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Advertisement call, general distribution, and range extension of *Leptodactylus notoaktites* (Anura, Leptodactylidae) to the State of Rio de Janeiro, Brazil

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RESUMEN: *Leptodactylus notoaktites* es una rana de tamaño moderado perteneciente al grupo *L. fuscus*. La especie se encuentra en el sureste y sur de Brasil y solo se conocía en los estados de São Paulo, Paraná y Santa Catarina. En este artículo, presentamos la distribución general actualizada y la primera aparición geográfica de la especie en un ambiente puntual y amenazado en el estado de Río de Janeiro. Se describe la llamada de anuncio de la especie.

Leptodactylus notoaktites Heyer, 1978 (Anura, Leptodactylidae) was known to occur, until now, only in the states of São Paulo, Paraná,

and Santa Catarina (Figueiredo et al., 2018); its type locality is in the Municipality of Iporanga, State of São Paulo, Brazil (Heyer, 1978, Frost,



Figure 1: *Leptodactylus notoaktites* Heyer, 1978 (unvouchered specimen) on the leaf litter of forest fragment.

Figura 1: *Leptodactylus notoaktites* Heyer, 1978 (ejemplar no documentado) sobre la hojarasca del bosque.

2024). The species belongs to the *Leptodactylus fuscus* group, in the *Leptodactylus mystaceus* species complex (de Sá *et al.*, 2014). The meaning of the epithet *notoaktites* derives from the Greek *notos*, of the south, and *aktios* or *aktites*, of the shore or coast dweller, in reference to the geographic distribution of the species in Brazil (Heyer, 1978; Lavilla *et al.*, 2022).

In this paper, we present the updated general distribution and the first geographical occurrence of the species in a punctual and threatened environment in the State of Rio de Janeiro. The advertisement call of the species in the new occurrence is presented.

The research was carried out in the Colônia Farm (22°24'45"S / 44°17'19"W, datum WGS 84; 390 masl), Municipality of Porto Real, State of Rio de Janeiro, Brazil. This farm is inserted in the APA Fluvial de Porto Real (Fluvial Environmental Protection Area of Porto Real), in the Paraíba do Sul River basin. On 30th November 2013, we collected six adult specimens of *Leptodactylus notoaktites* (Figure 1) and recorded one individual. The fieldwork was done following the guidelines of the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), under the license SISBIO 45308. Voucher specimens are deposited in the Museu Nacional, Rio de Janeiro, RJ, Brazil (MNRJ 94283) and

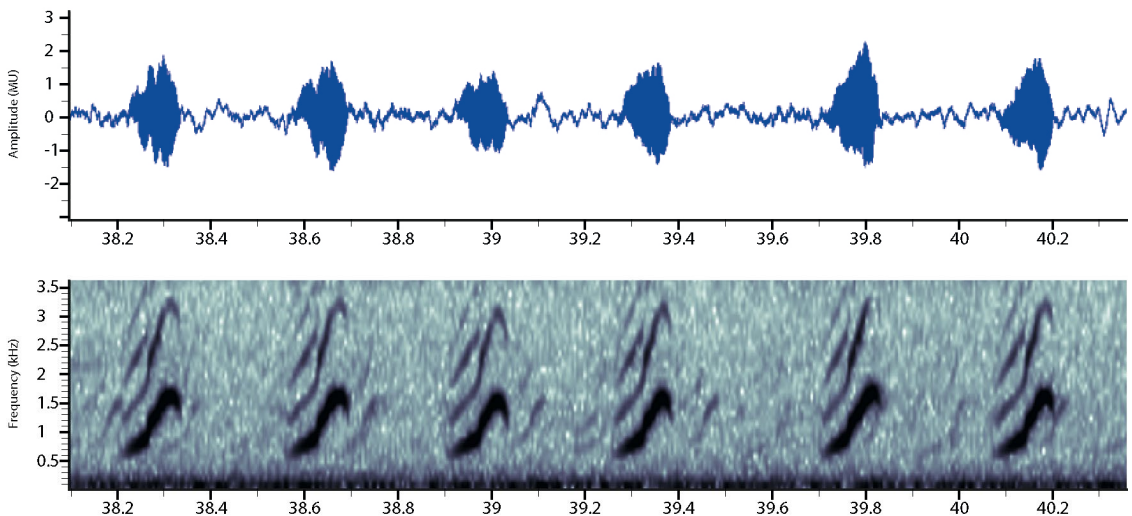


Figure 2: Oscillogram and sonogram of the advertisement call of *Leptodactylus notoaktites* (HUFPI 1933; Colônia Farm, Porto Real, State of Rio de Janeiro, Brazil). 30th November 2013, 21h, air temperature 23.8° C, relative humidity 75%.

Figura 2: Oscilograma y sonograma de la llamada de anuncio de *Leptodactylus notoaktites* (HUFPI 1933; Hacienda Colônia, Porto Real, Estado de Río de Janeiro, Brasil). 30 de noviembre de 2013, 21h, temperatura del aire 23,8° C, humedad relativa 75%.

