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RANGE EXTENSION OF THE BRAZILIAN DWARF BOA *Tropidophis paucisquamis* (MÜLLER, 1901) (SERPENTES, TROPIDOPHIIDAE) AND FIRST RECORD IN THE STATE OF MINAS GERAIS, BRAZIL

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Abstract: *Tropidophis paucisquamis* is a rare small-sized snake, endemic to the Atlantic Forest and strongly associated with coastal mountain ranges with elevations above 500 m a.s.l. In this work, we provide the first record of this species in the state of Minas Gerais, Brazil, being the most continental record for the species and extending its distribution approximately 180 km from the closest known localities, and 465 km from its type locality. This finding fills a distribution gap between the states of Rio de Janeiro and Espírito Santo, Brazil, and expands our understanding about *T. paucisquamis* geographic distribution.

Keywords: Atlantic Forest; defensive behavior; Serra do Brigadeiro; snake; Squamata.

The Brazilian dwarf boa, *Tropidophis paucisquamis* (Müller, 1901) is a rare Tropidophiidae, characterized by aglyphous dentition, rows of dark spots around their bodies and diminutive size, about 150 mm (Hedges 2002, Freitas 2003, Barbo *et al.* 2011, Curcio *et al.* 2012). The species is endemic to the Brazilian Atlantic Forest (*sensu* IBGE & MMA 2004) and strongly associated with coastal mountain ranges with elevation above 500 m a.s.l. (Curcio *et al.* 2012). Brazilian dwarf boas often present arboreal habits and nocturnal activity (Barbo *et al.* 2011). So far, this species has been known from three mountain complexes restricted to the states of Espírito Santo, Rio de Janeiro, São Paulo and Paraná, in southeastern and southern Brazil: 1) Serra do Mar; 2) Serra da Mantiqueira; and 3) Planalto Paulistano-Paranaense (Capela *et al.* 2017). Herein, we report a new locality for *T. paucisquamis*, the first in the state of Minas Gerais and the most continental record for the species, in an area belonging to Serra da Mantiqueira mountain range.

On 06 November 2017 (air temperature 16°C), we found a specimen of *T. paucisquamis* on the ground, amongst the marginal vegetation of a temporary pond commonly known as Lagoa das Bromélias, at Parque Estadual da Serra do Brigadeiro (Serra do Brigadeiro State Park; PESB), municipality of Ervália, state of Minas Gerais, Brazil (Figure 1; 20°53'30" S, 42°31'41" W, datum WGS84; 1227 m a.s.l.). The individual was a male (Figure 2a), 296 mm snout-vent length, 45 mm caudal length, 168

