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Boana bischoffi (BOULENGER, 1887) (ANURA, HYLIDAE) IN RIO DE JANEIRO, SOUTHEASTERN BRAZIL: NEW STATE RECORD

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Abstract: *Boana bischoffi* is a tree frog endemic to the Atlantic Forest that occurs from the state of Rio Grande do Sul to the state of São Paulo. This is the first record of the species in two locations in the municipality of Rio Claro, south of the state of Rio de Janeiro, confirmedly the northernmost occurrence of *B. bischoffi*. The species occurs in abundance and seems to be well established, being registered along seven years of monitoring.

Keywords: Atlantic Forest; geographic distribution; long-term monitoring; new state record.

Boana bischoffi (Boulenger 1887) is a tree frog endemic to the Brazilian Atlantic Forest, strict inhabitant of Tropical Submontana to Montana and Semideciduous forests (Marcelino *et al.* 2009), although it can tolerate a certain level of deforestation and occurs in anthropized environments (Ribeiro *et al.* 2005). The species has a relatively wide geographical distribution and its populations is abundant when compared to other Hylidae species of the Atlantic Forest (Garcia & Kwet 2010). *B. bischoffi* can be found in permanent water bodies, such as swamps, ponds, or lakes, both in open areas and in primary forests (Haddad *et al.* 2008, Kwet *et al.* 2010). To date, the species occurs in the south and southeast regions of Brazil, ranging from the state of Rio Grande do Sul to the north of the state of São Paulo (Marcelino *et al.* 2009). Herein we present the first record of *B. bischoffi* for the state of Rio de Janeiro, southeastern Brazil.

During a herpetological monitoring carried out from May 2009 to November 2015 in the district of Lídice, municipality of Rio Claro, state of Rio de Janeiro, southeastern Brazil, a total of 41 adult individuals of *B. bischoffi* (Figure 1) was registered: the first three adult individuals were captured in May 2009, two adults in August 2009, seven adults in July 2010, two adults in September 2010, two adults in September 2011, four adults in July 2012, five adults in December 2012, six adults in July 2013, six adults in September 2014, and the last four adult individuals were observed in April 2015. It is worth mention that many other *B. bischoffi* adult males were recorded by their calls during the monitoring. However, they were not counted to avoid missampling, so we are not considering these vocal records. The species was identified according to Marcelino *et al.* (2009), comparing with other specimens deposited at the Museu Nacional, Rio de Janeiro, Brazil.

