Notas de História Natural & Distribuição Geográfica

Distribution extension and new breeding site of *Leptodactylus barrioi* (Anura: Leptodactylidae)

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Leptodactylus Fitzinger, 1826 is a genus of anuran amphibians with 83 described species, belonging to the family Leptodactylidae (Frost 2021). This taxon can be subdivided into four main groups based on molecular and non-molecular evidence: *L. latrans*, *L. fuscus*, *L. melanonotus* and *L. pentadactylus* (de Sá et al., 2014). The *L. fuscus* group contains the *L. mystaceus* species complex, eight morphologically very similar described species, that can be distinguished by their calls (Heyer 1996; de Sá et al. 2014).

Leptodactylus barrioi Silva et al., 2020 was recently described within the *L. mystaceus* species complex, and it is distinguished from other members of the group by its call (Silva et al. 2020). This species occurs in five municipalities in Rio de Janeiro, Espírito Santo and Minas Gerais, and the only information about its natural history is the use of underground chambers as a vo-

calization site (Silva et al. 2020). In this work, we extend the distribution range of *L. barrioi*, and report a new breeding location for the species.

On 29 October 2020 we conducted a nocturnal survey at Estação de Pesquisa, Treinamento e Educação Ambiental (EPTEA) Mata do Paraíso (-20.800° -42.863°, 734 meters a.s.l.) in Viçosa municipality, Zona da Mata of Minas Gerais state, southeastern Brazil. Part of the Atlantic Forest biome, this protected area has approximately 195 hectares, an average elevation of 690 m (Pereira et al. 2005) and contains fragments of seasonal semideciduous forest in different successive stages (Pinto et al. 2008).

During this survey, we recorded the advertisement call of two males of *L. barrioi* at a distance of approximately one meter using a Tascam DR40 digital recorder (sampling rate 48 kHz and 16 bits resolution) coupled to a Sennheiser ME66 microphone. The specimens were vocalizing buried in muddy chambers, under leaves and twigs at the edge of an artificial pond. During the recording, the water and air temperatures were 21°C and 24°C, respectively, and it had rained in the previous days. One of the calling males was collected and deposited at Coleção Herpetológica of Museu de Zoologia João Moojen of the Universidade Federal de Viçosa, Viçosa municipality, Minas Gerais state, Brazil (MZUFV 19878; Fig. 1A). We deposited the recordings in the Fonoteca Neotropical Jacques Vielliard of the Universidade Estadual de Campinas, Brazil (FNJV50014 and FNJV50015).

We used Raven Pro 1.6.1 software (K. Lisa Yang Center for Conservation Bioacoustics, 2019) to analyze 30 calls, 15 from each male, following Köhler et al. (2017) for acoustic terminology. We measured the spectral and temporal parameters directly on the spectrogram and oscillogram. The spectrogram was generated with window type Hann, FFT = 1024 samples (512 for the figure), and FFT overlap of 90%. The following acoustic parameters were analyzed: call duration, call rate, call interval, number of pulses, pulse rate per second, and dominant frequency.

Our analysis showed that the advertisement call of *L. barrioi* is composed of single, pulsed notes, with all of the acoustic parameters overlapping the ones described for the species (Silva et al., 2020) (Fig. 1B; Table 1). Confirming our record, the call registered here has complete pulses, a characteristic that differentiates *L. barrioi* from other nearby species, such as *L. watu*, known only for the Rio Doce, whose call is composed of partly fused pulses (Silva et al., 2020). Our study extends the geographical distribution of *L. barrioi* approximately 73 kilometers northwest from its nearest locality record, and the

farthest inland record for *L. barrioi* (Fig. 2; Table 2).

The original description stated that *L. barrioi* reproduces in small puddles in marshy soil or under leaf litter at the border of the forest (Silva et al., 2020). In this study we found specimens reproducing in a flooded area adjacent to a permanent artificial pond surrounded by forest, which is compatible with the reproductive mode for the species of the *L. fuscus* group (mode 30 *sensu* Haddad & Prado, 2005). This represents a novel, additional breeding site for *L. barrioi*.

