

Gerrhonotus parvus Knight & Scudday, 1985 (Squamata: Anguidae): New range extension and clutch size in the state of Nuevo León, Mexico

Javier Banda-Leal^{1*}, David Lazcano¹, Manuel Nevárez-de los Reyes¹ and Carlos Barriga-Vallejo²

¹ Laboratorio de Herpetología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, San Nicolás de los Garza, Apartado Postal 513, C.P. 66450 Nuevo León, México.

² Laboratorio de Ecofisiología, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, San Nicolás de los Garza, F-96, C.P. 66450 Nuevo León, México.

* Corresponding author. E-mail: javier_banda@hotmail.com

ABSTRACT: We report a female specimen of *Gerrhonotus parvus* that represents a new record for the municipality of Santa Catarina, Nuevo León, Mexico. This species was known previously from only three localities in the state: the municipality of Galeana; the type locality, Los Rayones, where only one specimen was registered; and San Isidro Canyon in Santiago, which previously was the northernmost locality and where the largest number of specimens have been observed and collected. This new record extends the range of the species 48.2 km northeast of the nearest known locality in Santiago. In addition, the specimen laid six eggs, which is the largest clutch documented so far. The type locality is located in a transition zone between pine forest (*Pinus arizonica*) and open gypsophilous scrub. However, the nature of the microhabitats at the other localities, including the northernmost one reported here, suggests that the species has a preference for dry limestone canyons.

DOI: 10.15560/10.4.950

The genus *Gerrhonotus* is endemic to North America and represented by six species: *G. farri*, *G. infernalis*, *G. liocephalus*, *G. lugoii*, *G. ophiurus*, and *G. parvus*. Of these, the most widely distributed is *G. liocephalus* in western and southern Mexico and *G. infernalis* in central and northern Mexico and southern Texas (Good 1994). The rest of the species are found in small areas and are known from only a few individuals. *Gerrhonotus ophiurus* is distributed in central and southwestern San Luis Potosí, eastern Querétaro, Hidalgo, Tlaxcala, Puebla, and mountainous areas of northern Veracruz (Lemos-Espinal and Dixon 2013); *G. lugoii* is isolated in the Basin of Cuatrociénegas, Coahuila (McCoy 1970); *G. farri* is found near Tula, Tamaulipas (Bryson and Graham 2010); and *G. parvus* is known only from the state of Nuevo León, in the municipalities of Galeana, Los Rayones, and Santiago (Banda-Leal *et al.* 2013). The three previously-mentioned species have a restricted distribution and very little is known about their biology. For *G. lugoii*, there is only a report of reproduction in captivity that describes the courtship behavior and litter size (Lazcano *et al.* 1993). For *G. parvus*, there are more details available about their natural history (Bryson *et al.* 2003). For *G. farri*, only the collecting data for a single specimen are known (Bryson and Graham 2010).

Although efforts have been made to understand the phylogenetic relationships of the species in the genus (Good 1988a, 1994, and Conroy *et al.* 2005), they remain unclear. *Gerrhonotus parvus* is known from the Sierra Madre Oriental in the state of Nuevo León, Mexico (Figure 1), originally reported for the municipality of Galeana in a

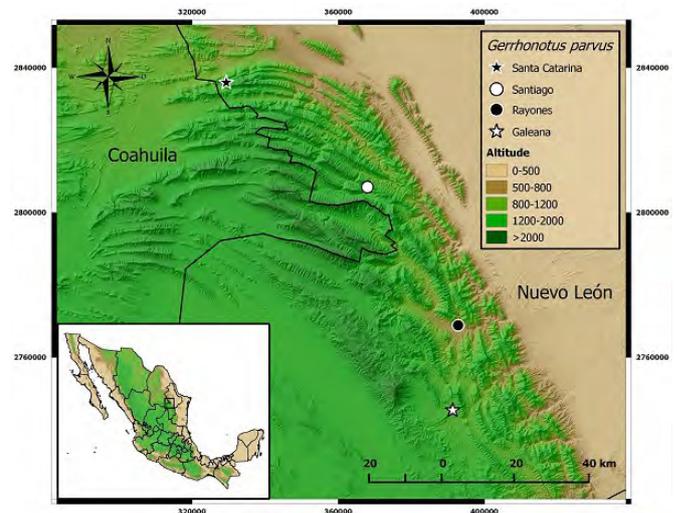


FIGURE 1. Geographic distribution of *Gerrhonotus parvus*, including the new locality reported for the municipality of Santa Catarina, Nuevo León, Mexico.

