 https://doi.org/10.22201/fc.25942158e.2021.02.141

NEW DATA OF SAUROPHAGY IN *SCELOPORUS VARIABILIS* (SQUAMATA: PHRYNOSOMATIDAE) AND CONFIRMATION OF CANNIBALISM

NUEVOS DATOS DE SAUROFAGIA EN *SCELOPORUS VARIABILIS* (SQUAMATA: PHRYNOSOMATIDAE) Y CONFIRMACIÓN DEL CANIBALISMO

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Received: 2021-06-02. **Accepted**: 2021-10-06.
Editor: Antonieta Labra-Lillo, Chile.

Resumen.— *Sceloporus variabilis* es una especie de amplia distribución y ocupa distintos tipos de hábitats. En este trabajo se reportan nuevos datos sobre el consumo de lagartijas, tanto de bosque tropical como de bosque mesófilo, y confirma la ocurrencia del canibalismo.

Palabras clave.— Dieta, presas, Scincidae, contenido estomacal.

Abstract.— *Sceloporus variabilis* is a species of wide distribution and occupies different types of habitat. This paper reports new data on the consumption of lizards, both in tropical and cloud forests, and confirms the occurrence of cannibalism.

Keywords.— Diet, prey, Scincidae, stomach content.

Sceloporus variabilis is a species with wide distribution from southern Texas, in United States of America, Mexico, and Middle America up to Costa Rica (Smith et al., 1993). The species occurs in different environments (tropical, temperate, and arid), vegetation types (e.g., tropical dry forest, cloud forest, pine forest) and elevations, from about sea level to 2,000 m a.s.l. and it has terrestrial and arboreal habits (Smith et al., 1993). Some of its predators are snakes, such as *Leptodrymus pulcherrimus* (Sunyer & Leonardi, 2015), and lizards, such as *Aspidoscelis deppii* (Martínez-Fonseca et al., 2016). The diet of *S. variabilis* is generally insectivorous (Fitch, 1973; Savage, 2002); however, it has been reported that it feeds on juvenile lizards of *A. deppii* (Köhler & Fried, 2012), in addition to reports of cannibalism (Mendoza-Quijano et al., 1991). To our knowledge *S. variabilis* has

