosses the edge of the prefrontal and internasal scales, the red and pale rings can completely encircle the body, or sometimes are interrupted on the venter by black pigment or black spotting (Williams 1988, 1994; Ruane et al 2014; Heimes, 2016); the ventral scales in this species range from 192 to 235.



Fig. 2. Specimens of *Lampropeltis annulata* collected in the Reserva de la Biósfera Barranca de Metztitlan, Hidalgo, Mexico. (A) Near the border between the municipalities of Metztitlán and San Agustín Metzquititlán; (B) San Juan Altonzintla, Metztitlán; (C) Rancho Alegre, San Agustín Metzquititlán); (D) Chacaya, Eloxochitlán (dorsal view); and (E) Chacaya, Eloxochitlán (ventral view);).

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The information presented here confirms the assumption by Ruane et al (2014) that *L. annulata* likely occurs in Hidalgo. Our records extend the distribution of *L. annulata* by 92.7 km to the S of the nearest locality, at 1 km SE of Agua Zarca, Landa de Matamoros, Querétaro (1.211667°N; -99.076667°W; WGS 84). The specimen collected at this locality was recorded as *L. triangulum* by Dixon and Lemos-Espinal (2010), but according to Ruane et al. (2014) it corresponds to *L. annulata*.

Our data represent an addition to the list of squamate species reported for RBBM (Vite-Silva et al., 2010; Cruz-Elizalde et al., 2015) and the arid areas of the state of Hidalgo (Fernández-Badillo et al., 2016).

Because of the resemblance of *L. annulata* to the venomous *Micrurus tener*, people in the RBBM often kill individuals of this species. Consequently, environmental education programs are necessary to help people distinguish between venomous and non-venomous species, as well as to recognize the importance of these organisms in the ecosystem. Accordingly, it is necessary to update the management plans of the RBBM to include this species in their conservation strategies. Because *L. annulata* was not considered in a risk category in NOM-059-SEMATAT-2010 (SEMARNAT, 2010), its conservation status remains unknown.



Fig. 3. Images of other species of *Lampropeltis* from the state of Hidalgo, Mexico. (A) *L. mexicana*: Mixquiahuala (CH-CIB 3357; single known specimen from Hidalgo); (B) *L. ruthveni*: Ejido de Mintho, Huichapan; (C) *L. polyzona*: Zacualtipán de Ángeles. 📷 © Ferdinand Torres-Ángeles (A), Alfonso Hernández-Melo (B), and Leonardo Fernández-Badillo (C)

Acknowledgments.—The authors thank project “Diversidad Biológica del Estado de Hidalgo” FOMIX-CONACyT-HGO 191908; SEMARNAT for the collecting permits issued to Irene Goyenechea (FAUT-0052); and students Miguel Ángel Flores-Hernández (for photographs of specimens CH-IBC 4525 and 4861), Alfonso Hernández-Melo (for the photograph of *Lampropeltis ruthveni*), and Ferdinand Torres-Ángeles (for the photograph of *Lampropeltis mexicana*). Finally, we are grateful to Sara Ruane, Luis Canseco-Márquez, and Peter Heimes for helping identify the specimens, and especially for corroborating the identification of those assigned to *Lampropeltis annulata*.

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