transition zone between pine forest (*Pinus arizonica*) and open gypsophilous scrub at altitude of 1650 m (Knight and Scudday 1985) (Figure 2). The species has been recorded from the San Isidro Canyon, Santiago, Nuevo León. This canyon is at an elevation of 1,600 m, runs east to west, is characterized by steep limestone walls covered with agaves (*Agave sp.*), sotols (*Dasyllirion sp.*), and scrub oaks (*Quercus sp.*), and has intermittent pools of water. The canyon bottom has piles of leaf litter with scattered large rocks (Banda-Leal *et al.* 2002; Bryson and Lazcano 2005) (Figure 3). The remaining record is from the canyon of

Mireles, Los Rayones, Nuevo León, with a habitat similar to that of San Isidro Canyon, but with an elevation of 900 m (Conroy *et al.* 2005) (Figure 4).

This group is distributed in northeastern México along the Sierra Madre Oriental, a mountain range approximately 1,350 km long, paralleling the Gulf of Mexico, and terminating to the south in the Neovolcanic Axis, which divides North America from Central America.



FIGURE 2. Type locality of *Gerrhonotus parvus*, transition zone between pine forest (*Pinus arizonica*) and open gypsophilous scrub in Galeana.



FIGURE 3. Limestone canyon with elements of Piedmont scrub in Santiago.

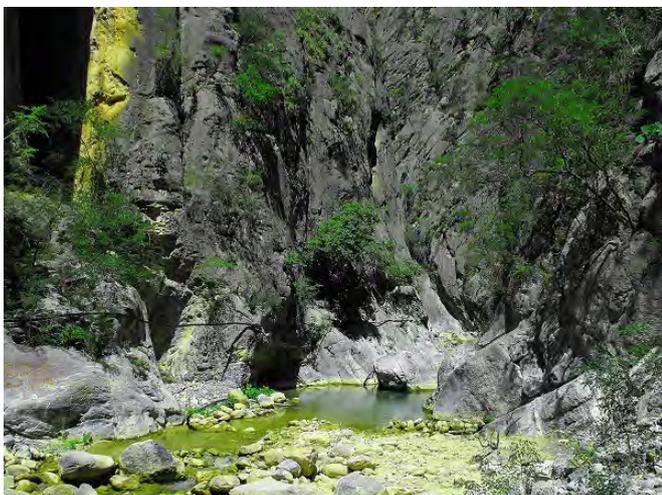


FIGURE 4. Limestone canyon with elements of Piedmont scrub in Los Rayones.

The cordillera runs through a large number of states, including Coahuila, Nuevo León, Tamaulipas, Texas, San Luis Potosí, Hidalgo, Tlaxcala, and others. The Pygmy Alligator Lizard inhabits only the states of Coahuila, Nuevo León, and Tamaulipas in Mexico.

Gerrhonotus parvus is characterized by a small, indistinct head with respect to the neck; slim body with short limbs and a tail length (TL) greater than the snout-vent length (SVL); head scales smooth and shiny; dorsal scales arranged in 16 longitudinal and 53 transverse rows; 12 longitudinal rows and 62 transverse rows on the venter; lateral fold formed by five or six rows of small granular scales; head grayish brown with irregularly distributed black spots and finely pigmented lips; gular area pearly white; dorsum grayish brown with pale gray transverse bands that are defined by dark edges, especially along the posterior edges of each band; pearly white belly; greyish brown tail, lighter than the trunk; and several transverse grey bands (Knight and Scudday 1985).

Scale counting is a tool to determine the genus and species (Waddick and Smith 1974). *Gerrhonotus parvus* is a small size lizard with a maximum total length (TL) of 130 mm. (Banda-Leal *et al.* 2005) and 84.5 mm for females (Knight and Scudday 1985). This species differs from its congeners by a combination of the following characters: small adult size, smooth dorsal scales, nasals in contact with medial fifth supraocular, suboculars separated from lower primary temporal by an upper lip, and wide pale crossbands on the tail. (Knight and Scudday 1985).