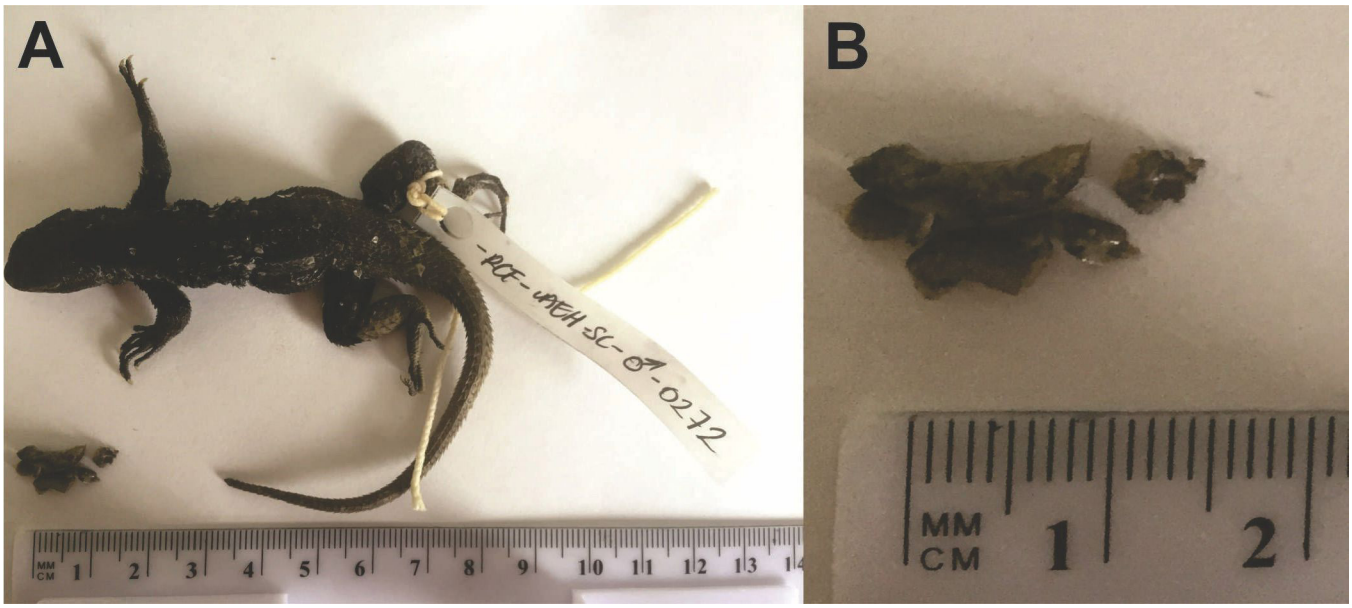

Figura 1. Vista dorsal del macho adulto de *Sceloporus variabilis* (depredador) (A) y restos de ***Scincella gemmingeri*** (presa) (B) que se encontraron en el contenido estomacal. Foto: Raciel Cruz-Elizalde.

Figure 1. Dorsal view of the adult male of *Sceloporus variabilis* (predator) (A) and the remains of a ***Scincella gemmingeri*** (prey) (B) found in its stomach contents. Photo: Raciel Cruz-Elizalde.

not been shown to feed on other species of lizards in vegetation types other than tropical. In this note we report two events of saurophagy by *S. variabilis*.

On 2 July 2014, an adult male (CIB–6103) of *S. variabilis* (SVL = 71.35 mm) was collected under rock in the locality of Santa Catarina, Municipality of Acaxochitlán, Hidalgo, Mexico (20.257531°N, 98.183400°W; WGS 84; elev. 1,845 m) in a cloud forest. The analysis of the stomach contents revealed insects (coleopterans, orthopterans, hymenopterans, and lepidopteran larvae) and the remains of a lizard, *Scincella gemmingeri* (Fig. 1). Using the formula of an ellipsoid (Selby, 1965), we calculate the volume of *S. gemmingeri's* remnants was 234.5 mm^3 (28 mm length; 4 mm width) and weighed 0.1197 g (using an analytical balance, ± 0.0001 g).

Another adult male of *S. variabilis* (CIB–6104; SVL = 59.44 mm) was collected on 30 August 2014 in the locality of Atlapexco, Municipality of Atlapexco, Hidalgo, Mexico (21.016176°N, 98.338403°W; WGS 84; elev. 140 m) in a tropical dry forest. The analysis of its stomach content revealed arthropods (coleopterans, hymenopterans, hemipterans, lepidopteran larvae, and spiders), plant matter (leaves) and a juvenile lizard, *S. variabilis* (Fig. 2). The prey had a volume of 1436.76 mm^3 (14 mm length; 14 mm width), and a weight of 0.1673 g.

For the determination of the remains of lizards, we used the identification keys for the herpetofauna of Hidalgo, Mexico (Ramírez-Bautista et al., 2014), and it was corroborated with the list of reptile species for the region (Cruz-Elizalde & Ramírez-Bautista, 2012). In the locality of Santa Catarina, the species *S. gemmingeri* and *Plestiodon lynxe* can be found, so the determination of the species could be carried out considering distinctively a coppery and light coloration in *S. gemmingeri* (by the dark and blue in *P. lynxe*) and arrangement of scales in the tail fragments found (with more overlapping scales in *S. gemmingeri*) (Ramírez-Bautista et al., 2014). In the case of the prey corresponding to *S. variabilis*, the organism was complete, and it was identified through the arrangement and pattern of dorsal scales, in addition to the postfemoral pocket, characteristic of the *Sceloporus variabilis* group (Ramírez-Bautista et al., 2014).

The consumption of *S. gemmingeri* by *S. variabilis* had not been recorded, and thus herein, we present the first record. Also, our data suggest that this species as integrant of the *Sceloporus* genus, is mainly insectivorous (Serrano-Cardozo et al., 2008), and this species maybe an opportunistic carnivorous, showing cannibalism, which is also known to occur in some *Sceloporus* species (Mendoza-Quijano et al., 1991; Robbins et al., 2013; Ramírez-Bautista et al., 2014). It is important to point out that despite being a species with a wide distribution, and that its

