

## Distribution extension, new state record and geographic distribution map of *Ceratophrys joazeirensis* Mercadal, 1986 (Anura: Ceratophryidae)

Natan Medeiros Maciel<sup>1\*</sup>, Marcelo Nogueira de Carvalho Kokubum<sup>2</sup>, Pedro Henrique Pereira Braga<sup>1</sup>, Armando Teixeira de Queiróz-Júnior<sup>3</sup>, Rubens Hisanari Matsushita<sup>4</sup>

The genus *Ceratophrys* Wied-Neuwied, 1824 currently comprises eight species occurring in Tropical South America (Frost, 2013). *Ceratophrys joazeirensis* was described by Mercadal (1986), and is the only species of the genus that occurs in the Caatinga biome, a typical semi-arid morphoclimatic domain in northeastern Brazil (Ab'Saber, 2003). This species is reported from the type locality (vicinities of Joazeiro, Bahia, Brazil; Mercadal, 1986), north of Triunfo, Pernambuco (Santos et al., 2009), Araruna, northern Paraíba, and from the vicinities of Passa-e-Fica, northern Rio Grande do Norte (Vieira et al., 2006a). Recently, two records were reported: one from Santa Maria, Rio Grande do Norte (Jorge et al., 2012) and the other from Pindobaçu, Bahia (Zaidan and Leite, 2012). The last authors also described the advertisement call of the species.

In the present paper, we report a new record for *Ceratophrys joazeirensis* to the Cerrado biome. We also present a map of the current known distribution of this species based on literature.

Specimens were collected at Fazenda Jatobá (17°21'03" S and 44°57'43" W), Buritizeiro, Minas Gerais, Brazil at December 10th, 2004. Voucher specimens were housed at the Coleção Herpetológica of the Universidade de Brasília (CHUNB), Brasília, Distrito Federal, Brazil (CHUNB 44326–32). We analyzed seven specimens collected in open formations of Cerrado (04 males: CHNUB 44326–27, 44329–30 and 03 females CHUNB 44328, CHUNB 44331–32; Figure 1). This is the first record of *Ceratophrys joazeirensis* in the state of Minas Gerais and also in the Cerrado biome. The record of *C. joazeirensis* in Buritizeiro extends its geographic distribution in approximately 884 km southwest of its nearest known distribution, Pindobaçu, Bahia (Figure 2). Voucher specimens had some diagnostic characters that confirmed their identification, such as color patterns of head: a blot between the interocular space to the nostrils and features of upper eyelids: upper eyelid fairly pronounced (Mercadal, 1986). According to the original description, *C. joazeirensis* is most similar to *C. cranwelli* Barrio, 1980. *Ceratophrys cranwelli* also occurs in semi-arid environments and Chaco of Argentina, Bolivia, and Paraguay (Mercadal, 1986). The main difference between the two species is the ploidy level, since *C. cranwelli* is a 2n species and *C. joazeirensis* is an 8n species (Mercadal, 1981; 1986; Mercadal de Barrio and Barrio, 2002; Vieira et al., 2006b). *Ceratophrys aurita* is the species with the nearest distribution to *C. joazeirensis*, although not parapatric. However, the former species occurs in the Atlantic Brazilian forest, whereas the last mainly in open formations of the Caatinga and Cerrado. Also, *C. aurita* has a prominent upper eyelid, inner metatarsal tubercle without cornification, and pointed finger extremities, in contrast to the rounded fingers of *C.*

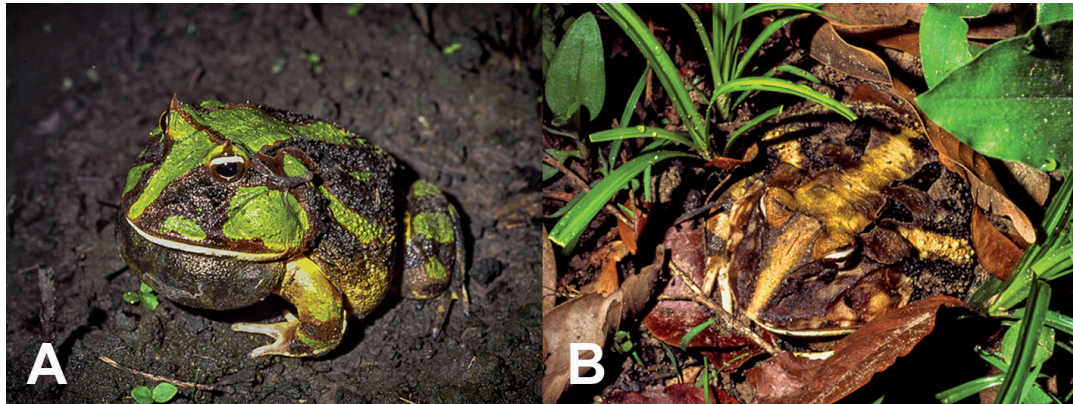
<sup>1</sup> Universidade Federal de Goiás, Instituto de Ciências Biológicas, Departamento de Ecologia. Rodovia Goiânia-Nerópolis km 5, Campus II, Setor Itatiaia, CEP 74001-970, Goiânia, Goiás, Brazil.

