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**Short Communication**

# A new population of the endangered salamander *Pseudoeurycea firscheini* (Caudata: Plethodontidae) from Mexico, with notes on natural history

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**Palavras-chave:** dieta, distribuição geográfica, morfologia, salamandra-de-firschein.

Mexico has one of the greatest diversities of amphibians in the world with 393 species (AmphibiaWeb 2019). It also has the second largest number of threatened amphibian species in the world (Stuart *et al.* 2006). In Mexico, salamanders of the family Plethodontidae are the most diverse amphibian group, with around 129 species (AmphibiaWeb 2019) of which more than 87% are endemic.

*Pseudoeurycea firscheini* Shannon and Werler, 1955 is endemic to Mexico; it is restricted to a montane portion of the central-west Veracruz in the municipalities of Acultzingo (limit with Puebla) and Tequila between the altitudes of 1600 and 2000 m a.s.l. (Stuart *et al.* 2008, Woolrich-Piña *et al.* 2017, AmphibiaWeb 2019). This rare species occurs in pine-oak forests and cloud forests. Apparently, *P. firscheini* does not survive in highly degraded habitat (although it is found on the edge of forest) and needs the presence of abundant bromeliads in mature trees (IUCN 2016). Populations of *P. firscheini* are in decline (Parra-Olea *et al.* 1999, Stuart *et al.* 2008, IUCN 2016). The species is considered Endangered by the IUCN (2016) because the extent of its distribution is only 181 km$^2$ and agriculture expansion, wood extraction, and increased development is encroaching on the extent and the quality of the habitat. Similarly, it is considered under special protection (Pr) in the Norma-Oficial-Mexicana-059-SEMARNAT-2010 (SEMARNAT 2010). Additionally, Van-Rooij *et al.* (2011) documented the presence of *Batrachochytrium dendrobatidis* Longcore, Pessier, and D. K. Nichols, 1999 in an individual of *P. firscheini* near to the locality Puerto del Aire, in the municipality of Acultzingo.

Herein, we supplement the available information about the distribution, diet, and morphology of *P. firscheini* based on fieldwork carried out in Región de las Altas Montañas, central-west Veracruz, Mexico, and examination of two museum specimens. (MVZ 76192, MVZ 106752). Two specimens collected were deposited in the herpetological collection of the Instituto de Biologia (IBH 30995–30996), Universidad Nacional Autónoma de México.

On 12 June 2018, at about12:20 h, in the

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Cerro Petlalcala (18°46'46.2" N, 97°05'57.8" W, WGS 84; 1935 m a.s.l.) in the municipality of San Andrés Tenejapan (Figure 1), we collected an adult salamander on a moss-covered rock covered 3 m above the ground in a forest patch in an ecotone between pine-oak forest and cloud forest. The individual (IBH 30995; Figure 2) has a snout–vent length of 63.5 mm. We examined fecal matter from this individual and found ant eggs and fragments of ants. At this same locality on 24 June 2018, at about 16:30 h, a second adult (IBH 30996, SVL 57.5 mm) was collected under of a rock in a patch of pine forest (18°46'38.06" N; 97°06'7.74" W, WGS 84) at an elevation of 2150 m a.s.l. Additionally, we found juveniles of this species under rocks in February, March, May, and June 2016.

This population is located 6.5 km (airline) north of the nearest reported locality in the municipality of Tequila (Stuart *et al.* 2008); thus, there now are three known municipalities in which *Pseudoeurycea firscheini* occurs and its range is increased to about 330 km$^2$ with an altitudinal limit of 2150 m a.s.l. It is possible that the species occurs farther south than is currently known along the border between Puebla and Veracruz, as this region has been poorly explored. It is unlikely, however, that the distribution substantially exceeds current estimates, because most surrounding areas have been surveyed for amphibians, including salamanders of the genus *Pseudoeurycea* (e.g., Cázares-Hernández *et al.* 2018).

