

A review of the geographical distribution of *Sphaenorhynchus prasinus* Bokermann, 1973 (Anura: Hylidae) in the state of Alagoas, northeastern Brazil

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RESUMO: (Revisão da distribuição geográfica de *Sphaenorhynchus prasinus* Bokermann, 1973 (Anura: Hylidae) no Estado de Alagoas, nordeste do Brasil) *Sphaenorhynchus prasinus* é um anuro neotropical arborícola caracterizado por apresentar uma linha negra na região cantal, pregas dérmicas nos antebraços, cotovelos e tarsos, apêndices calcâneos arredondados e região subcloacal com uma aba dérmica branca e margens laterais circulares. Sua distribuição geográfica abrange o sudeste e nordeste do Brasil. No presente trabalho, nós corrigimos informações prévias sobre o registro de *S. prasinus* e estabelecemos a ocorrência da espécie para o Estado de Alagoas, nordeste do Brasil, a partir de novos achados.

Palavras-chave: rã verde de Bokermann, Floresta Atlântica, novos registros.

ABSTRACT: (A review of the geographical distribution of *Sphaenorhynchus prasinus* Bokermann, 1973 (Anura: Hylidae) in the state of Alagoas, northeastern Brazil) *Sphaenorhynchus prasinus* is a neotropical small greenish treefrog characterized by a canthal black line, dermal folds on forearms and tarsi, dermal fold on elbow and round calcar appendage, and a white dermal flap with round lateral margins on the subcloacal region. Its geographic distribution

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comprises southeastern and northeastern of Brazil. In this note, we rectify the previous records of *S. prasinus* and reestablish the occurrence of the species for the state of Alagoas, northeastern Brazil based on new findings.

Key words: Bokermann's Lime Treefrog, Atlantic Forest, new records.

The hylid frog genus *Sphaenorhynchus* Tschudi, 1838 includes 15 small greenish treefrogs (Frost, 2016) that generally inhabit ponds in open areas and forest edges, where males vocalize while perched on the floating vegetation or partially submerged in the water (e.g. Lutz & Lutz, 1938; Bokermann, 1973; Cruz & Peixoto, 1980).

Most species of *Sphaenorhynchus* occur in the Brazilian Atlantic Forest, from the northern portion of the state of Rio Grande do Sul to the state of Pernambuco [*S. botocudo* Caramaschi, Almeida & Gasparini, 2009, *S. bromelicola* Bokermann, 1966, *S. canga* Araujo-Vieira, Lacerda, Pezzuti, Leite, Assis & Cruz, 2015, *S. caramaschii* Toledo, Garcia, Lingnau & Haddad, 2007, *S. mirim* Caramaschi, Almeida & Gasparini, 2009, *S. orophilus* (Lutz & Lutz, 1938), *S. palustris* Bokermann, 1966, *S. pauloalvini* Bokermann, 1973, *S. planicola* (Lutz & Lutz, 1938), *S. prasinus* Bokermann, 1973, and *S. surdus* (Cochran, 1953)].

According to Bokermann (1973), *Sphaenorhynchus prasinus* is characterized by its medium size (snout-vent length 23.0–31.0 mm in males, $n = 20$ in this study); snout truncate in lateral view (*sensu* Duellman, 1970; see also Bokermann, 1973: figure 2); canthal black line extending from the tip of snout to the anterior corner of eye; dorsolateral white line from the posterior corner of eye to sacral region absent; tympanic membrane absent (concealed tympanum *sensu* Wever, 1985); dark pigmented nuptial pad; less developed vocal sac, reaching the anterior pectoral region, without longitudinal lateral folds; well developed and smooth dermal fold on the ventrolateral surface of forearms and tarsi; dermal fold on elbow and round calcar appendage; and white dermal flap with round lateral margins on the subcloacal region.

The species occurs in Brazil from the southeastern part of the state of Minas Gerais (Feio *et al.*, 1998; 1999; Feio & Caramaschi, 2002) through the coastal regions of the states of Espírito Santo, Bahia and Pernambuco (Bokermann, 1973; Silvano & Pimenta, 2003; Juncá, 2006; Pimenta & Carvalho-e-Silva, 2004; Caramaschi *et al.*, 2009; Santos & Moura, 2009; Silva *et al.*, 2013). It was also recorded for the state of Alagoas, northeastern Brazil (Figure 1; Table 1), in the municipalities of Quebrangulo (Da Silva *et al.*, 2013, Araujo-Vieira *et al.*, 2015), Rio Largo (Araujo-Vieira *et al.*, 2015), and Coruripe (Almeida *et al.*, 2016). However, there are some problems concerning the species identification for this state that deserve some considerations. In

this note, we rectify the previous records of *Sphaenorhynchus prasinus* and reestablish the occurrence of the species for the state of Alagoas based on new findings.