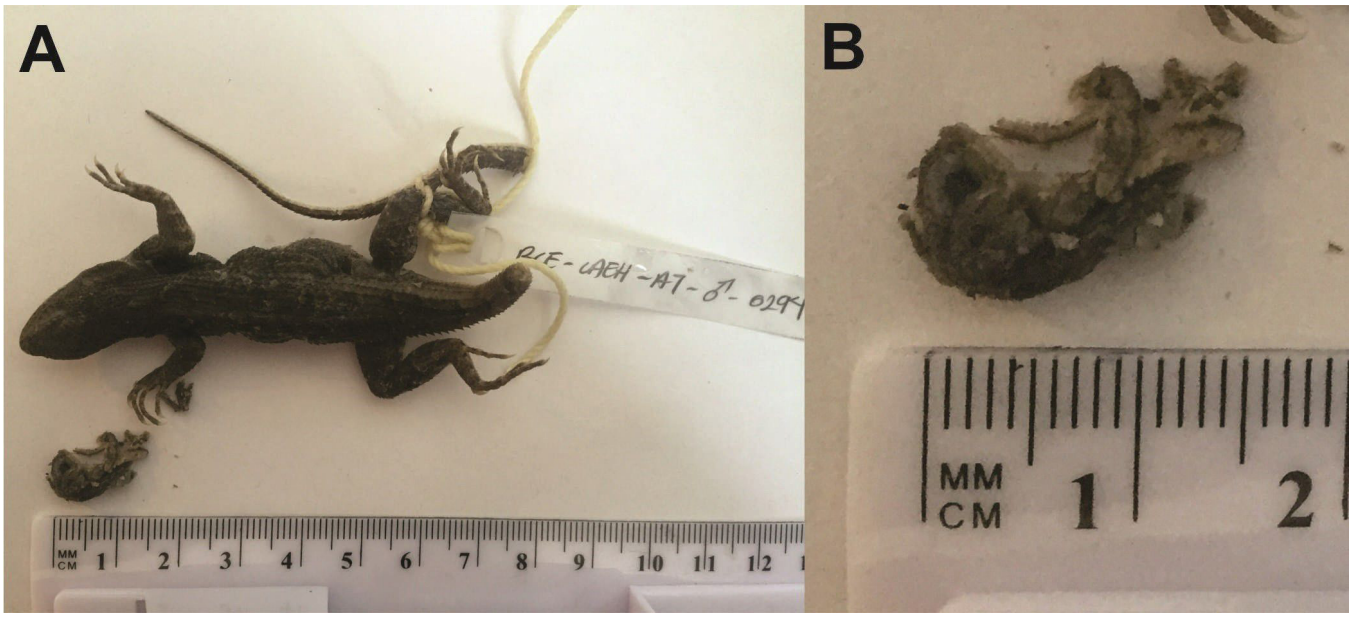

Figura 2. Vista dorsal del macho adulto de *Sceloporus variabilis* (depredador) (A) y juvenil (B) de la misma especie que se encontró en el contenido estomacal. Foto: Raciel Cruz-Elizalde.
Figure 2. Dorsal view of the adult male of *Sceloporus variabilis* (predator) (A) and juvenile (B) of the same species found in its stomach contents. Photo: Raciel Cruz-Elizalde.

reproductive cycle (Benabib, 1994; Cruz-Elizalde & Ramírez-Bautista, 2016) or morphology (Cruz-Elizalde et al., 2017) are known, there is not a complete study on the feeding habits of the species to date. In this sense, we can suggest that the consumption of plant matter may be accidental, as they capture their prey (Mendoza-Quijano et al., 1991; Ramírez-Bautista et al., 2014) as occur in *S. grammicus* (Leyte-Manrique & Ramírez-Bautista, 2010) or *Xenosaurus mendozai* (Zamora-Abrego & Ortega-León, 2016). Diverse events as i) an increase of juvenile density, ii) overlap of microhabitats and dietary niche between juveniles and adults, and iii) a decrease of food availability could result in cannibalistic behavior (Robbins et al., 2013), especially with high densities of individuals. *Sceloporus variabilis* shows high densities in its populations (Smith et al., 1993), principally in tropical environments (Ramírez-Bautista et al., 2006), where the phenomenon of cannibalism has been recorded. Our records of saurophagy in the locality of Santa Catarina, with cloud forest suggests the possibility of cannibalism in environments other than tropical dry forests if populations experience environmental factors that promote cannibalistic behavior (Robbins et al., 2013).

Acknowledgements.— We thank Itzel Magno Benítez and Daniel Lara Tufiño for his help in the field and Irene Goyenechea Mayer-Goyenechea for providing the specimen numbers from the Colección Herpetológica CIB-UAEH. Field work was supported by project CONABIO JM001. We thank two anonymous reviewers for greatly improving our manuscript. The specimens were collected under scientific permit #SGPA/DGVS/11746/13 issued by Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT).

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