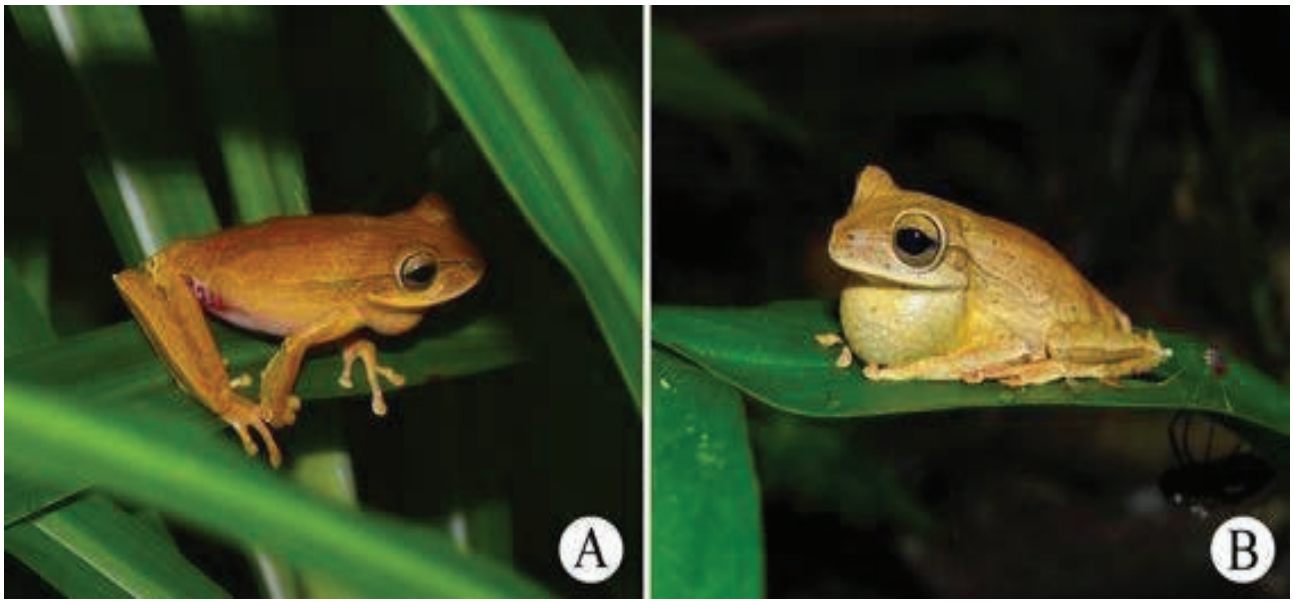

Figure 1. Adult males (A-B) of *Boana bischoffi* calling perched on marginal vegetation of a forested permanent pond at the district of Lídice, municipality of Rio Claro, state of Rio de Janeiro, southeastern Brazil. Photo: Thiago Silva-Soares.

We found two sites where *B. bischoffi* have established populations: (i) fish weir in an open and antropized area at the Pousada Águas Claras (PAC; 22° 50' 21.81" S, 44° 12' 25.17" W, datum WGS84; 570 m elev.; Figure 2), (ii) and in a forested and permanent pond at the Pequena Central Hidrelétrica Rio do Braço (PCH; 22° 46' 50.08" S, 44° 13' 51.70" W, datum WGS84; 657 m elev.; Figure 3). Eleven specimens out of the 34 individuals visually found were manually collected, nine from PAC site (MNRJ76003-09, July 2010; MN RJ 72145-46, September 2010), and two from PCH site (MNRJ 76644, September 2011; MNRJ 84960, December 2012). All specimens were deposited in the Amphibian Collection of the Museu Nacional, Universidade Federal do Rio de Janeiro, municipality of Rio de Janeiro, Rio de Janeiro, Brazil.

The new records extends *B. bischoffi* distribution to the Atlantic Forest of Rio de Janeiro, being the first record to this state. Moreover, this is the northernmost record for the current distribution of *B. bischoffi* (Figure 4). PAC and PCH sites are 6,5 km distant from each other in a straight-line distance. The present record in Rio de Janeiro, i.e, the record at PCH site, is 140,5 km SW distant from the nearest and former northernmost record at Natividade da Serra, São Paulo, southeastern Brazil.

The dorsal color pattern variation along with *B. bischoffi* distribution range has been under taxonomic discussion for many years between two distinct species (Lutz & Lutz 1939, Heyer *et al.* 1990), as a phenotypic variation in a monotypic species (Haddad & Sazima 1992). While individuals from southern populations have smooth pattern (not striped), with variants with sparse and interrupted lines to completely gray back and sometimes stained, northern populations have longitudinal dorsal lines (Marcelino *et al.* 2009). This color pattern variation has been shown as a polymorphic trait within populations throughout all *B. bischoffi*'s range (Marcelino *et al.* 2009). The color pattern found in the new population of Rio de Janeiro is congruent with the northern pattern of multiple longitudinal stripes (Figure 5), which is absent in *B. bischoffi* southern populations of the states of Rio Grande do Sul to Paraná, and partially in São Paulo (Marcelino *et al.* 2009).

After seven years of monitoring, 34 adults of *B. bischoffi* were visually recorded, in addition to dozens of records by unaccounted vocalization. Individuals were found vocalizing perched on the marginal vegetation associated with permanent ponds. At PAC, *B. bischoffi* was found in a weir located in an anthropized open area used for fish farming, with very scattered bush vegetation surrounding it, beside a particular unpaved road that leads to the inn. The PCH permanent pond is situated in a well-preserved forest area, quite far from roads or human edifications, all surrounded by marginal vegetation. Finding the species in

Figure 2. Fish weir in an open area at the Pousada Águas Claras, district of Lídice, municipality of Rio Claro, state of Rio de Janeiro, southeastern Brazil. Photo: Cláudia Arantes Bouças.

Figure 3. Pond inside a well preserved forested in the surroundings Pequena Central Hidrelétrica Rio do Braço, district of Lídice, municipality of Rio Claro, state of Rio de Janeiro, southeastern Brazil.