During a fieldwork from 17–18 June 2014 at Pedra Talhada Biological Reserve, municipality of Quebrangulo, state of Alagoas, we discovered two allopatric species of *Sphaenorhynchus*: *S. aff. palustris* and *S. prasinus*. Voucher specimens were collected under permit ICMBio number 34734-1 and deposited in the Herpetological Collection of the Universidade Regional do Cariri, Ceará, Brazil (URCA-H).

Sphaenorhynchus aff. palustris (URCA-H 6319; male, SVL 27.2 mm; Figure 2A–C) has been found in a high altitude area about 850 m a.s.l. (09°14'22.38"S, 036°25'43.65"W, DATUM WGS84), whereas *S. prasinus* (URCA-H 9295; male, SVL 25.2 mm; Figures 2D–F and 3A–B) occurs in an open disturbed area of medium altitude (09°16'10.7"S, 036°26'39.0"W, DATUM WGS84; 500 m a.s.l). The latter voucher specimen was previously included in the list of examined specimens of Araujo-Vieira *et al.* (2015).

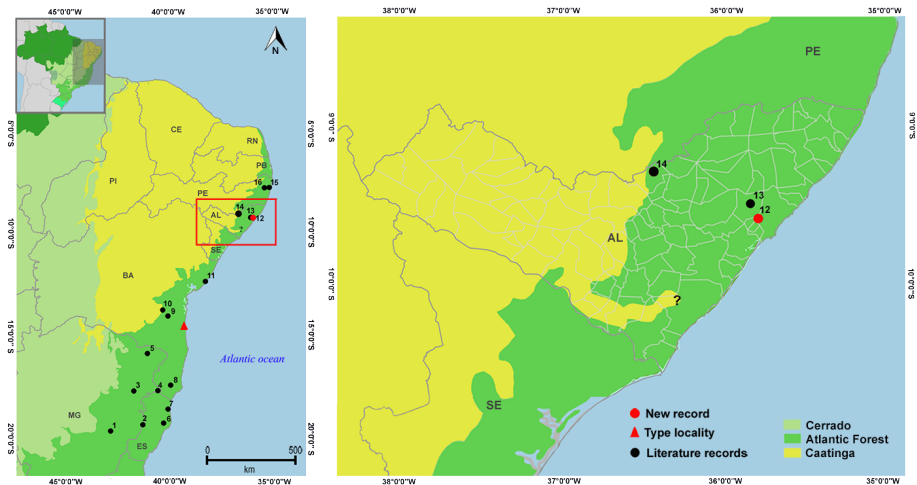


Figure 1. Geographic distribution map of *Sphaenorhynchus prasinus*. Type locality (red triangle): Centro de Pesquisas do Cacau, Ilhéus, BA, Brazil. New record (red circle) for the Alagoas State: (13) Environmental Protection Area of Catolé e Fernão Velho, Maceió (9°33'29.71"S, 035°48'6.62"W). Question mark (?): Coruripe (10°03'36.5"S, 036°17'23.7"W). Literature records (black circles). See Table 1 for additional localities names, numbers and references.

Table 1. Localities in the Brazilian states with records of *Sphaenorhynchus prasinus*. See Figure 1 for distribution map. AL = Alagoas, BA = Bahia, ES = Espírito Santo, MG = Minas Gerais, and PE = Pernambuco. Voucher specimens were examined for almost all localities in this note, except numbers 7, 10 and 16 (see Appendix).