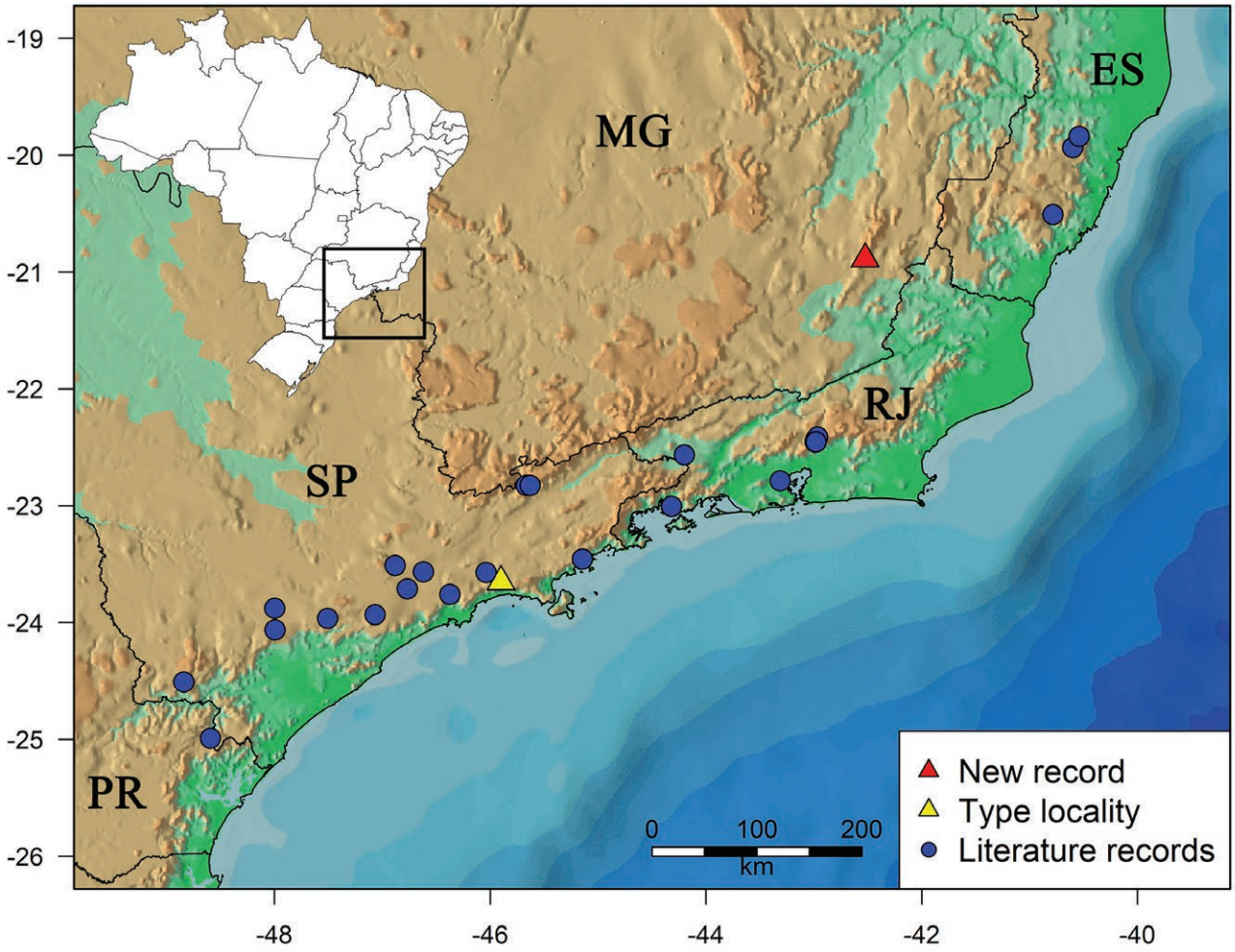

Figure 1. Previously known locality records and the new record of *Tropidophis paucisquamis* (Serpentes, Tropidophiidae). Inset map: Brazil, detailing the area of the main map. ES = Espírito Santo; MG = Minas Gerais; PR = Paraná; RJ = Rio de Janeiro; SP = São Paulo. See Table 1 for coordinates and record references.

ventral scales, 23 dorsal scales at midbody, and lacking interparietal scales, characters within the know range of *T. paucisquamis* (Curcio *et al.* 2012).

Whilst the specimen was manipulated and photographed, it displayed the defensive behaviors of coiling the body and hiding the head (Figure 2b), well reported for the species (*e.g.*, Antunes & Haddad 2009, Barbo *et al.* 2011, Tanaka *et al.* 2018). The specimen was euthanized with an injection of 10% lidocaine, fixed in 10% formalin, preserved in 70% ethanol and is currently housed at the herpetological collection of the Museu de Zoologia João Moojen, Universidade Federal de Viçosa, state of Minas Gerais, Brazil (voucher MZUFV 2495). In addition, tissue samples were collected and will be integrated into the tissue collection of Universidade Federal do Mato Grosso do Sul.

To provide an updated distribution map for *T. paucisquamis*, we made a search of records of this species in the scientific literature, using the terms "*Tropidophis paucisquamis*", "distribution" and "range extension" as keywords in the electronic databases *Google Schoolar* and *SciELO*. Additionally, we searched for records in all volumes of the journal *Herpetological Review*, which traditionally publishes distribution records. Searches were made between April and May 2018.

From the papers found, eight presented geographical coordinates and three presented distribution maps of the species, which were used as references to generate the map of this work (Amaral 1930, Carvalho 1951, Levandeira-Gonçalves *et al.* 2007, Forlani *et al.* 2010, Salles & Silva-Soares 2010, Curcio *et al.* 2012, Capela *et al.* 2017, Tanaka *et al.* 2018). During this search,

