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Artigos Originais (Original Articles)

Trilepida koppesi (Amaral, 1955) (Leptotyphlopidae): First Paraguayan record of the genus and species, with an illustrated key to Paraguayan blind-snakes (Scolecophidia)

Trilepida koppesi (Amaral, 1955) (Leptotyphlopidae): Primeiro registro do gênero e espécie no Paraguai, com uma chave ilustrada dos Scolecophidia conhecidas do Paraguai

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As a result of their fossorial habitats, little is known of the ecology of the blind-snakes (Infraorder Scolecophidia) and many species are known from very few specimens. Nonetheless, despite the relative homogeneity of their body form, the species diversity within the group is large, with thirty-nine genera in five families recognized. Indeed, genetic data suggests that, as currently understood, the Scolecophidia may even be paraphyletic (Miralles et al. 2018).

Three families of blind-snakes (Anomalepididae Taylor, 1939;

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Leptotyphlopidae Stejneger, 1892; and Typhlopidae Merrem, 1820) have been reported from Paraguay, containing six species in the genera *Liotyphlops* (2), *Rena* (1), *Epictia* (2) and *Amerotyphlops* (1) (Cacciali et al. 2016, Santos 2018). Most of these species are known from relatively few Paraguayan specimens. Species identification can be complex, but recent taxonomic revisions have been published for *Liotyphlops* (Santos 2018, Santos & Reis 2018), *Epictia* (Francisco et al. 2012, Koch et al. 2015, 2016) and *Amerotyphlops* (Graboski et al. 2018).

In this contribution we report a new country record of a blind-snake species in Paraguay and provide an illustrated key for distinguishing the species of Scolecophidia that are now known to occur in Paraguay.

MATERIAL AND METHODS

Specimens are housed at the Colección Zoológica Para La Tierra (CZPLT) located at Centro IDEAL, Pilar, Ñeembucú department, Paraguay. They were identified using the keys and literature cited in the introduction. Scale terminology adopted also follows these publications. Measurements were taken with dial calipers accurate to 0.1 mm and are those used by Adalsteinsson et al. (2009). All images are copyright of the authors.

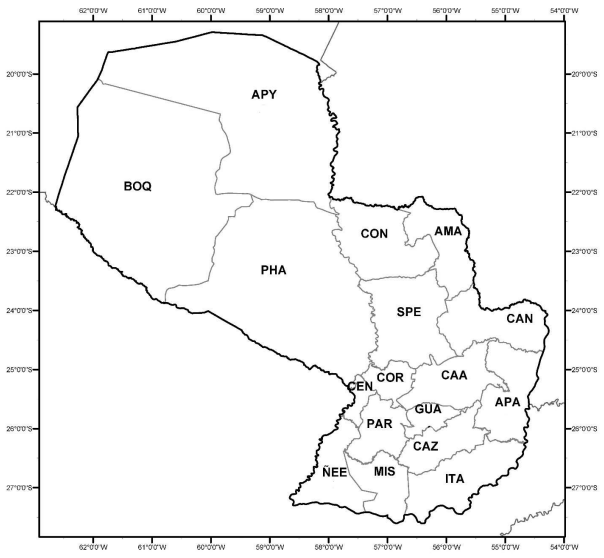

Figure 1. Map showing the political departments of Paraguay. Departments as follows: Chaco region – Alto Paraguay (APY), Boquerón (BOQ), Presidente Hayes (PHA); Oriental region – Amambay (AMA), Alto Paraná (APA), Caaguazú (CAA), Canindeyú (CAN), Caazapá (CAZ), Central (CEN), Concepción (CON), Cordillera (COR), Guairá (GUA), Itapúa (ITA), Misiones (MIS), Ñeembucú (ÑEE), Paraguarí (PAR), San Pedro (SPE).

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RESULTS

Records of *Trilepida koppesi* (Amaral, 1955)

Two specimens were collected in sandy soil Cerrado at Rancho Laguna Blanca, San Pedro department, Paraguay (23º 46' 52.6" S, 56º 17' 28.9" W). A specimen (cited as *Leptotyphlops* sp.) had been previously found dead at this locality on 15 November 2005, but was not collected (Smith 2006).

Specimen CZPLT 691: Collected 25 January 2014 by Jean-Paul Brouard. Pitfall trap. Total Length 231 mm; SVL 215.5 mm; Tail 15.5 mm (damaged); Body shape index (total length/width) 33; Relative tail length 6.7%; Tail shape index (tail length/width) 3.1; Mid-dorsal line 186; Mid-ventral line 187; Subcaudals 13; Supralabials 3; Infralabials 4; Midbody scale ring 15; Midtail scale ring 10. This specimen shows asymmetry in the supralabial scales between the left (1+1) and right (2+1) side.