Number	Locality	Latitude	Longitude	Reference
1	MG: Marliéria: Rio Doce State Park	19°48'S	042°38'W	Feio <i>et al.</i> , 1999
2	MG: Aimorés*	19°29'47.51"S	041° 4'16.93"W	Araujo-Vieira <i>et al.</i> , 2015
3	MG: Teófilo Otoni*	17°51'47.56"S	041°30'32.41"W	Caramaschi <i>et al.</i> , 2009; Araujo-Vieira <i>et al.</i> , 2015
4	MG: Nanuque*	17°50'39.43"S	040°20'33.27"W	Caramaschi <i>et al.</i> , 2009; Araujo-Vieira <i>et al.</i> , 2015
5	MG: Almenara, Fazenda Limoeiro	16°03'S	040°51'W	Feio & Caramaschi, 2002
6	ES: Linhares*	19°24'55.42"S	040° 3'52.02"W	Caramaschi <i>et al.</i> , 2009; Araujo-Vieira <i>et al.</i> , 2015
7	ES: São Mateus*	18°44'20.88"S	039°50'58.95"W	Toledo <i>et al.</i> , 2007
8	BA: Teixeira de Freitas, Fazenda Alcopadro	17°34'48.11"S	039°43'23.33"W	Silvano & Pimenta, 2003
9	BA: Itagibá, Fazenda Pedra Branca*	14°14'14.37"S	039°51'21.15"W	Caramaschi <i>et al.</i> , 2009; Araujo-Vieira <i>et al.</i> , 2015
10	BA: Serra do Brejo Novo farm	13°56'41"S	040°06'33.9"W	Santos <i>et al.</i> , 2013
11	BA: Mata de São João, Reserva Sapiranga	12°33'22.69"S	038° 2'29.61"W	Juncá, 2006
12	AL: Maceió: Environmental Protection Area of Catolé e Fênão Velho, Maceió	09°33'29.71"S	035°48'6.62"W	This study
13	Rio largo**	09°29'26.59"S	035°50'0.64"W	Araujo-Vieira <i>et al.</i> , 2015.
14	AL: Quebrangulo: Pedra Talhada Biological Reserve**	09°16'10.7"S	036°26'39.0"W	Araujo-Vieira <i>et al.</i> , 2015
15	PE: Recife, Dois Irmãos*	08°0'58.24"S	034°56'42.90"W	Araujo-Vieira <i>et al.</i> , 2015
16	PE: São Lourenço da Mata: Estação Ecológica do Tapacurá	08°01'59"S	035°10'59"W	Santos & Moura, 2009

*Geographic coordinates obtained using Google Earth © Google Inc. **Geographic coordinates provided in this note.

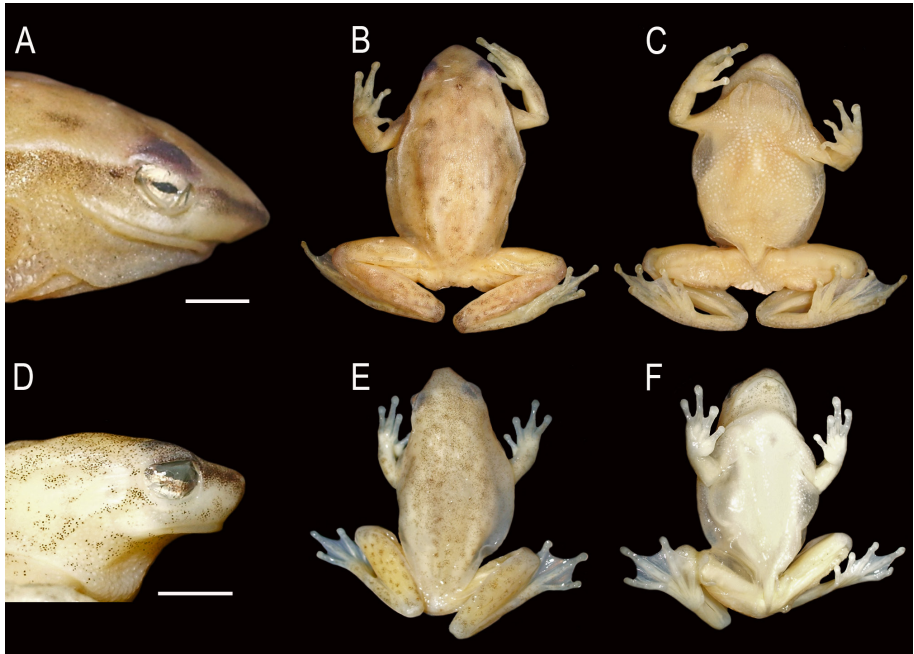


Figure 2. (A) Head in lateral view, and (B) body in dorsal and (C) ventral views of *Sphaenorhynchus* aff. *palustris*, adult male, URCA-H 6319, SVL 27.2 mm. (D) Head in lateral view, and (E) body in dorsal and (F) ventral views of *S. prasinus*, adult male, URCA-H 9295, SVL 25.2 mm. Both specimens from Pedra Talhada Biological Reserve, Quebrangulo, Alagoas, Brazil. Scale bars = 3 mm.