While sampling for herpetofauna in the municipalities of García and Santa Catarina, Nuevo León (Figure 1), we collected in the municipality of Santa Catarina a female specimen of *Gerrhonotus parvus* in the locality known as Cañon Reflexiones (Figure 5). This specimen collection was approved by the SEMARNAT (Secretary for Environment Protection Management), under permit number SGPA/DGVS/01511/12 and 01589/12. The specimen (Figure 6) was deposited in the herpetological collection of the Universidad Autónoma de Nuevo León (UANL), catalog number UANL-7275. The specimen was identified using Good 1988. We measured (using vernier Helios accuracy 0.05 mm) snout-vent length (SVL) and tail length (TL) and recorded the temperature of the body and microhabitat (using RayTek ST30 Pro Enhanced).



FIGURE 5. New locality of *Gerrhonotus parvus* in Santa Catarina.



FIGURE 6. Female of *Gerrhonotus parvus* (UANL-7275) collected in Santa Catarina.

We collected the specimen of *Gerrhonotus parvus* on 30 March 2012, in Cañon Reflexiones (25°37'50.68" N, 100°41'58.47" W, WGS84, 1650 m), located 48.2 airline km. northwest from the nearest locality recorded in the municipality of Santiago, Nuevo León (Figure 1). We found the lizard active on the wall of the canyon at 14:00 h. The specimen had a SVL of 72.56 mm and a TL of 72.25 mm (incomplete). The ambient temperature was 24°C, while that of microhabitat was 16°C and the body temperature (BT) 17°C. Subsequently, on 9 May, the female laid six elliptical eggs that weighed on average 0.39 g \pm 0.01 (0.37–0.41 g) and measured an average 13.06 mm \pm 0.05 (12.54–13.57 mm) in length and 7.27 mm \pm 0.05 (7.18–7.36 mm) in width. Unfortunately, they did not develop (Figure 7). This is a larger litter size than previously reported for the paratype, which was 4 eggs (Knight and Scudday 1985). This determination was verified by Robert W. Bryson.

Cañon Reflexiones is quite narrow, made of limestone rock, with the presence of rosetophilous and piedmont scrub elements (Figure 5). At the base of the canyon, we found the following species of plants: Shrubby Bulls Eye (*Gochnatia hypoleuca*), Desert Willow (*Chilopsis linearis*), Texas Mountain Laurel (*Sophora secundiflora*), Barreta (*Helietta parvifolia*), and isolated individuals of Checkerbark Juniper (*Juniperus deppeana*). On the rocky walls of the canyon, we found the following species: Lechuguilla (*Agave lecheguilla*), Squid Agave (*Agave bracteosa*), as well Rock Palm (*Brahea berlandieri*) and several cacti (*Mammillaria melanocentra*, *M. plumosa*, *Epithelantha unguispina*, and several species of

Echinocereus). In the less rocky areas with a northeast exposition, we found Gregg's Pine (*Pinus greggii*).

This specimen of *Gerrhonotus parvus* represents the first record for the municipality of Santa Catarina, as well as the northernmost recorded for the species, extending its range 48.2 km northwest of the previously known localities (Banda-Leal et al. 2002). Currently, *Gerrhonotus parvus* is under the status of special protection by the NOM-059-SEMARNAT (2010) and Endangered (B1 ab[iii] ver.3.1) by the IUCN (2013). The characteristics of the microhabitat of this site are very similar to those of the canyons of San Isidro and Mireles in the municipalities of Santiago and Los Rayones, which suggests that this species might have a preference for this type of habitat, rather than that of the type locality in Galeana, Nuevo León.



FIGURE 7. Litter of six *Gerrhonotus parvus* eggs.

ACKNOWLEDGMENTS: We would like to thank the San Antonio Zoological Gardens and Aquarium and Los Angeles Zoo and Botanical Gardens for financial support for this study and SEMARNAT for issuing collecting permits and providing the most recent ones (Oficio Num. SGPA/DGVS/0511/12 and 01589/13). We also would like to thank all the persons who participated in lab and field work, in particular Alejandro Huereca Delgado and Alejandra Rodriguez-Jaime and the authorities of Parque Nacional Cumbres de Monterrey. Special thanks to Robert L. Bezy and Larry D. Wilson for the review of this manuscript.