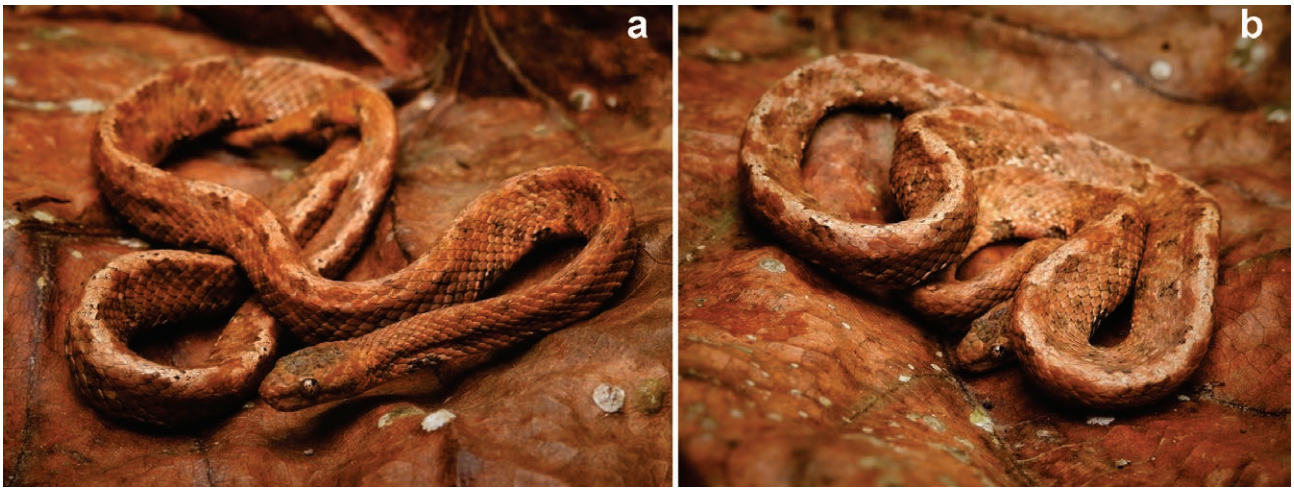

Figure 2. (a) Individual of *Tropidophis paucisquamis* (S*erpentes*, T*ropidophiidae*) found at Parque Estadual da Serra do Brigadeiro, municipality of Ervália, state of Minas Gerais, southeastern Brazil. (b) Same individual exhibiting defensive behaviour of head hiding. Photos by Leandro de Avelar Oliveira.

we found some incoherencies among provided coordinates and their respective localities (*e.g.*, Curcio *et al.* 2012: provided coordinates that fall into a neighbor municipality instead of the one mentioned in the text). In such cases, we updated the coordinates using the centroid of the municipality as a proxy for the species record. When the authors provided specific localities for a record, such as protected areas, we used the coordinates of such specific places instead of the centroid of the municipality (Figure 1; Table 1).

Our record extends the distribution of *T. paucisquamis* about 465 km from its type locality (municipality of Salesópolis, state of São Paulo), and is the westernmost locality of occurrence for this species, approximately 176 km NE of municipality of Teresópolis (state of Rio de Janeiro) and 180 km SW of Araguaia (state of Espírito Santo),

Table 1. Localities and coordinates from this study and the literature review of *Tropidophis paucisquamis* (Serpentes, Tropidophiidae) occurrence in Brazil.

State	Municipality	Locality	Latitude	Longitude	Reference
Minas Gerais	Ervália	Parque Estadual Serra do Brigadeiro*	-20.8868	-42.5243	This study
Espírito Santo	Araguaia	-	-20.50	-40.78	Curcio *et al.* (2012)
Espírito Santo	Santa Teresa	-	-19.93	-40.60	Curcio *et al.* (2012)
Espírito Santo	Santa Teresa	Reserva Biológica Augusto Ruschi	-19.836	-40.540	Curcio *et al.* (2012)
Rio de Janeiro	Angra dos Reis	Floresta	-23.006	-44.318	Carvalho (1951)
Rio de Janeiro	Barra Mansa	Cotiara	-22.566	-44.200	Curcio *et al.* (2012)
Rio de Janeiro	Duque de Caxias	-	-22.78	-43.31	Salles & Silva-Soares (2010)