During a recent fieldwork on 8 January 2016 at the Environmental Protection Area of Catolé e Fernão Velho (9°33'29.71"S, 035°48'6.62"W, DATUM WGS84; 112 m a.s.l.), a remnant of Atlantic Rain Forest situated in the municipality of Maceió, also in the state of Alagoas, one adult male specimen of *Sphaenorhynchus prasinus* was found inside the forest, perched on a bush at 60 cm from the ground. The area is occupied by temporary pond during the rainy season, but was dry at the time and there were no other water bodies nearby. This is the first record of *S. prasinus* for Maceió. The voucher specimen was collected under permit ICMBio number 7345-1 and deposited in the Herpetological Collection of the Museu de História Natural da Universidade Federal de Alagoas, Brazil (MUFAL 12247, SVL 23.4 mm; Figures 3C and 4A–C).

There are specimens of *Sphaenorhynchus prasinus* collected in the municipality of Rio Largo, state of Alagoas (09°28'00"S, 035°51'00"W,



Figure 3. Adult males of *Sphaenorhynchus prasinus* in life from Alagoas, Brazil. (A) and (B) URCA-H 9295, Pedra Talhada Biological Reserve, Quebrangulo. (C) MUFAL 12247, Environmental Protection Area of Catolé e Fernão Velho, Maceió.

DATUM WGS84; about 50 km from Maceió, 76 m a.s.l.), MNRJ 38680–38683 (males, combined SVL 25.2–27.8 mm; Figure 4D–F), collected on 2 February 2005 in a pond of approximately 8.75 ha by H. Wogel and R. Fernandes. These specimens were also previously included in the list of examined specimens of Araujo-Vieira *et al.* (2015).

All specimens of *Sphaenorhynchus prasinus* were identified based on morphological features of adults obtained from preserved specimens (see Appendix) complemented with the description of Bokermann (1973).

Our study of the specimen (ZUF RJ 14090) from the Pedra Talhada Biological Reserve (09°14'S, 036°25'W, approximately 850 m a.s.l.) and reported as the first record of *Sphaenorhynchus prasinus* for the state of Alagoas by Da Silva *et al.* (2013) indicates that the specimen is not a *S. prasinus*. Actually, this individual is identical to the specimen herein identified as *S. aff. palustris* (Figure 2A–C; see also Da Silva *et al.*, 2013: figure 1). It can be differentiated from *S. prasinus* by having a snout protruding in dorsal view (truncate in lateral view in *S. prasinus*), dorsolateral black line from the tip of snout extending beyond the eye to gradually disappearing up to the flanks (only a canthal black line extending from the tip of snout to the anterior corner of eye in *S. prasinus*), dorsolateral white line from the posterior corner of eye to sacral region (absent in *S. prasinus*), more developed vocal sac, extending to the middle of pectoral region, with longitudinal lateral folds (less developed vocal sac, reaching the anterior pectoral region, without longitudinal lateral folds in *S. prasinus*), dermal fold slightly crenulated or small tubercles on the ventrolateral surface of forearms and tarsi (well developed and smooth dermal fold on the ventrolateral surface of forearms and tarsi in *S. prasinus*), dermal appendages on elbow and heel absent (dermal fold on elbow and round calcar appendage present in *S. prasinus*), and a white glandular subcloacal dermal fold (white dermal flap with round lateral margins on the subcloacal region in *S. prasinus*).

