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New records of *Aparasphenodon bokermanni* (Pombal, 1993) from Santa Catarina, southern Brazil, and extension of genus range (Anura: Hylidae)

Larissa Zanette-Silva[1, 3], **Douglas Lemos Farias**[1] & **Ivo Rohling Ghizoni-Jr**[2]

[1] Universidade Federal de Santa Catarina, Centro de Ciências Biológicas, Departamento de Ecologia e Zoologia, Laboratório de Ecologia de Anfíbios e Répteis. Campus Universitário, s/n, Sala 219B, Bloco B, 2°andar. Bairro Córrego Grande. CEP 88040-900. Florianópolis, SC, Brazil
[2] Caipora Cooperativa, Avenida Desembargador Vitor Lima, 260, Sala 513. Bairro Carvoeira. CEP 88040-400. Florianópolis, SC, Brazil
[3] Corresponding author. E-mail: larissa_zanette@hotmail.com

Abstract: *Aparasphenodon bokermanni* is a poorly known casque-headed tree frog found in São Paulo and Santa Catarina, southern Brazil. Here we provide two new records, one from Joinville, northeastern Santa Catarina, and the first record from Santa Catarina Island, Brazil, which extends to the south the range of the genus by approximately 150 km.

Key words: Amphibia; casque-headed tree frog; Joinville; Florianópolis; restinga

The genus *Aparasphenodon* was described in 1920 with *A. brunoi* as its type species (Miranda-Ribeiro 1920). This genus is characterized by having strongly co-ossified skin and skull, head longer than broad, snout narrow and acuminate in dorsal view, canthal ridges distinct and concave anteriorly, bone configuration of dermal covering surface consisting of a reticulated web of low-relief grooves and prominent patterns of radial ridges, prenasal bones, and single, median, subgular vocal sac, among other traits (Trueb 1970). Faivovich et al. (2005) mentioned that a possible morphological synapomorphy is the presence of the prenasal bone, but this character seems to be insufficient to support the genus (Pimenta et al. 2005; Assis et al. 2013).

This genus is composed of five species with disjunct distributions. *Aparasphenodon venezolanus* (Mertens, 1950) occurs in the Amazon Forest of northern Brazil, southwestern Venezuela and eastern Colombia, while the other species are distributed in the Atlantic Forest, eastern Brazil (Mollo Neto & Teixeira Jr. 2012; Assis et al. 2013). *Aparasphenodon arapapa* (Pimenta, Napoli & Haddad, 2009) is found in eastern Bahia, *A. pomba* (Assis, Santana, Silva, Quintela & Feio, 2013) in Minas Gerais, *A. brunoi* (Miranda-Ribeiro, 1920) occurs from Bahia to São Paulo, and *A. bokermanni* (Pombal, 1993) has only few populations in São Paulo (SP) and one site in northeastern Santa Catarina (SC). This work presents two new locality records for *Aparasphenodon bokermanni* from Santa Catarina, expanding its known distribution.

On 3 November 2013, March, June and August 2014, during opportunistic searches in Florianópolis, Santa Catarina Island, SC, at least 11 specimens of *Aparasphenodon bokermanni* were found in fragments of restinga habitat (27.680159° S, 048.521533° W, 7 m above sea level [a.s.l.]; Figure 1). These individuals were found in different habitats at the edges of the fragments cut by a highway, from tree roots to branches up to 1.80 m (Figures 2A–D). Males were heard emitting nocturnal and diurnal calls, although we did not find pairs in amplexus, tadpoles or eggs.

On 24 October 2016, in a survey at Morro do Meio, Joinville, SC, a single specimen of *A. bokermanni* was found during the day (26.318889° S, 048.913611° W, 20 m a.s.l.). The area is composed of swamp forest with few bromeliads (Figures 2F–G). On the next day, more searches were conducted but no specimens were found. Ten specimens of *A. bokermanni*, one from Joinville and nine from Santa Catarina Island, including juveniles, adult males (SVL 47.8–57.3 mm, n = 2) and adult females (SVL 52.1–63.8 mm, n = 3) were collected and deposited in the Herpetological Collection of the Departamento de Ecologia e Zoologia, Universidade Federal de Santa Catarina (CHUFSC 3041–43, 3292–93, 3295–96, 3298, 3351, 3425). Collection permits were provided by Fundação do Meio Ambiente (license #057/2013) and Instituto Brasileiro do Meio Ambiente e Recursos Renováveis (license #449/2014).