Finally, we highlight the importance of the advertisement call to accurately identify species. In groups such as the *L. mystaceus* complex, in which morphological characters are very similar among species, calls are very important for species identification.

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Table 1. Acoustic measurements of the advertisement call of *Leptodactylus barrioi*: variation (mean and standard deviation).

Parameter	This work	Silva et al. 2020
Note duration (ms)	83–112 (92±6)	62–126 (93.3±5.9)
Note rate (call/min)	211–242 (226.4±21.4)	124–275 (167.9±21.2)
Pulses per note	7-10 (8.5±0.6)	6-12 (8.7±1.2)
Pulse rate (pulses/sec)	71.4-107.1 (92.7 ±8)	75–125 (99.4±11.8)
Dominant frequency (Hz)	602–1162 (902.9±228.3)	586–1383 (1003±145.4)

Table 2. Localities with records of *Leptodactylus barrioi* in southeastern Brazil. State abbreviations: ES = Espírito Santo, MG = Minas Gerais and RJ = Rio de Janeiro.

Point on the map	Municipality	State	Lat.	Long.	Reference
1	Duas Barras	RJ	-22.06°	-42.52°	Silva et al., 2020
2	Chiador	MG	-22.00°	-43.08°	Silva et al., 2020
3	Cataguases	MG	-21.38°	-42.72°	Silva et al., 2020
4	Viçosa	MG	-20.80°	-42.86°	This work
5	Ibitirama	ES	-20.55°	-41.66°	Silva et al., 2020
6	Linhares	ES	-19.55°	-39.85°	Silva et al., 2020

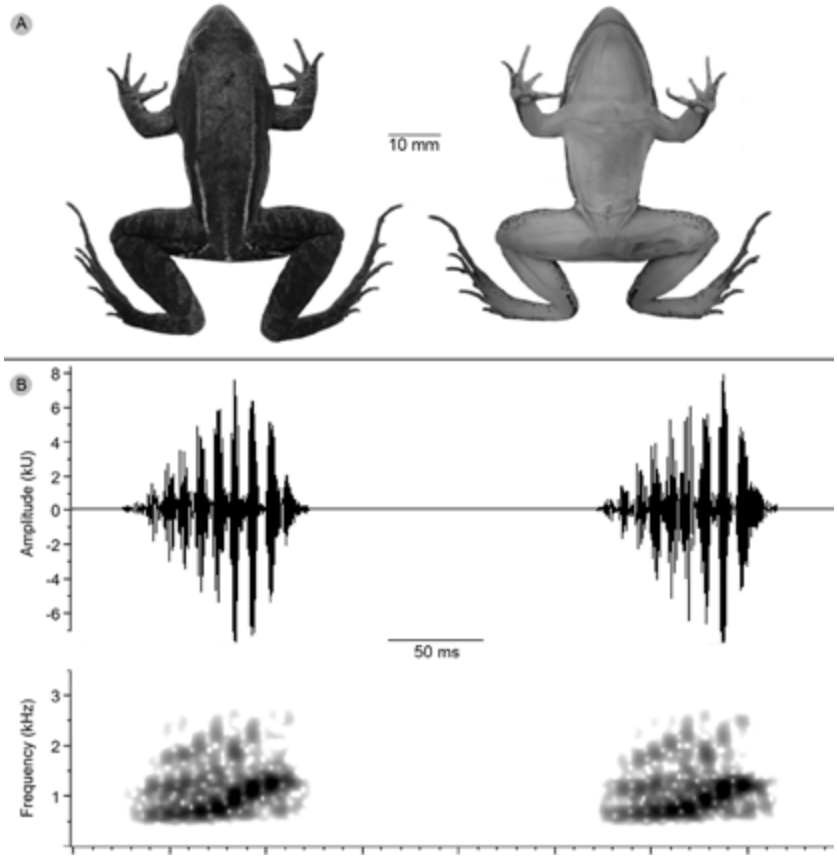

Figure 1. (A) Specimen of *Leptodactylus barrioi* (MZUFV 19878), and (B) oscillogram and spectrogram of advertisement call recorded at EPTEA Mata do Paraíso, Viçosa municipality, Minas Gerais state, Brazil.