<sup>2</sup> Universidade Federal de Campina Grande, CSTR. Rodovia Patos/Teixeira-Jatobá, CEP 58704-330, Patos, Paraíba, Brazil.

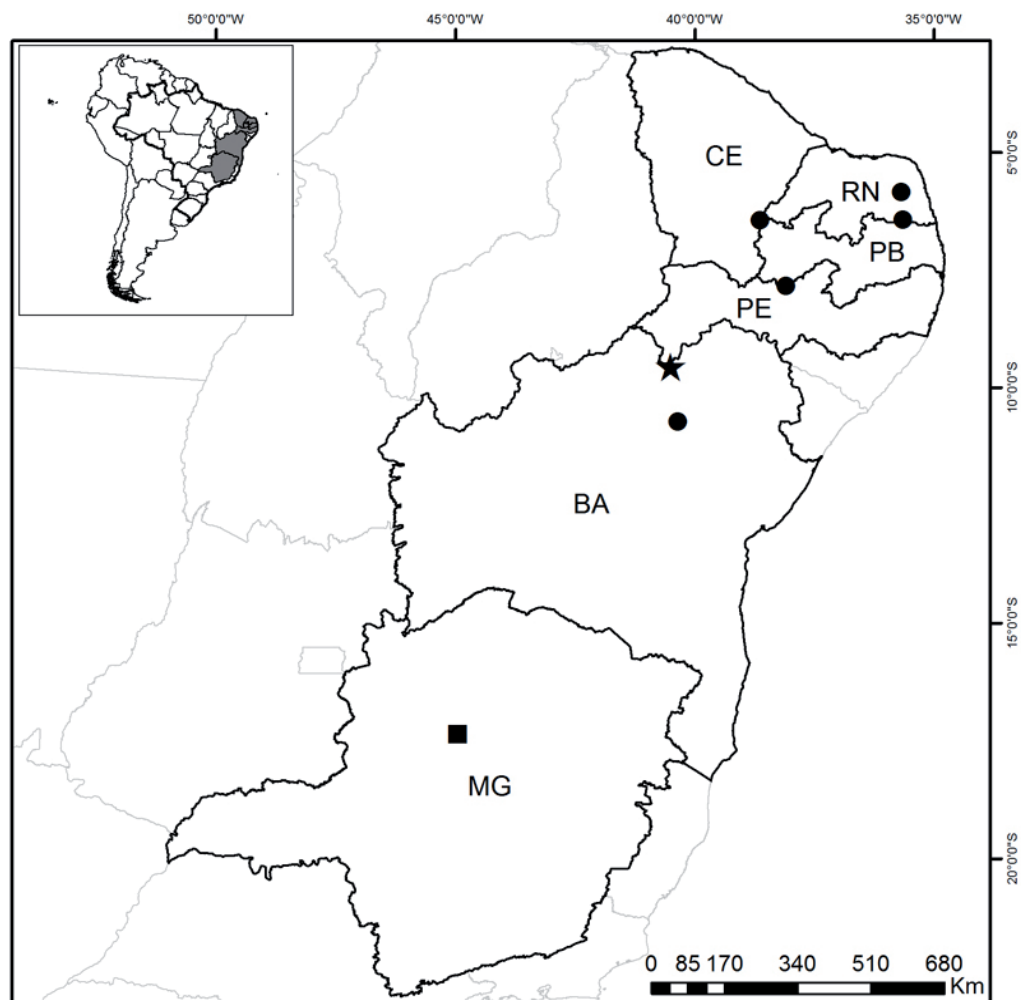
<sup>3</sup> Colégio Galois, SGAS 601, Conjunto A, Lote 02, Asa Sul, CEP 70200-610, Brasília, Distrito Federal, Brazil.

<sup>4</sup> 4ª Câmara de Meio Ambiente e Patrimônio Cultural/Ministério Público Federal, SAF Sul Quadra 4 conjunto C, bloco B, sala 302, CEP 70050-900, Brasília, Distrito Federal, Brazil.