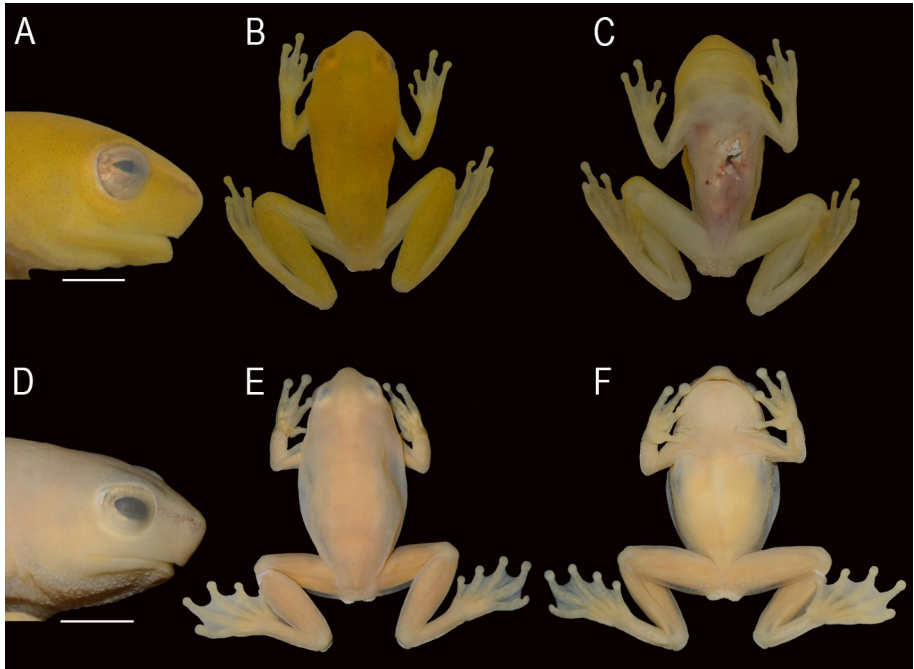


Figure 4. Adult males of *Sphaenorhynchus prasinus* from Alagoas, Brazil. (A) Head in lateral view, and (B) body in dorsal and (C) ventral views of MUFAL 12247, SVL 23.4 mm, Environmental Protection Area of Catolé e Fernão Velho, Maceió. (D) Head in lateral view, and (E) body in dorsal and (F) ventral views of MNRJ 38683, SVL 27.8 mm, Rio Largo. Scale bars = 3 mm.

On the other hand, the presence of this species for the municipality of Coruripe reported by Almeida *et al.* (2016) remains uncertain, since the diagnosis was based on a single photography (Almeida *et al.*, 2016: figure 3) and the voucher specimen (MUFAL 3805) has been lost (Nascimento, F.A. obs. pers.). Although, it is possible that this specimen is a *Sphaenorhynchus prasinus*, we prefer to be conservative and consider this record as dubious.

Therefore, we rectify the record of *Sphaenorhynchus prasinus* of Pedra Talhada Biological Reserve for a new locality (09°16'10.7" S, 036°26'39.0" W, DATUM WGS84; 500 m a.s.l.) distant about 5 km SW from the locality previously reported by Da Silva *et al.* (2013), and also record the species for two more localities in the state of Alagoas (municipalities of Maceió and Rio Largo). These records extending the known distribution of this species in 195 km SW from the Estação Ecológica de Tapacurá in municipality of São Lourenço da Mata (8°1'59" S, 035°10'59" W, 140 m a.s.l.), Pernambuco (Santos &

Moura, 2009), and approximately 403 km NE from the Reserva Sapiranga in municipality of Mata de São João (12°33'22.69"S, 038°2'29.61"W, 200 m a.s.l.), Bahia (Juncá, 2006).

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Appendix. Examined specimens

Sphaenorhynchus prasinus: BRAZIL: **Espírito Santo**, Linhares, MZUSP 75641, 75643. **Minas Gerais**, Teófilo Otoni, MZUSP 99512, 99513. Almenara, Fazenda Limoeiro, MZUFV 4152, 5939, 5938. Marliéria, Rio Doce State Park, MZUFV 2631, 2633, MNRJ 20874. Aimorés, MNRJ 56347. Nanuque, MNRJ 4517. **Pernambuco**, Recife, Dois Irmãos, MZUSP 99503. **Bahia**, Ilhéus, MZUESC 6533, 6534, 6861, 6862, 6863. Mata de São João, MZUFBA 7357, 4344–4346, 2962, 2969–2973. Itagibá, Fazenda Pedra Branca, MNRJ 4295–4297, 56348, 56349. Teixeira de Freitas, Fazenda Alcopadro, MNRJ 29664–29668. **Alagoas**, Rio largo, MNRJ 38680–38683. Quebrangulo, Pedra Talhada Biological Reserve, URCA-H 9295. Maceió, Environmental Protection Area of Catolé e Fernão Velho, MUFAL 12247.

Sphaenorhynchus aff. *palustris*: BRAZIL: **Alagoas**, Quebrangulo, Pedra Talhada Biological Reserve, URCA-H 6319.