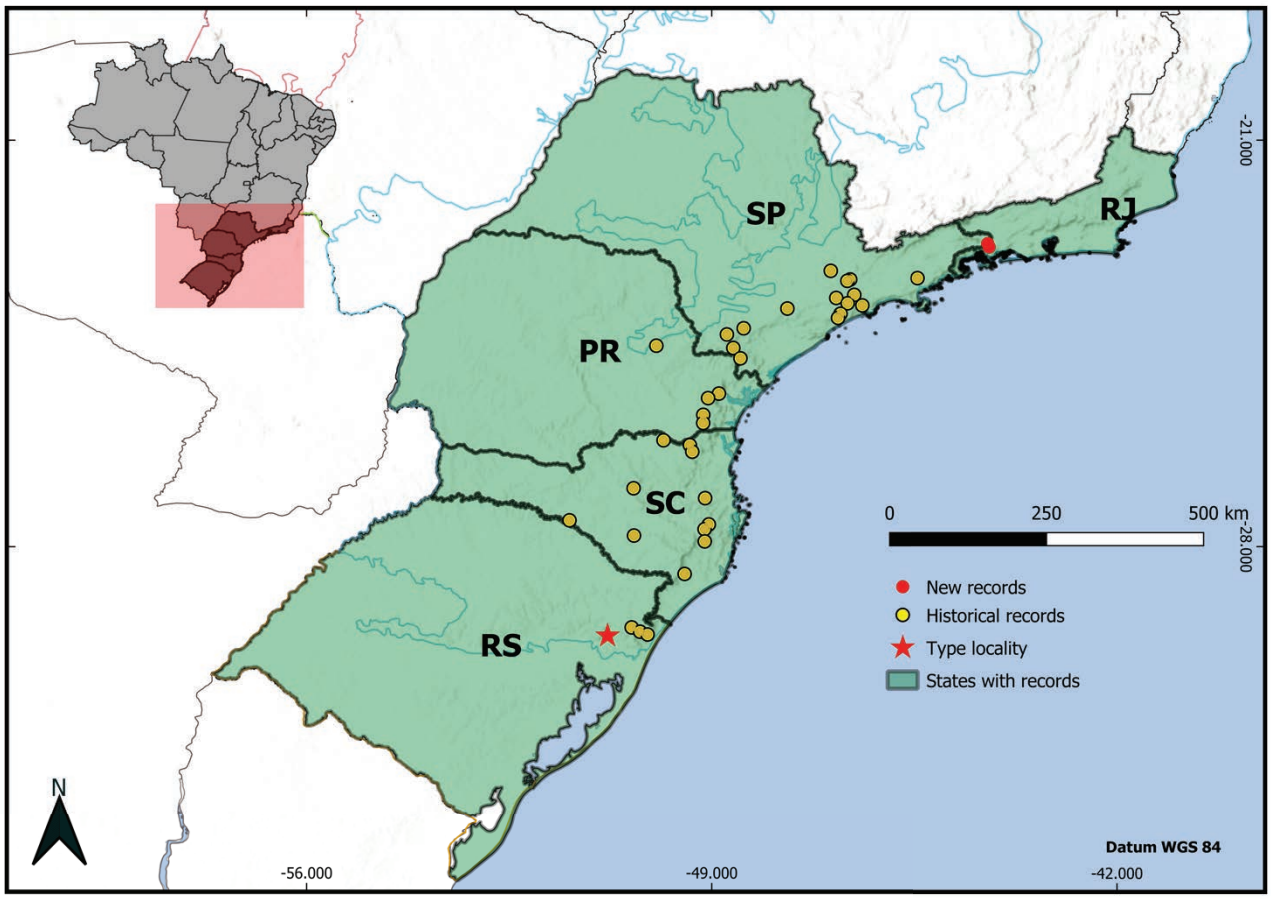

Figure 4. Geographic distribution range of *Boana bischoffi*. Red star: type locality; yellow dots: literature records; red circles: new records from Rio de Janeiro (RJ). Abbreviations: RJ = Rio de Janeiro; SP = São Paulo; PR = Paraná; SC = Santa Catarina; RS = Rio Grande do Sul.

both open and forested areas corroborate with literature (Ribeiro *et al.* 2005, Haddad *et al.* 2008, Kwet *et al.* 2010).