Specimen CZPLT 1120: Collected 18 November 2016 by Catherine Lee-Zuck. Pitfall trap. Total Length 199; SVL 184 mm; Tail 15 mm; Body shape index (total length/width) 33.2; Relative tail length 7.5%; Tail shape index (tail length/width) 3.3; Mid-dorsal line 188; Mid-ventral line 186; Subcaudals 13; Supralabials 3; Infralabials 4; Midbody scale ring 14; Midtail scale ring 10.

Specimens were confirmed to belong to the genus *Trilepida* because of the lack of longitudinal stripes and large anterior supralabial (eliminating *Epictia*), the yellow colouration absent on the rostral region and tip of the tail (eliminating *Habrophallos*), mid-dorsal counts below 253 (eliminating the Hispaniolan endemic *Mitophis*), the presence of a truncate snout in lateral view, narrow rostral base and an enlarged caudal spine (eliminating *Siagonodon*), the absence of four supralabials and two pale dorsolateral stripes (eliminating *Tetracheilostoma*), low mid-dorsal counts and brownish venter (eliminating *Rena*) (Adalsteinsson et al. 2009. Francisco et al. 2012, Martins et al. 2019). In addition, characters consistent with *Trilepida* (*Tricheilostoma* sensu Adalsteinsson et al. 2009) were 14 mid-body scale rows, 10 mid-tail scales, mid-dorsal scale rows in the range 152-253, subcaudals in the range 10-23, 2+1 supralabials, moderate anterior supralabial (consistent with Fig. 2C in Adalsteinsson et al. 2009), total length 138–400 mm, body shape index (total length/width) 32–68, relative tail length 3.4–10.7 %, tail shape index 2.0–4.4, unstriped brown dorsum with pale venter and small supraocular scale. Species identification was reached using the key in Pinto & Fernandes (2017), how-

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ever we note that the specimens reported here had a near uniform pale brownish-white venter, and the ventral scales did not have “the center darker than their edges”.

Key for the identification of Paraguayan blind-snakes

The known departmental distributions of each species in Paraguay are given following Cacciali et al. (2016), Hicks et al. (in press) (Fig. 7).

1 Uniformly pinkish colouration. Rostral scale pointed, giving the impression of a "beak" when viewed laterally (Boquerón) (Fig. 2) .....*Rena unguirostris* (Boulenger, 1902)
- Colouration brownish, greyish or blackish, or with longitudinal lines. Snout with rounded or truncate profile when viewed laterally .....… 2

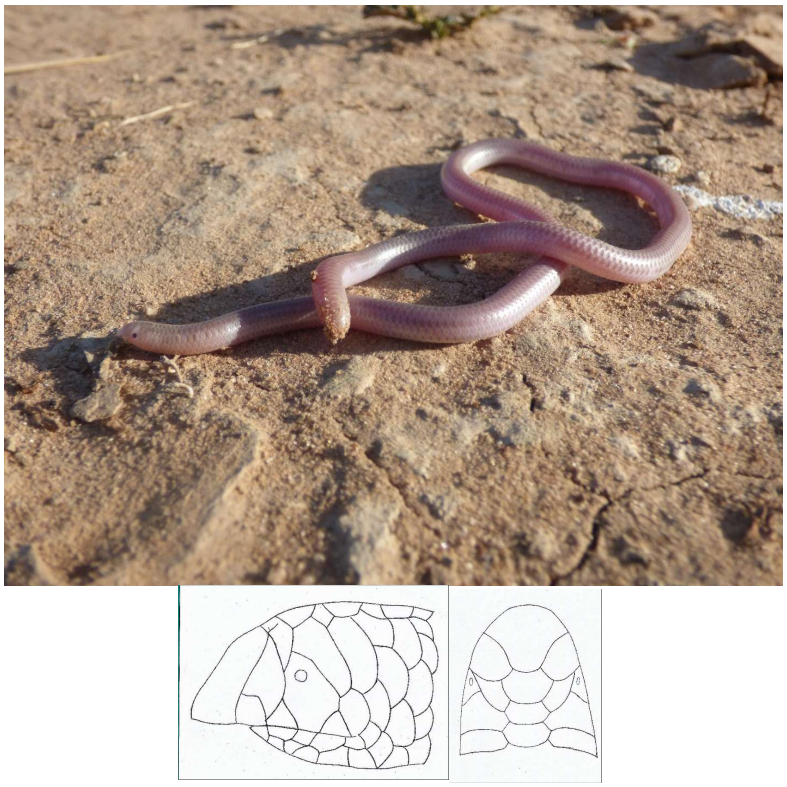

Figure 2. *Rena unguirostris*. Fortín Toledo, Boquerón department. Lateral and dorsal images of cephalic scale patternation. (Photo and scale drawing: Paul Smith)