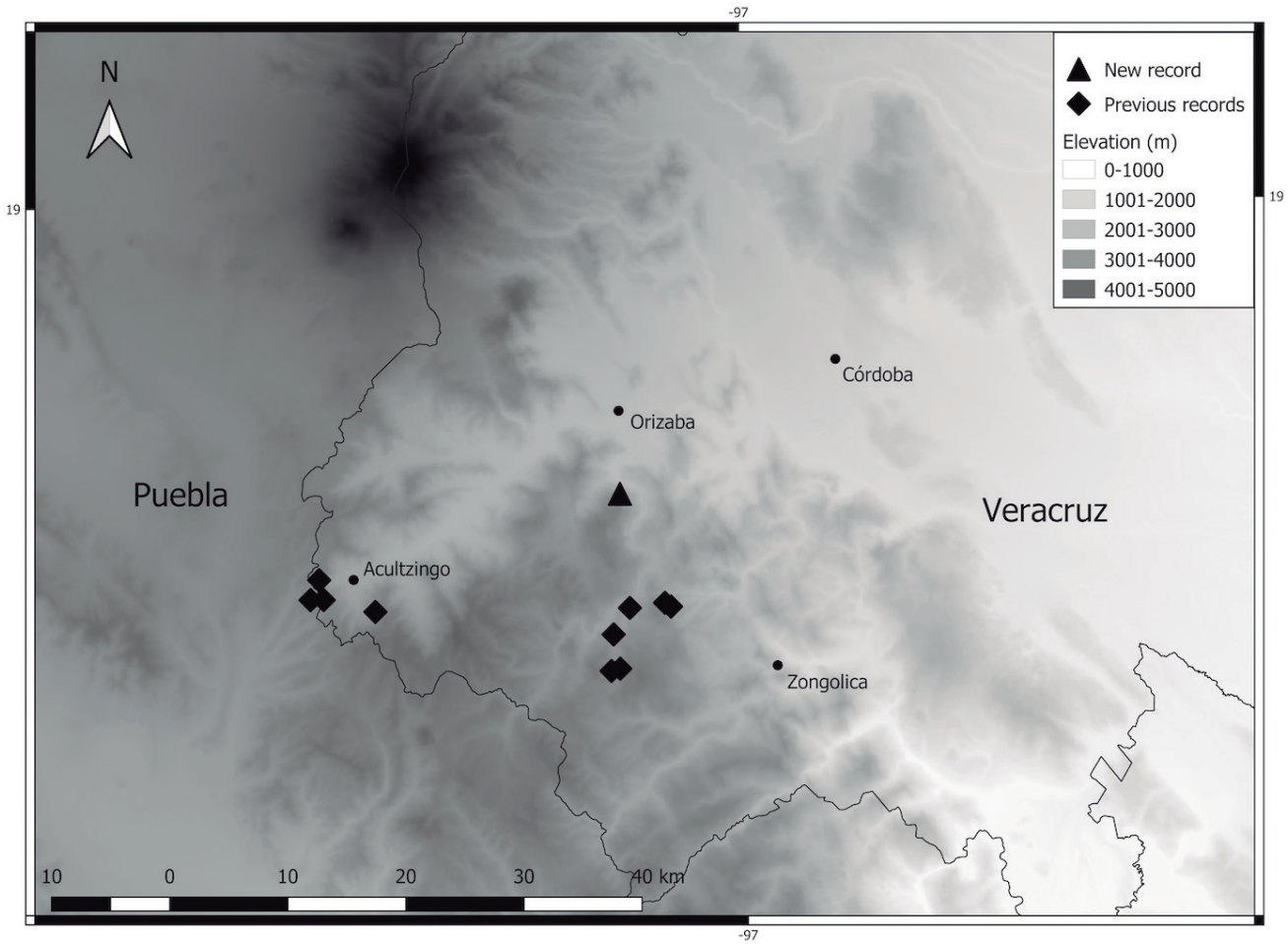


**Figure 1.** Distribution of *Pseudoeurycea firscheini* in central-western Veracruz, Mexico.

**Figure 2.** An adult *Pseudoeurycea firscheini* from Cerro Petlalcala, municipality of San Andrés Tenejapan, Veracruz, Mexico. Photo by Víctor Vásquez-Cruz.

Our measurements of *Pseudoeurycea firscheini* complement the description of this species (Table 1). We documented a maximum SVL of 63.5 mm—a value greater than that of Regal (1966) (60 mm), and a maximum (92) and minimum (74) of premaxillary-maxillary teeth (PMT/MT) and a minimum of 23 vomerine teeth (VT). These quantitative data increase our knowledge of morphological variation in *P. firscheini.*

Dietary information for *Pseudoeurycea firscheini* was previously lacking. Although we report the presence of ants in the diet of wild *P. firscheini,* we cannot state that they are a main component as in the case of some other salamanders—e.g. *Aneides aeneus* (Cope and Packard, 1881), *Bolitoglossa mexicana* Duméril, Bibron, and Duméril, 1854, *B. rufescens* (Cope, 1869) and *Plethodon cinereus* (Green, 1818) (Anderson and Mathis 1999, Paluh *et al.* 2015).

The designation of *Pseudoeurycea firscheini* as Endangered by the IUCN is largely based on its restricted range. Our records expand its known distribution to 330 km$^2$. Nevertheless, its range of the species is still small enough to qualify it as Endangered under IUCN criterion EN B (extent of occurrence < 5000 km$^2$), given that it is found at fewer than five total localities and its distribution is severely fragmented (criterion B1a) and that there is a continuing decline in the extent and quality of its habitat

**Table 1.** Measurements (mm) of individuals of *Pseudoeurycea firscheini:* snout–vent length (SVL), tail length (TL), axilla–groin (AX), forelimb length (FLL), hind-limb length (HLL), head length (HL), head width (HL), head height (HH), interorbital distance (IO), internarial distance (IN), right-foot width (RFW), length of the longerst (third) toe (T3), length of Toe V (T5), premaxillary-maxillary teeth (PMT/MT), vomerine teeth (VT). Data from holotype taken from Shannon and Werler (1955).

| Institution | Number | Sex | SVL | TL | AX | FLL | HLL | HL | HW | HH | IO | IN | RFW | T3 | T5 | PMT/MT | VT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MVZ | 76192 | F | 58.5 | 51.6 | 33.3 | 13 | 14.2 | 12.8 | 7.7 | 4.4 | 2.5 | 2.6 | 4.6 | 2.3 | 0.8 | 77 | 29 |
| MVZ | 106752 | M | 55.6 | NA | 30.4 | 14.2 | 15.3 | 12.9 | 7.8 | 4.5 | 2.3 | 2.7 | 5.6 | 2.6 | 1.1 | 67 | 30 |
| IBH | 30995 | F | 63.5 | 58.01 | 34.26 | 14.39 | 15.77 | 13.27 | 8.64 | 3.83 | 2.88 | 2.69 | 5.37 | 2.21 | 0.77 | 74 | 23 |
| IBH | 30996 | F | 57.5 | 52.8 | 32.11 | 12.85 | 14.19 | 12 | 7.9 | 4 | 2.66 | 2.57 | 4.87 | 2.03 | 0.79 | 92 | 24 |
| Holotype FAS | 4714 | | 47.2 | NA | NA | NA | NA | NA | 7.0 | NA | NA | NA | NA | NA | NA | 86 | 34 |

(criterion B1biii). Thus, we recommend no change in its IUCN Red List status. The ever-increasing anthropogenic disturbance at the Cerro Petlalcala site, as well as at other known localities, is the most important threat to the species.

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