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AMELY IN A FEMALE OF *PHRYNOSOMA ORBICULARE* (SQUAMATA: PHRYNOSOMATIDAE)

AMELIA EN UNA HEMBRA DE *PHRYNOSOMA ORBICULARE* (SQUAMATA: PHRYNOSOMATIDAE)

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Resumen.– Se registra un caso de amelia por un posible intento de depredación en una hembra adulta de *Phrynosoma orbiculare* en el Estado de México.

Palabras clave.– Anomalía, lesión, pérdida de extremidad, sobrevivencia de la presa.

Abstract.– A case of amelia is reported due to a possible attempted predation on an adult female *Phrynosoma orbiculare* in the State of Mexico.

Keywords.– Anomaly, lesion, limb loss, prey survival.

Lesions or abnormalities in limbs are rarely documented in lizards, despite their importance in the species' performance. Limb loss can result from predator attacks and, less frequently, from genetic alterations during embryonic development. Limb anomalies have been described in the scientific literature and categorized as adactyly, aphalangy, brachydactyly, and ectrodactyly (see details in De la Rosa-Silva et al., 2023); as well as more severe conditions where partial (ectomely) or total (amely) loss of the limb is observed (Henle et al., 2017; Kolenda et al., 2017). In Mexico, information on cases of limb anomalies is limited to recent observations in *Aspidoscelis costatus* (De la Rosa-Silva et al., 2023), *Sceloporus grammicus* (Díaz-Marín et al., 2023a), and *Phrynosoma orbiculare* (Díaz-Marín et al., 2023b).

The Mountain Horned Lizard *P. orbiculare* (Linnaeus, 1789), is an endemic species to Mexico with a wide distribution across the country, ranging from the Sierra Madre Oriental, through the Trans-Mexican Volcanic Belt, to the Mexican Plateau (Bryson et al., 2012). It belongs to the Phrynosomatidae family and primarily inhabits pine-oak forests and xerophilous scrublands at elevations from 1,300 to 3,400 m a.s.l. (Suárez-Rodríguez et al., 2018).

On 16 October 2024, at 10:00 h, we observed an adult female *P. orbiculare* at the Parque de la Ciencia Sierra Morelos (PCSM), in the municipality of Toluca, State of Mexico, Mexico (19.3155° N, 99.6909° W, Datum WGS 84, 2,700 m a.s.l.). The PCSM is a protected natural area located in an urban site, surrounded by towns and fragmented by the continuous introduction of cattle grazing and with recreational places such as cycling and with walking and hiking areas (Oviedo-Hernández et al., 2024). The adult female was measured with a digital caliper (precision ± 1 mm): snout-vent length = 79 mm, tail length = 37 mm, inter-axillary distance = 42 mm, head length, width, and height = 17, 28,

16 mm, respectively; the female did not present its right forelimb (Fig. 1A). The exposed humerus was visible most proximally to the shoulder. Around the injury, healing soft tissues were observed covering the bone, with traces of coagulated blood and blackened skin, suggesting that probably the injury was the result of a recent predation attempt (Fig. 1B). Other explanations are possible, such as having been trampled by livestock or intentionally damaged by a human; however, the injury shows a clean amputation, similar to those caused by birds, with no trace of incisors or canines (Coombs, 2016). Therefore, the loss of the limb due to a predation attempt should be the best supported hypothesis. Additionally, no trace of blood was observed around the ocular region, suggesting that the organism may not have used blood-squirting as a defense strategy (Sherbrooke, 2022). Despite the injury, the lizard displayed an active mobility with bright coloration and no other apparent abnormalities affecting its behavior or physical condition. The lizard was taken to the laboratory for photographs of the injured area, which seemed to be healing, showing signs of scarring and the beginning of scaling in the stump formation; later, the female was released at its site of capture. Two weeks later, it was found with good health and we measured body mass = 34.58 g with a balance (precision 0.01 g), similar to the average reported by Suárez-Rodríguez et al. (2018) for gravid females in the same population (34.3 g). It appears that the anomaly did not hinder its mobility.

Although Díaz-Marín et al. (2023a) reported ectromely in a *P. orbiculare* specimen, the lifeless individual only lost part of its forelimb. Here, we present a case of amely, where an individual completely lost its right forelimb as a result of a possibly failed predation attempt that it survived. Potential predators in the study area include small mammals and birds, which tend to

