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Advertisement call of *Dendropsophus studevae* (Carvalho-e-Silva, Carvalho-e-Silva and Izecksohn, 2003) (Anura: Hylidae), with new record and geographic distribution extension

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The treefrog genus *Dendropsophus* Fitzinger comprises 95 species, with geographic distribution from northern Argentina and Uruguay north through tropical South and Central America to tropical southern Mexico (Frost 2014). *Dendropsophus studevae* was included in the *D. microcephalus* clade by Faivovich *et al.* (2005), which currently consists of 39 species (Frost 2014). The species that most resembles *D. studevae* is *D. bipunctatus* (Spix), as already stated in the original description of the former (Carvalho-e-Silva *et al.* 2003). Thus far, *Dendropsophus studevae* was only known from its type locality, in the municipality of Quebrangulo (09°19'08"S, 36°28'16"W), State of Alagoas, northeastern Brazil. The original description of the species also included data on its eggs, tadpole (oral disc and external morphology) and some natural history information of adults and larvae, but its advertisement call remains undescribed.

Here, we present new records of *D. studevae* from Atlantic Rainforest remnants of the northern coast of the State of Bahia, northeastern Brazil (fig. 1A) and describe for the first time the advertisement call of the species. This is the southernmost record and the first outside the type locality of this species, extending its range ca. 407-airline km southwards (fig. 1B). Furthermore, this new record (103 m a.s.l.) is below the elevation of the type locality (600 m a.s.l.).

Specimens from northern Bahia were diagnosed by us as *D. studevae* by having the following characteristics (fig. 1A): small sized specimens (snout–vent length of adult males, \bar{x} = 21.7 ± 1.2, 19.3–23.4 mm, n = 15; adult females, \bar{x} = 26.6 ± 0.6, 26.1–27.0 mm, n = 2), dorsal surfaces green in life and reddish brown in preservative, thighs orange, a longitudinal sepia sideband from the snout to the middle of the flank, two to four yellow spots on each side of the upper lip and other minor blemishes from the corner of the lower lip to the middle of the flank (Carvalho-e-Silva *et al.* 2003).

Specimens were collected at a forest remnant of 1,257-ha known as Mata da Campina (12°27'03.6"S, 38°24'23.3"W, 103 m a.s.l.), a private area in the municipality of São Sebastião do Passé, State of Bahia, Brazil, on 21 May 2010 and 13 December 2010, by Jocilene B. Herrera, Camilla A. Souto, Rafael O. Abreu and Deise Cruz. This region has irregular topography with climate Köppen's Aw (tropical). The original vegetation cover is the Tropical Atlantic Forest, but today, this landscape is highly fragmented due to intense logging. The landscape matrix is mainly composed of pasture for cattle, with many forest remnants at an initial to intermediate stage of regeneration. There are no conservation units in the region.

We collected specimens of *D. studevae* at night in a temporary pond of about 40 cm depth, inside the forest remnant. Two calling males were recorded in the field on 21 May 2010 (air temperature not recorded) while emitting advertisement calls in a duet, perched on branches ca. 20 cm above the water, one of them was collected. Nevertheless, the vocalization of the collected specimen was not correctly assigned to it given that the specimen were accidentally deposited with other vouchered specimens of *D. studevae* during the fieldwork (UFBA 10127–10135, 10138–10143). We recorded the calls using a Portable Digital Recorder Marantz PMD 661 with a Sennheiser ME66 directional microphone. Calls were recorded and analyzed with a sampling frequency of 48 kHz and sample size of 16 bits. Temporal parameters of the calls were measured and counted on waveforms using the software Avisoft-SASLab Lite for

Advertisement calls (fig. 1C) consisted of 1–5 multipulsed notes ($\bar{x}=1.31\pm 0.64$, $n=220$), call duration 0.03–0.65 s ($\bar{x}=0.09\pm 0.09$, $n=220$), intercall intervals 0.15–2.27 ($\bar{x}=0.91\pm 0.37$, $n=206$), note duration 0.02–0.07 s ($\bar{x}=0.05\pm 0.010$, $n=290$), internote intervals 0.10–0.13 s ($\bar{x}=0.11\pm 0.01$, $n=70$), note rate 6.33–66.37 notes/s ($\bar{x}=18.14\pm 6.25$, $n=220$), notes with 4–10 pulses ($\bar{x}=6.59\pm 1.41$, $n=289$) and note pulse rate 97.09–161.55 pulses/s ($\bar{x}=121.95\pm 7.30$, $n=289$). Calls with one note lasted 0.02–0.07 s ($\bar{x}=0.05\pm 0.01$, $n=168$), two notes 0.17–0.22 s ($\bar{x}=0.19\pm 0.01$, $n=37$), three notes 0.31–0.36 s ($\bar{x}=0.33\pm 0.01$, $n=13$), four notes 0.46 s ($n=1$) and five notes 0.65 s ($n=1$). The first pulse of the call has less energy than the others, which have similar amplitude. Two main frequency bands (harmonics) are distinguishable in each note of the call from the audiospectrogram and power spectrum. The lowest-pitched harmonic (fundamental frequency) ranged from 2.50 to 3.57 kHz ($\bar{x}=2.74\pm 0.12$, $n=284$). The highest-pitched harmonic was the dominant frequency and ranged from 5.45 to 6.19 kHz ($\bar{x}=5.77\pm 0.17$, $n=287$). Detailed descriptive statistics in Table 1.

The advertisement call of *D. studerae* largely overlaps with the call of *D. bipunctatus* described by Abrunhosa *et al.* (2001) from one calling male recorded in the municipality of Saquarema, State of Rio de Janeiro, Brazil (Table 1). Nevertheless, the lowest-pitched harmonic (fundamental frequency) of *D. studerae* ($\bar{x}=2.74\pm 0.12$, 2.50–3.57 kHz) is higher than that of *D. bipunctatus* ($\bar{x}=2.14\pm 0.05$, 2.12–2.25 kHz). Statistics related to the number of pulses per note and note pulse rate were not provided by Abrunhosa *et al.* (2001), avoiding further comparisons. Carvalho-e-Silva *et al.* (2003) already stated that *D. studerae* and *D. bipunctatus* share ‘similar voices’ and our results confirm that statement, which reinforces the supposition of their close relationship.

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