LITERATURE CITED

- Banda-Leal, J., D. Lazcano and M. Nevárez-de los Reyes. 2013. Notes on Mexican Herpetofauna 19: Herpetofauna Sympatric with *Gerrhonotus parvus* in San Isidro Canyon, Santiago, Nuevo León, Mexico. *Bulletin of the Chicago Herpetological Society* 48(2): 13–19. ([http://www.chicagoherp.org/bulletin/48\(2\).pdf](http://www.chicagoherp.org/bulletin/48(2).pdf))
- Banda-Leal, J., R. W. Bryson, Jr. and D. Lazcano. 2005. *Gerrhonotus parvus* (Pygmy Alligator Lizard). Maximum size. *Herpetological Review* 36(4): 449.
- Banda-Leal, J., R. W. Bryson, Jr. and D. Lazcano. 2002. New record of *Elgaria parva* (Lacertilia: Anguidae) from Nuevo León, México. *The Southwestern Naturalist* 47(4): 614–615.
- Bryson R.W. and M.R. Graham. 2010. A New Alligator Lizard from Northeastern México. *Herpetologica* 66(1): 92–98. (doi: <http://dx.doi.org/10.1655/09-012.1>)
- Bryson R. W., D. Lazcano, J. Banda-Leal, G. Castañeda-Gaitán y C. García-de la Peña. 2003. Historia Natural de la Lagartija Pigmea (*Elgaria parva*) Endémica de Nuevo León, México. *Boletín de la Sociedad Herpetológica Mexicana* 11(1): 21–22.
- Bryson R.W. and D. Lazcano. 2005. The Pygmy Alligator Lizard of Nuevo Leon, Mexico. *The Reptilia European Herp Magazine* (GB) No. (39): 69–72. April (http://www.reptilia.net/articulos_ing/039.pdf)
- Conroy, C. J., W. R. Bryson, Jr., D. Lazcano and A. Knight. 2005. Phylogenetic placement of the Pygmy Alligator Lizard based on mitochondrial DNA. *Journal of Herpetology* 39(1): 142–147. (doi: 10.1670/0022-1511(2005)039[0142:PPOTPA]2.0.CO;2)
- Good, D.A. 1988. Phylogenetic relationships among gerrhonotinae lizards, an analysis of external morphology. University of California Press (121): 1–139.
- Good, D.A. 1994. Species limits in the genus *Gerrhonotus* (Squamata: Anguidae). *Herpetological Monographs* 8: 180–202. (http://desertfishes.org/cuatroc/literature/pdf/Good_1994_species_limits_Gerrhonotus.pdf)
- IUCN. 2013. *IUCN Red List of Threatened Species*. Version 2013.2. Captured on 14 January 2014. Accessible at <http://www.iucnredlist.org/>.
- Knight, R. A. and J. F. Scudday. 1985. A new *Gerrhonotus* (Lacertilia: Anguidae) from the Sierra Madre Oriental, Nuevo León, Mexico. *The Southwestern Naturalist* 30 (1): 89–94.
- Lazcano, D. Jr., A. Contreras-Arquieta and M. Nevárez de los Reyes. 1993. Notes on Mexican Herpetofauna 3: Reproductive Biology of *Gerrhonotus lugoi* an Anguid Lizard from the Cuatro-Cienegas Basin, Coahuila, Mexico. *Bulletin Chicago Herpetological Society* 28 (12): 263–265.
- Lemos-Espinal J.A. and Dixon J.R. 2013. *Amphibians and Reptiles of San Luis Potosí*. Eagle Mountain Publishing, 312 pp.
- McCoy, C. J. 1970. A new alligator lizard (genus *Gerrhonotus*) from the Cuatro-Cienegas Basin, Coahuila, Mexico. *The Southwestern Naturalist* 15(1): 37–44.
- SEMARNAT. 2010. NORMA Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-especies nativas de México de flora y fauna silvestres-categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-lista de especies en riesgo. Diario Oficial de la Federación. Jueves 30 de Diciembre de 2010. (http://www.profepa.gob.mx/innovaportal/file/435/1/NOM_059_SEMARNAT_2010.pdf)
- Waddick, J. W. and H. M. Smith. 1974. The significance of scale characters in evaluation of the lizard genera *Gerrhonotus*, *Elgaria*, and *Barisia*. *Great Basin Naturalist* 34: 257–266.

RECEIVED: February 2014

ACCEPTED: June 2014

PUBLISHED ONLINE: September 2014

EDITORIAL RESPONSIBILITY: Philippe Kok