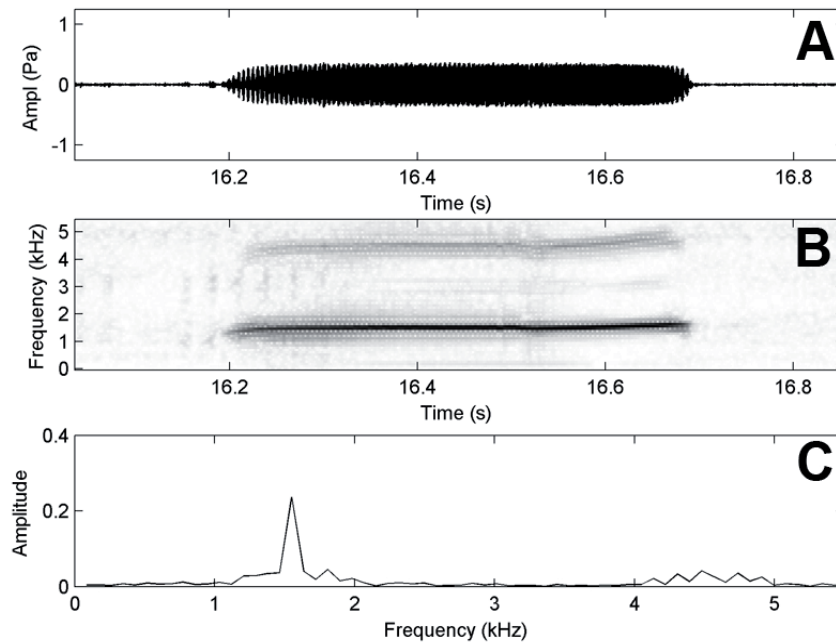
\* Corresponding author. E-mail: nmaciell@gmail.com



**Figure 1.** Specimens of *Ceratophrys joazeirensis* from Buritizeiro, Minas Gerais, Brazil. A: male and B: female.



**Figure 2.** Distribution map of *Ceratophrys joazeirensis*. Circles = literature registers (see text); star (type locality; vicinities of Joazeiro, Bahia - BA); square = new record: Fazenda Jatobá, Buritizeiro, and Minas Gerais - MG, Brazil. PB = Paraíba; RN = Rio Grande do Norte; PE = Pernambuco.



**Figure 3.** Advertisement call of *Ceratophrys joazeirensis* from Fazenda Jatobá, Buritizeiro, Minas Gerais, Brazil. A: sonogram, B: spectrogram, and C: power spectrum. Code: Ceratophrysjoazeirensiscanto084FazendaJatobá. Voucher: private collection MNCK 0085.

*joazeirensis*. Valdujo et al. (2012) identified a specimen from Buritizeiro (CHUNB 38786) as *C. aurita*, but did not provide arguments for their identification. Based on our examination of individuals from Buritizeiro and the literature, we argue that this population should not be identified as *C. aurita*.

We also recorded (MNCK 0085) a specimen from Buritizeiro and analyzed the advertisement call of another specimen (not collected) from the same locality. Recordings were edited with frequency at 22 KHz and 16 bits resolution and analyzed in SoundRuler (Marcos Gridi-Papp, Phys. Science, UCLA, USA) software. Fundamental frequency ranges from 710.59 to 790.72 Hz ( $733.34 \pm 32.84$  Hz), dominant frequency ranges from 1421.19 to 1593.45 Hz ( $1476.55 \pm 72.51$  Hz) and call duration from 462.22 to 555.55 ms ( $514.61 \pm 25.83$  ms). This call resembles that from Pindobaçu, Bahia, Brazil in spectral and temporal features (Zaidan and Leite 2012), which had dominant frequency at 1550.4 Hz and call duration ranging from 618 to 721 ms ( $674.9 \pm 28.5$  ms). We observed that call duration between the two populations analyzed had some degree of variation. Temporal call parameters, such as call duration are dynamic features that could vary more among

populations. Temporal properties are more variable than spectral ones (Ryan, 1998).

Considering that the Cerrado is an area of low diversity of Certophryidae, and that *Ceratophrys joazeirensis* is a quite distinctive species, Cerrado and Caatinga populations may support the biogeographical hypothesis of the dry diagonal open areas (e.g., Cabrera and Willink, 1973), including *C. cranwelli* found in Chaco.

**Acknowledgments.** Guarino R. Colli provided access to specimens from Buritizeiro under his care at Coleção Herpetológica of the Universidade de Brasília. We also thank Dr. Ariovaldo Giaretta for the pre-peer review. One anonymous reviewer and Diogo B. Provete (editor) provided helpful comments on the manuscript. Also to Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq 475333/2011-0) and Fundação de Apoio a Pesquisa do Distrito Federal (FAPDF 193.000.292/2007) for financial support.

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