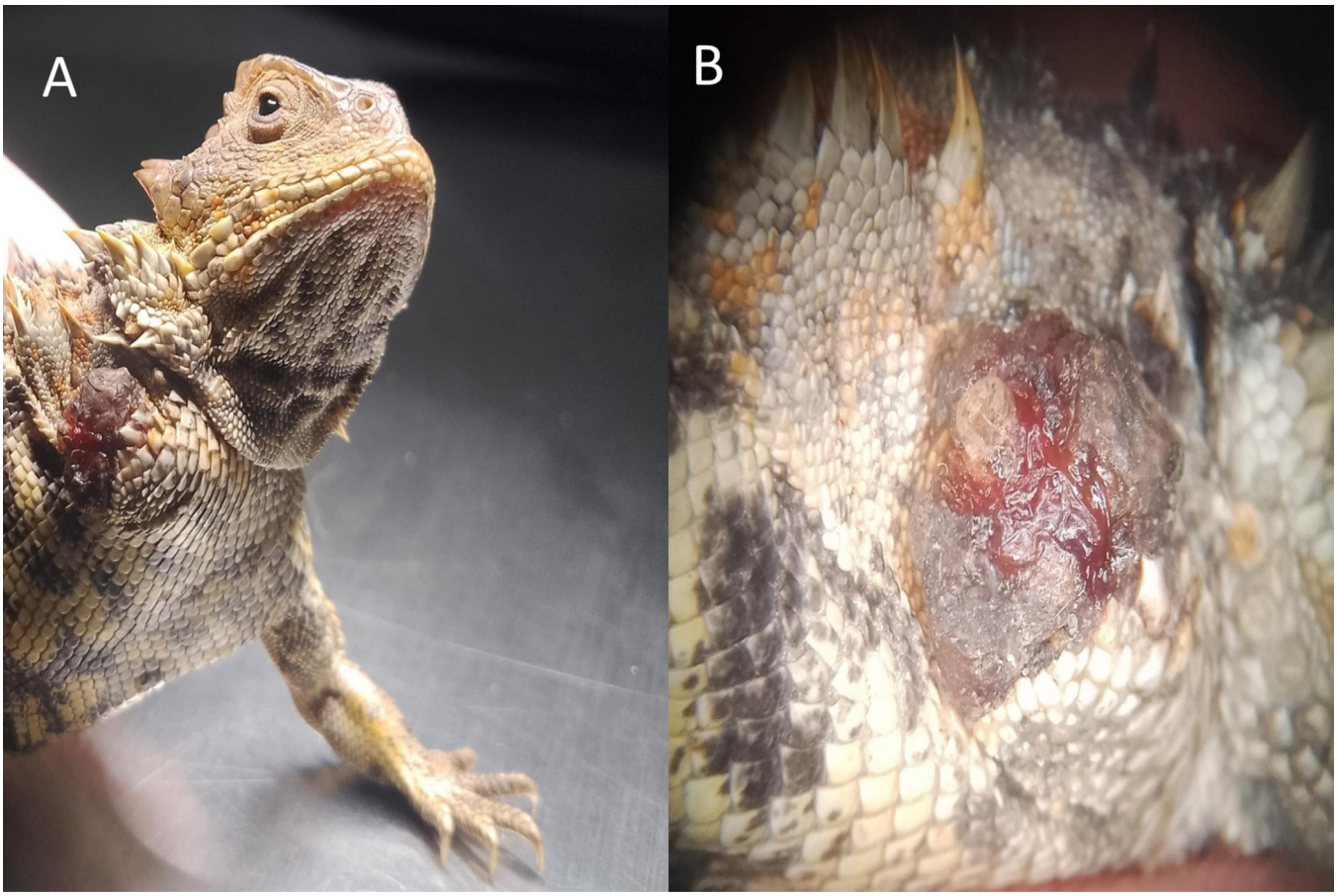

Figura 1. (A) Hembra de *Phrynosoma orbiculare* con la extremidad en cicatrización en el Parque de la Ciencia Sierra Morelos, Toluca, Estado de México. (B) Detalle de la lesión en la extremidad anterior derecha, es visible el húmero expuesto. Foto: Ivonne Tovar-Alva.

Figure 1. (A) Female of *Phrynosoma orbiculare* with forelimb in healing from Parque de la Ciencia Sierra Morelos, Toluca, State of Mexico. (B) Detail of the injury in the right forelimb, the exposed humerus is visible. Photo: Ivonne Tovar-Alva.

latch onto any part of their prey's body (Sherbrooke, 2001, 2003), particularly a recent predation event by the Loggerhead Shrike (*Lanius ludovicianus*) in *P. orbiculare*, a bird which is characterized by impaling its preys (Gómez-Benitez et al., 2023), a multiple predator events also reported in Flat-tailed Horned lizard *P. mcallii* (Lara-Resendiz et al., 2019).

Although it has been suggested that limb loss could negatively affect the mobility and performance of lizards and, therefore, their survival, the observed case demonstrates that *P. orbiculare* was able to move normally despite the amputation. This implies that the species has the ability to adapt through various defensive strategies, such as cryptic coloration, immobility, and primarily blood-squirting (Gómez-Benitez et al., 2021), to evade fatal attacks, allowing it to survive even with severe injuries. A similar case was observed in *P. cornutum*, which survived a coyote attack (Sherbrooke, 2022). Limb loss could compromise these strategies; however, survival cases have been documented in specimens with anomalies that did not affect their mobility, such as *A. costatus* with ectrodactyly (De la Rosa-Silva et al., 2023), *Basiliscus plumifrons* with amely (Mora et al., 2020), and both *Lacerta agilis* and *Zootoca vivipara* with hemimely and meromely, respectively (Kolenda et al., 2017). These species, with different foraging strategies, have survived predation attempts and anomalies. Further research is needed to determine how these injuries impact long-term survival and longevity. The analysis and quantification of these events can provide valuable insights into ecological interactions and defensive behavior in lizards facing predator attacks.

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