



# First Case of Microphthalmia in Forrer’s Leopard Frog, *Lithobates forreri* Boulenger 1883 (Anura: Ranidae), in Mexico

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Morphological abnormalities in amphibians have been reported worldwide, and the frequency of these reports has increased over time (Henle et al. 2017; Mónico et al. 2019). Two distinct groups of abnormalities stand out: 1) malformations, which are permanently defective structures resulting from abnormal development, and 2) deformities, such as the alteration of an organ or structure that was originally normally developed (Meteyer 2000; Cortés-Suárez and Amaya-Villabona 2020). Ocular malformations in anurans include anophthalmia, dark eye or eye without iris, and microphthalmia (Glaw and Vences 1997; Meteyer 2000; Cortés-Suárez 2018; Cortés-Suárez et al. 2021). In Mexico, ocular malformations have been scarcely documented (see Venerozo-Tlazalo et al. 2022).

Forrer’s Leopard Frog (*Lithobates forreri*) is distributed from central Sonora and southwestern Chihuahua to the south along the Pacific coastal plain in Mexico; nevertheless,

its presence is uncertain in other countries of Central America (e.g., Guatemala, Honduras, Nicaragua, and Costa Rica) (McCranie 2015; Luque-Montes et al. 2018; IUCN SSC Amphibian Specialist Group 2020; Frost 2021). Herein, we report the first published case of microphthalmia in Forrer’s Leopard Frog (*L. forreri*) from Mexico.

At 2200 h on April 30, 2022, during a night survey, we encountered a juvenile female Forrer’s Leopard Frog (*L. forreri*) with an ocular malformation known as microphthalmia according to Meteyer (2000). The affected eye was small in size and not fully fused to the eyelid (Fig. 1). The individual (63 mm SVL) was found on the edge of a pond surrounded by tropical dry forest modified for recreational activities in the village of El Walamito, Municipality of Culiacán, Sinaloa, Mexico (24.373242 °N, 107.036803 °W; elev. 136 m asl). Once the individual was examined and photographed, it was released in the same place where it was found. The photo-



**Fig. 1.** A female Forrer’s Leopard Frog (*Lithobates forreri*) with a reduced-eye malformation. Photographs by María Cecilia Soto-Cisneros.

graphs were deposited in the herpetological digital collection of the Natural History Museum of Los Angeles (LACM PC: 2913-17).

Monroy-Vilchis et al. (2015) reported six types of malformations in a population of Forrer's Leopard Frog (*L. forreri*) in central Mexico, with the dark eye (or without iris) being the only ocular malformation documented for the country so far. Thus, our report is the second documented ocular malformation and the first incidence of microphthalmia in Mexico for this species. There are several possible causes for abnormalities in amphibians, including genetic and environmental factors, parasitic infestation, microbial diseases, elevated UV-B radiation, and the main factor: chemical contaminants (Aguillón-Gutiérrez 2018). All of these possible causes can affect amphibian survival and fitness because they increase the probability of predation and reduce foraging efficiency and mate acquisition (Johnson et al. 2006). Therefore, these reports are important to help understand the dynamics of malformations as these abnormalities may denote environmental complications, which may impact other organisms (Roy 2002).

This reported case of microphthalmia in *L. forreri* calls for further research in the region to determine the factors that can cause this type of morphological abnormality and other malformations, as well as defining with greater certainty the rate of incidence and the effects that they could have on populations of amphibians that inhabit, in particular, the interior tropical dry forest of Sinaloa.

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