Ribeiro et al. (2005) states that *B. bischoffi* can be found throughout the southern part of the Atlantic Forest, from Rio de Janeiro to Rio Grande do Sul. However, the authors did not provide any further information, reference or voucher of the species in Rio de Janeiro. Dorigo *et al.* (2018) provided an updated list of the amphibians of the state of Rio de Janeiro, with a record of 201 amphibian species (197 of them anurans). The authors did not include *B. bischoffi* in the list, but discussed its occurrence in Rio de Janeiro because Frost (2017) included Rio de Janeiro in the species' distribution, although with no further sources. Therefore, without solid evidence, Dorigo *et al.* (2018) adopted a conservative approach and kept *B. bischoffi* off the updated amphibian list of Rio de Janeiro. With voucher specimens and additional data, herein we add one more amphibian species to the state of Rio de Janeiro, which, based on Dorigo *et al.* (2018), now comprehends 202 species (198 of them anurans).

Despite the great amphibian richness in Brazil (Segalla *et al.* 2021), data on distribution and natural history of many anurans are still lacking (Anjos *et al.* 2020). This insufficiency of data reflects the difficulty of assigning their current conservation status, which makes difficult to promote conservation and management strategies for both species and ecosystems. Due to these threats, studies on natural history, distribution and long-term monitoring are important to accumulate knowledge about ecological aspects of species, which are necessary to propose conservation strategies (Anjos *et al.* 2020). Herein we present the first record of *B. bischoffi* in the state of Rio de Janeiro, increasing its distribution to the northernmost record of its geographic range, with additional data on natural history that fills knowledge gaps about this tree frog.

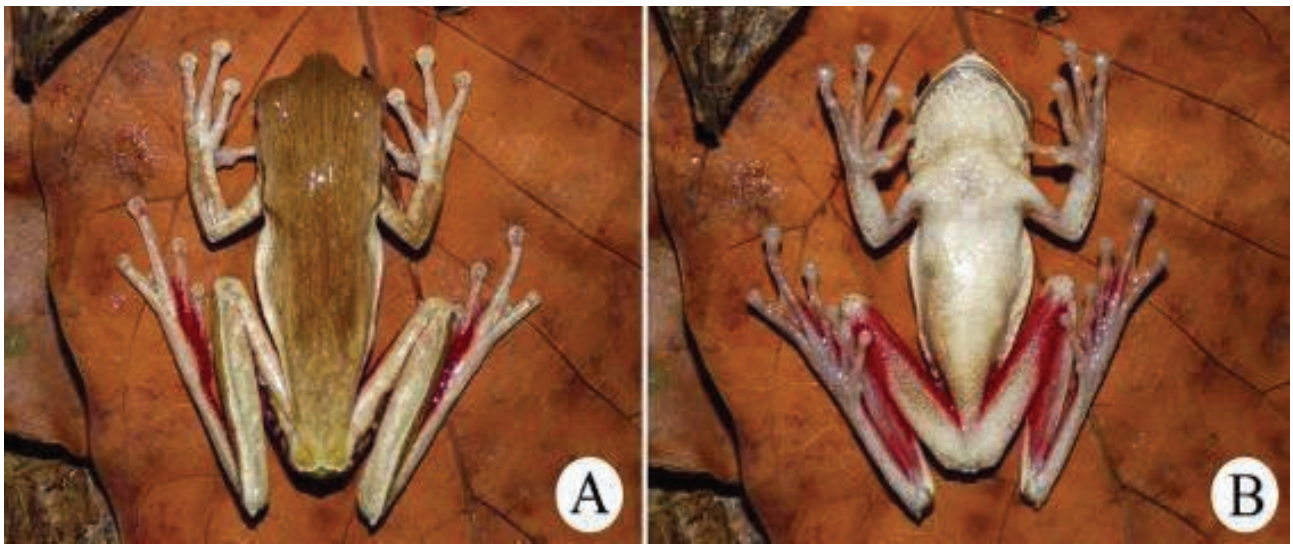

Figure 5. Dorsal (A) and ventral (B) color patterns of *Boana bischoffi* from the population corresponding to the first record of the species in the state of Rio de Janeiro, southeastern Brazil.

Assessing issues involving biodiversity depends on a continuous series of data. Hence, it is need to because to implement continuous monitoring systems that cover space on a large scale. In this manner, it is possible to carry out the preservation of species already described in the place, as well as species not yet cataloged and/or new records. It is also possible to categorize the potential geographic distributions of each species and monitor the intensity of temporal variation in such distributions, as well as in addition to monitoring the genetic variability of species and population levels.

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