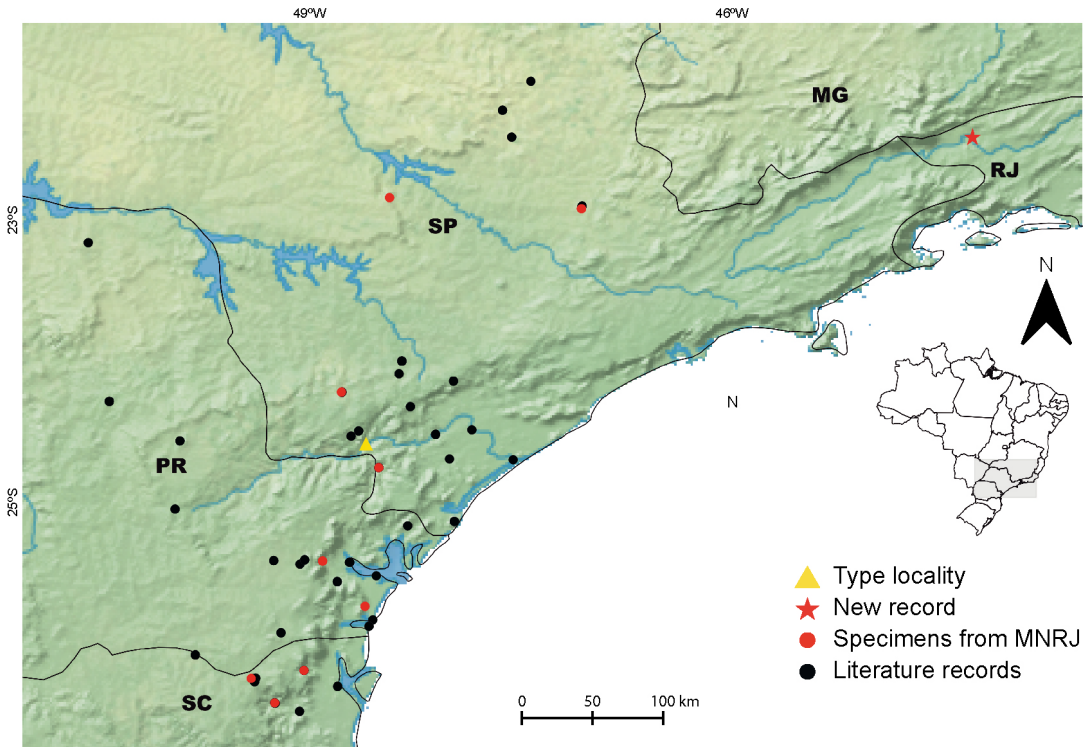


Figure 3: Distribution of *Leptodactylus notoaktites*. Yellow triangle, the type locality; Red star, the first record to the State of Rio de Janeiro, Municipality of Porto Real; Orange dots, specimens from Museu Nacional, Rio de Janeiro (MNRJ); Black dots, literature records. RJ, Rio de Janeiro; MG, Minas Gerais; SP, São Paulo; PR, Paraná; SC, Santa Catarina.

Figura 3: Distribución de *Leptodactylus notoaktites*. Triángulo amarillo, localidad tipo; Estrella roja, primer registro para el Estado de Río de Janeiro, Municipio de Porto Real; Puntos naranjas, ejemplares del Museo Nacional de Río de Janeiro (MNRJ); Puntos negros, registros de la literatura. RJ, Río de Janeiro; MG, Minas Gerais; SP, São Paulo; PR, Paraná; SC, Santa Catarina.

the Coleção de História Natural da Universidade Federal do Piauí, PI, Brazil (CHNUFPI 1933–1935, 3018, 3029).

Additional specimens examined are housed in the MNRJ and are referred in the Appendix 1. The previous geographical distribution of the species follows Heyer (1978), Crivellari *et al.* (2014), and Figueiredo *et al.* (2018).

The advertisement calls analyses were performed in *Raven Pro* 1.6.5 software (Cornell Lab 2019). The parameters used are according to Köhler *et al.* (2017) being: call/note duration (in seconds - s), interval between consecutive calls (s), notes per second, pulses per note,

dominant frequency (in kHz), dominant frequency modulation (kHz), and rise time (s) as an envelope shape of the call. The spectrogram was analyzed with window type in Hann and FFT (Fast Fourier Transform) at 512 samples. The data are displayed as interval of variation (mean ± standard deviation).

Leptodactylus notoaktites is a moderate-sized anuran that presents a light upper lip stripe from the tip of the snout to the jaw commissure and distinct dorsolateral folds (Heyer, 1978; de Sá *et al.*, 2014). The advertisement call (N = 64) has duration between 0.07-0.12s (0.10 ± 0.01), distance between notes 0.19-

0.70s (0.29 ± 0.10), the call consists of a single note, call rate 0.9 to 2.8 (2.00 ± 0.6) calls per second, dominant (= fundamental) frequency between 0.61-1.69 kHz (1.49 ± 0.86) with harmonic structure, modulation of dominant frequency between 0.61 and 0.84 kHz (0.70 ± 0.06) at the beginning, and 1.31 to 1.78 kHz (1.59 ± 0.08) at the end of the call (Figure 2). The advertisement call is similar to previously reported descriptions (de Sá *et al.* 2014, Figueiredo *et al.* 2018).

The species is distributed in the states of São Paulo, Paraná, and Santa Catarina, in southeastern and southern Brazil (Figure 3). The new record represents the first occurrence of the species in the State of Rio de Janeiro, which comprises 500 km from its type locality and 288 km from Campinas (SP), the nearest occurrence locality.

The species was observed only in the Colônia Farm and its surroundings and it is strictly dependent on the temporary ponds at the margins of Atlantic Forest where it is found foraging on the leaf litter. The area is experiencing deforestation pressures and desiccation of swamps due to urban growth; indeed, these conditions could lead to the local extinction of the species in the area. Consequently, the conservation status of the species should be considered threatened in the State of Rio de Janeiro.

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