Specimens found in this study have the same features described by Pombal (1993) for *A. bokermanni*, which include prominent canthus rostralis with straight ridge; head longer than broad; snout long, slightly rounded in dorsal view and truncate in lateral view; nostrils directed laterally; eye large; tympanum large, nearly circular; supratympanic fold distinct; toe disks large, nearly elliptical and slightly smaller than finger disks, and other characters.

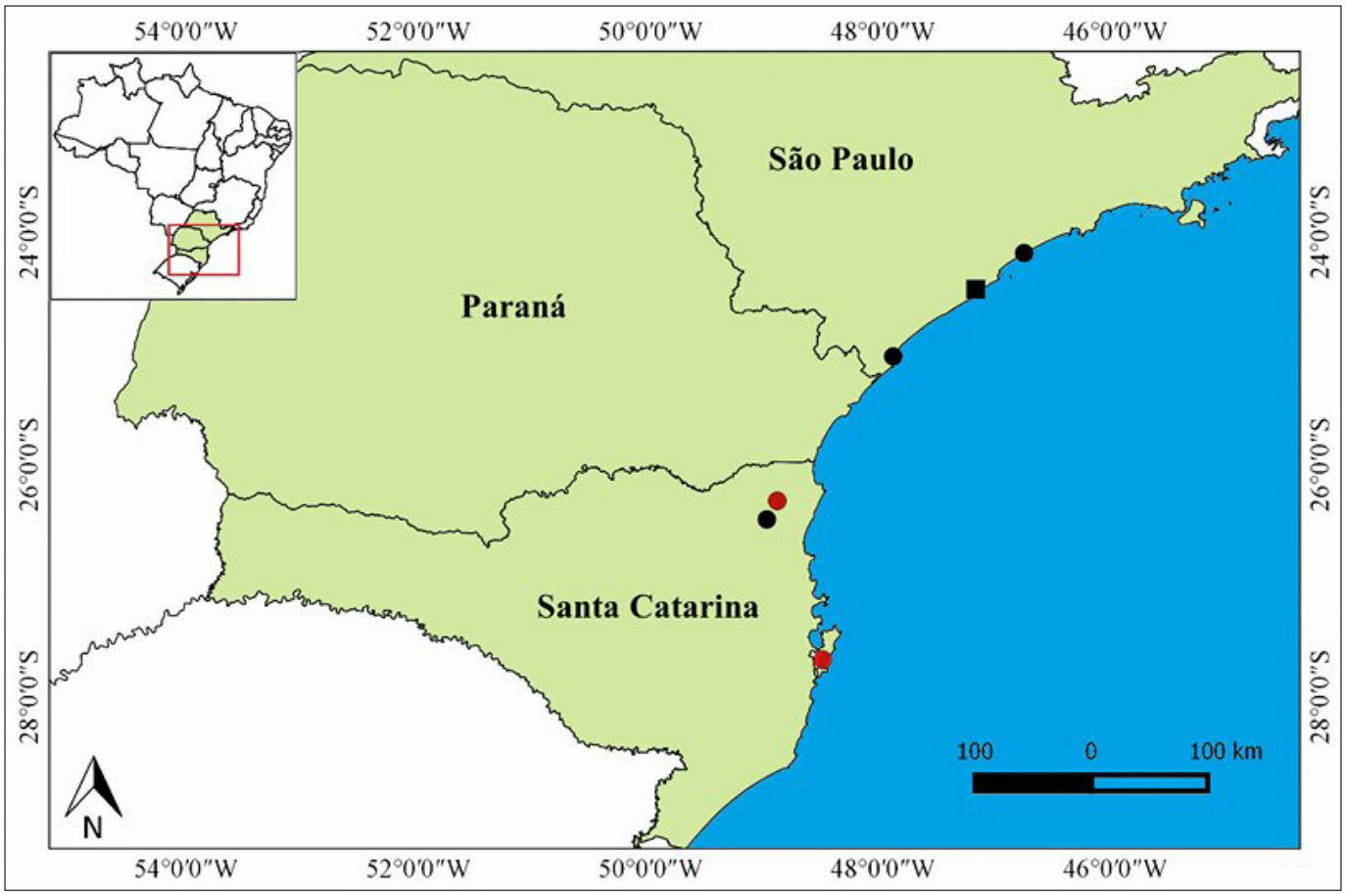

Figure 1. Geographic distribution of *Aparasphenodon bokermanni.* Red circles: new records for Santa Catarina, Brazil; Black circles: literature records (Mollo Neto & Teixeira Jr. 2012). Black square: type locality.

They also have a dark brown dorsum, head blackish brown, arms and legs brown, discs dark brown, and flanks with cream spots.

Aparasphenodon bokermanni has not been found in sympatry with other congeners (Mollo Neto & Teixeira Jr 2012). However, it may be distinguished from other *Aparasphenodon* species by the canthus rostralis (concave in *A. brunoi* and *A. venezolanus*, slightly elevated and almost straight in *A. pomba*, and rounded, poorly elevated, without straight sharp ridges in *A. arapapa*) and by general colour pattern (dorsum marbled with irregular dark brown markings, and arms and legs with transversal dark brown stripes or irregular dark brown markings in *A. brunoi* and *A. venezolanus*, dorsal and lateral surfaces immaculate and light brown in *A. arapapa* and dorsum and limbs with cream-colored reticulation on a dark brown background in *A. pomba*) (Pombal 1993; Pimenta et al. 2009; Assis et al. 2013).

This is the second and third record of *Aparasphenodon bokermanni* for the state of Santa Catarina, although we provide the first record of this species from an island in SC. Furthermore, it constitutes a new southernmost record from Guaramirim, SC (Woehl & Woehl 2003), increasing the species' range by about 150 km. This new record also extends the distribution of the genus.