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2 Rostral scale enlarged when viewed dorsally, bordered on each side by up to three lateral scales and posteriorly by one long frontal scale that is at least twice as wide as it is long. Coloration generally uniformly dark (brownish or blackish) on the dorsum and ventrum, often with a pinkish or pale brown snout

2a Mid-body scale rows 20. Dorsal scales less than 463 (384 to 455) (Alto Paraná) .....*Liotyphlops beui* (Amaral, 1924)

2b Mid-body scale rows 22. Dorsal scales more than 463 (463 to 510) (Amambay, Cordillera, Itapúa, San Pedro) (Fig. 3) .....*Liotyphlops ternetzii* (Boulenger, 1896)

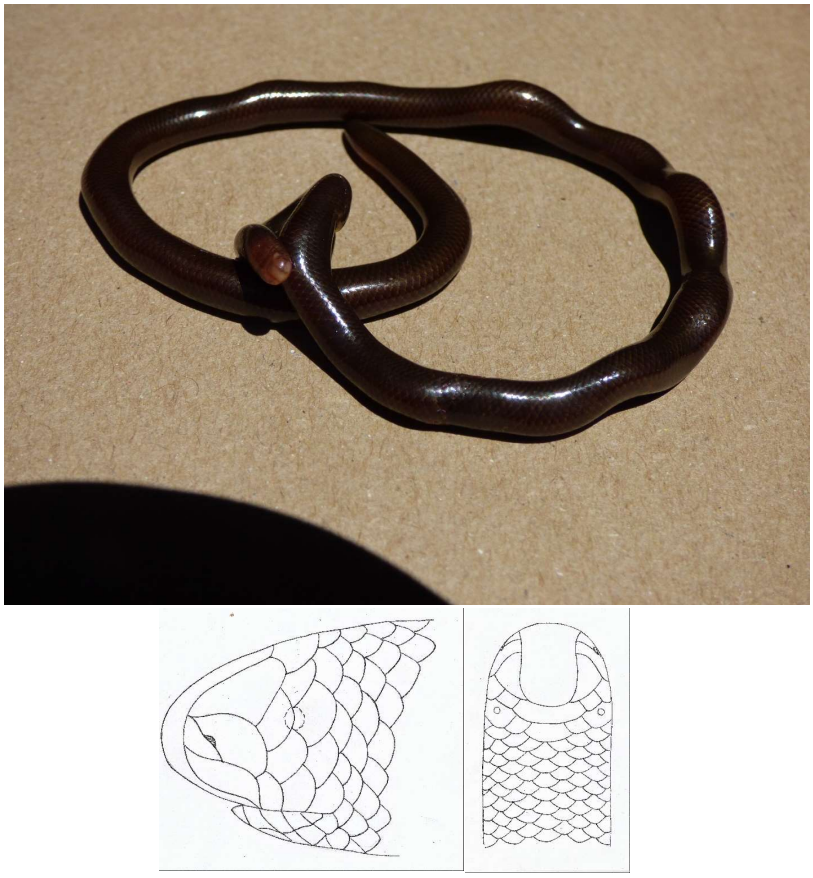

Figure 3. *Liotyphlops ternetzii.* Encarnación, Itapúa department. Lateral and dorsal images of cephalic scale patternation. (Photo and scale drawing: Paul Smith)