Table 1. *Continued on next page...*

Table 1. *...Continued*

State	Municipality	Locality	Latitude	Longitude	Reference
Rio de Janeiro	Teresópolis	Parque Nacional Serra dos Órgãos	-22.433	-42.983	Levandeira-Gonçalves *et al.* (2007)
Rio de Janeiro	Teresópolis	-	-22.41	-42.96	Curcio *et al.* (2012)
Rio de Janeiro	Teresópolis	Alto do Soberbo	-22.454	-42.989	Curcio *et al.* (2012)
Rio de Janeiro	Teresópolis	Represa Guinle	-22.454	-42.980	Curcio *et al.* (2012)
São Paulo	Apiaí	-	-24.50	-48.84	Curcio *et al.* (2012)
São Paulo	Barueri	-	-23.51	-46.88	Curcio *et al.* (2012)
São Paulo	Biritiba Mirim	-	-23.57	-46.03	Curcio *et al.* (2012)
São Paulo	Juquitiba	-	-23.93	-47.06	Curcio *et al.* (2012)
São Paulo	Salesópolis	Estação Biológica de Boracéia	-23.65	-45.9	Curcio *et al.* (2012)
São Paulo	Santo Amaro	Serra de Paranapiacaba	-23.710	-46.768	Amaral (1930)
São Paulo	Santo André	Estação Ferroviária Campo Grande	-23.759	-46.374	Curcio *et al.* (2012)
São Paulo	Santo Antônio do Pinhal	-	-22.82	-45.66	Curcio *et al.* (2012)
São Paulo	Santo Antônio do Pinhal	Estação Ferroviária Eugênio Lefévre	-22.825	-45.629	Curcio *et al.* (2012)
São Paulo	São Miguel Arcanjo	Parque Estadual Carlos Botelho	-23.878	-47.997	Forlani *et al.* (2010)
São Paulo	São Miguel Arcanjo	Parque Estadual Carlos Botelho	-24.063	-47.995	Forlani *et al.* (2010)
São Paulo	São Paulo	-	-23.56	-46.62	Curcio *et al.* (2012)
São Paulo	Tapiraí	-	-23.96	-47.50	Curcio *et al.* (2012)
São Paulo	Ubatuba	Projeto Dacnis Private Reserve	-23.4573	-45.1462	Tanaka *et al.* (2018)
Paraná	Campina Grande do Sul	Capivari River	-24.989	-48.593	Capela *et al.* (2017)

the closest known localities. In addition, the new record fills a distributional gap of *T. paucisquamis* in southeastern Brazil, and reinforces the hypothesis that the Serra da Mantiqueira may represent the western border of its geographic range (Curcio *et al.* 2012). Lastly, it reveals the presence of *T. paucisquamis* at a protected area in Minas Gerais, the Serra do Brigadeiro State Park, considered a priority area for the conservation of the herpetofauna of Minas Gerais (Drummond *et al.* 2005). The occurrence of *T. paucisquamis* at PESB increases the park's known reptile richness (Moura *et al.* 2012) to 41 species.

So far, we found records of this species in 26 localities and about 50 specimens are deposited in scientific collections (*e.g.*, Curcio *et al.* 2012, Capela *et al.* 2017, Tanaka *et al.* 2018). Although our understanding of the geographic distribution of *T. paucisquamis* has increased, it is pivotal that more studies are conducted in order to understand more about the biology and natural history of this rare species. Despite that the Atlantic Forest is the most studied Brazilian biome (Oliveira *et al.* 2016), with many scientific collections, it still lacks information to provide a better understanding of the patterns of diversity and distribution of many reptile species (Bérnils *et al.* 2009). This lack of data and herpetofaunistic inventories may be responsible for the previous distribution pattern observed for this snake, especially in the state of Minas Gerais when compared to the states of São Paulo and Rio de Janeiro, which have large and traditional reference centers in faunistic studies, such as the Instituto Butantan and the Museu Nacional, respectively. Another factor that must be considered is that the elevation can be a determining factor in the distribution of this species. As suggested by Moura *et al.* (2017), in the Atlantic forest, topographic complexity works as a climatic barrier that precludes the dispersion of the species.

In addition, the extinction risk of *T. paucisquamis* is currently unassessed globally (IUCN 2017), nationally (MMA 2014), and regionally (COPAM 2010), which is mostly associated with the rarity of this species, both in nature and scientific collections. Considering the current anthropogenic pressure in the Brazilian Atlantic Forest (Myers *et al.* 2000), *T. paucisquamis* is likely to be endangered. Thus, we hope that this study provides information that contributes to determine the current status risk of *T. paucisquamis*, its distribution and to design strategies for the conservation of the species.

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