In Santa Catarina Island, the specimens were found during all months monitored, although males were observed vocalizing only in August and November. The area where *A. bokermanni* was found is composed of arboreal restinga with high density of large bromeliads, as noted by Pombal & Gordo (2004) in Iguapé and Vilela et al. (2012) in Ilha do Cardoso. The record from Joinville, about 14 km from Guaramirim, confirms that the species is naturally rare in the region, because our large sampling effort found only one specimen and no previous records existed.

Table 1. Locality records for *Aparasphenodon bokermanni*.

Locality	Country/State	Coordinates	Source
Itanhaém, Cidade Santa Júlia	Brazil, São Paulo	24.183075° S, 046.789375° W	Mollo Neto & Teixeira Jr. 2012
Iguapé, F. F. Juréia-Itatins	Brazil, São Paulo	24.493252° S, 047.206050° W	Pombal 1993
Cananeia, P. E. Ilha do Cardoso	Brazil, São Paulo	25.072252° S, 047.915705° W	Pimenta et al. 2009
Joinville	Brazil, Santa Catarina	26.318889° S, 048.913611° W	This study
Guaramirim	Brazil, Santa Catarina	26.473511° S, 049.003391° W	Woehl & Woehl 2003
Florianópolis, Santa Catarina Island	Brazil, Santa Catarina	27.680159° S, 048.521533° W	This study

Figure 2. Collected specimens of *A. bokermanni* from Santa Catarina. **A.** Juvenile (CHUFSC 3041, SVL 35.1 mm). **B–C.** Adult females (CHUFSC 3043, SVL 58.9 mm; CHUFSC 3298, SVL 52.1 mm, specimen found without an arm). **D.** Edge of the restinga fragment with high density of large bromeliads. **E.** Male from Joinville (CHUFSC 3425, SVL 55.05 mm). **F.** Fragment of swamp forest.

Furthermore, the individual was found in swamp forest, which may imply that the species can occur in other areas beyond restinga fragments.

Aparasphenodon bokermanni is a rare species and its populations have low density (e.g., Pombal 1993; Vilela 2011). So, new insights about the species distribution and ecology are of great importance since its biology and conservation status is poorly known.

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