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- When viewed dorsally the rostral scale is bordered laterally by only one large scale on each side, and posteriorly by a single small frontal scale that is approximately as wide as it is long. Patterned either with conspicuous dark longitudinal lines, or with a pale ventrum constrasting with a darker dorsum 3
3 Body with long, conspicuous dark longitudinal lines. Head and (usually) the tail tip of a different colour to the rest of the body. In dorsal view the three scales in contact posteriorly with the frontal are of unequal size. Nasal and prefrontal not fused in lateral view. Spine on tail tip yellow. Body form is long, thin and cylindrical, and even when total length is great the snake appears to be slender and delicate ... *Epictia* (Gray, 1845) 4
- Body lacking longitudinal lines. Head not of a noticeably different colour to the rest of the body. In dorsal view the three scales in contact posteriorly with the frontal are of approximately equal size. Spine on tail tip may or may not be yellow. Body form not particularly long, thin, slender or delicate 5
4 Pale ground colour and darker longitudinal lines, made up of rectangular blotches (as defined by Francisco et al. 2012). Usually no white tip to the snout. No black caudal ring. 16 or less subcaudal scale rows, 10 mid-tail scales on dorsal side. Between 224 and 255 scale rows along the

Figure 4. *Epictia vellardi.* Aguadulce, Alto Paraguay department. (Photo: Paul Smith)

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body (Alto Paraguay, Boquerón, Central, Concepción, Presidente Hayes) (Fig. 4) ..... *Epictia vellardi* (Laurent, 1984)
- Dark ground colour and moderate dorsoventral contrast. Deeply pigmented longitudinal stripes made up of triangular blotches. Snout often with white or pale tip. Usually with black caudal ring. 19 or more subcaudal scale rows, 12 mid-tail scales on dorsal side. Between 246 and 285 mid-dorsal scale rows along the body (Central, Misiones, San Pedro) (Fig. 5)…..... *Epictia albipuncta* (Burmeister, 1861)

Figure 5. *Epictia albipuncta.* San Ignacio Guazú, Misiones department. Lateral and dorsal images of cephalic scale patternation. (Photo and scale drawing: Paul Smith)

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5 Rostral and nasal scales not conspicuously pale-edged, and not appearing like lines on the snout in dorsal view. One nasal scale visible between rostral and ocular scales in dorsal view. Three supralabials. Ocular scale in contact with mouth. Body not obviously dorso-ventrally flattened (San Pedro) (Fig. 6) ..... *Trilepida koppesi* (Amaral, 1955)
- Rostral and nasal scales conspicuously pale-edged, appearing like lines on the snout in dorsal view. Two nasal scales visible between rostral and ocular scales in dorsal view. Two supralabials. Ocular scale not in contact with mouth. Fairly large and robust, with slight dorso-ventral flattening (Recorded from all departments except Alto Paraná, Caaguazú and Caazapá to date) (Fig. 7) … *Amerotyphlops brongersmianus* (Vanzolini, 1976)

Figure 6. *Trilepida koppesi.* Rancho Laguna Blanca, San Pedro department. Lateral and dorsal images of cephalic scale patternation. (Photo: Jean-Paul Brouard; Scale drawing: Paul Smith)

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Figure 7. *Amerotyphlops brongersmianus.* Rancho Laguna Blanca, San Pedro department. Lateral and dorsal images of cephalic scale patternation. (Photo: Jean-Paul Brouard; Scale drawing: Paul Smith)

DISCUSSION

We report the presence of a fifth genus of blind-snake in the Paraguayan herpetofauna, *Trilepida* Hedges, 2011. The number of Scolecophidians known to be present in Paraguay is now seven. However, we note that there is a proposal to synonymise *Liotyphlops beui* (Amaral, 1924) with *L. ternetzii* (Boulenger, 1896) by Santos (2018a), *Trilepida koppesi* is distributed widely in the Cerrado zone of Brazil (southwestern Goiás, central and eastern Mato Grosso do Sul and east to São Paulo) (Passos et al. 2006, Nogueira et al. 2019), and this report extends its distribution to the Cerrado of Paraguay. The Paraguayan locality is approximately 413 km south of the closest record of the species, the type locality "Terenos, Mato Grosso do Sul" (IBSP 8883 holotype). This is the first report of the species from outside of Brazil.

Claudio et al. (2017) report the predation of *Trilepida* sp. by Burrowing Owls *Athene cunicularia* (Molina, 1782) from São Paulo state in Brazil, which potentially refers to this species. We note that this phenomenon has also been reported briefly for Paraguay by Smith (2006) as *Leptotyphlops* sp. from the locality at which these specimens are here reported, and in reference to this species.

Passos et al. (2006) describe a stippling of pigmentation on the ventral scales as a useful character for distinguishing the species from *T. fuliginosa*. We caution that though this is faintly present in the two Paraguayan specimens when viewed under a microscope, it is visible with the naked eye only on the subcaudals. We suggest that this may be a variable and subjective character for diagnosis.

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The authors declares no conflict of interest.

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