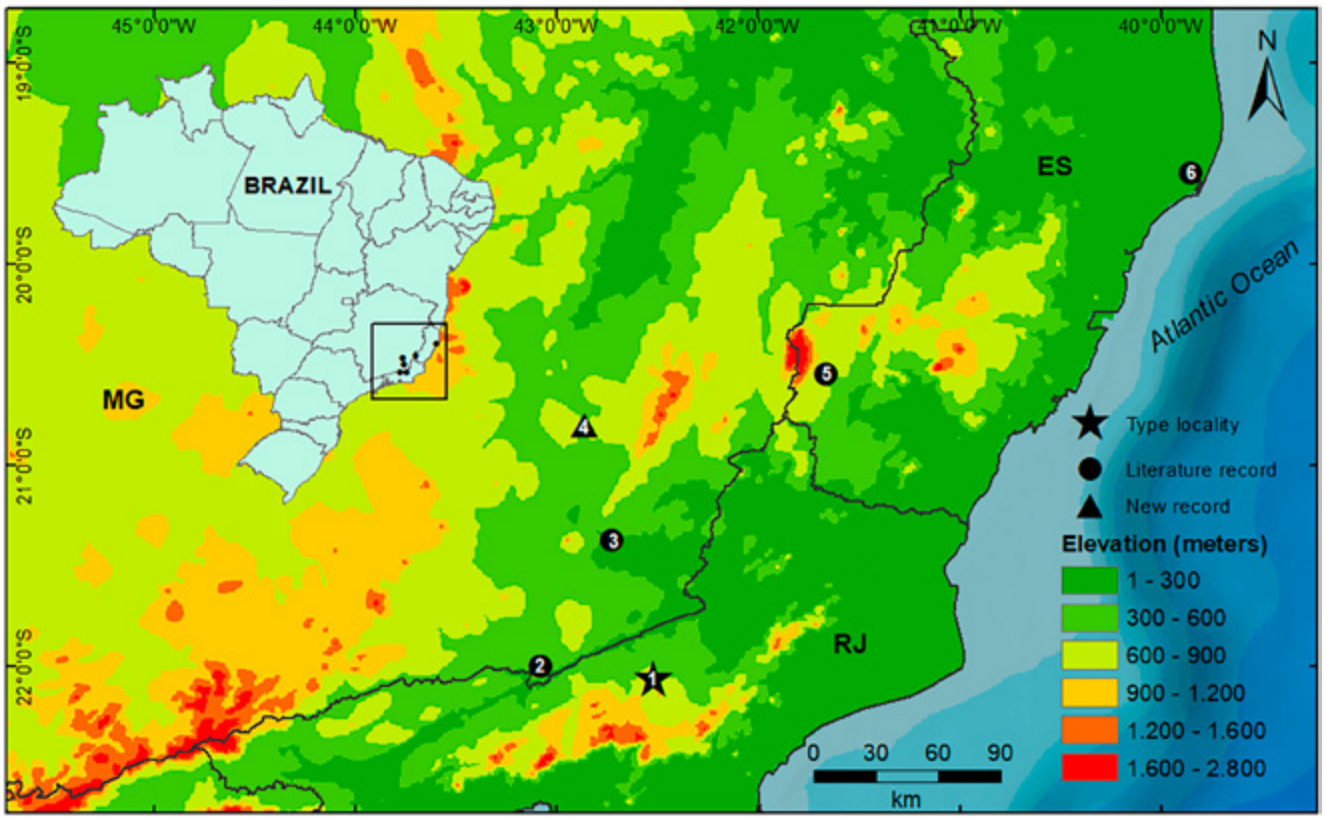

Figure 2. Distribution records of *Leptodactylus barrioi*. Abbreviations of the states: MG = Minas Gerais, RJ = Rio de Janeiro; ES = Espírito Santo.