



## On advertisement call of the poison frog *Ameerega berohoka* (Dendrobatidae, Anura) from the Brazilian Cerrado

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The poison frog genus *Ameerega* (Dendrobatidae) currently contains 32 species. They are distributed from central Brazil into western Amazonia to the lower Andean versant. In addition, three trans-Andean species have been allocated to *Ameerega* (Andrade *et al.* 2013; Frost 2014). *Ameerega berohoka* (Vaz-Silva & Maciel 2011) was described based on specimens from central Brazil (type-locality: Arenópolis, GO) and it is assumed to occur in parts of western and southwestern state of Goiás (Frost 2014). More recently, Andrade *et al.* (2013) extended its distribution to the state of Mato Grosso. Here we re-describe the advertisement call of *A. berohoka*, providing additional information regarding its temporal structure and spectral traits. Our observations also consist of a new distribution record for this species to the state of Mato Grosso.

Field work was conducted on 16–17 November 2012 at the Parque Estadual Serra Azul (PESA), municipality of Barra do Garças (15.850767 S, 52.270808 W, approximately 533 m a.s.l.), state of Mato Grosso, Brazil. Recordings were made between 07:27–08:05 hrs. The most representative habitats in PESA are *cerrado rupestre* (hill savanna on rocky soil), *cerrado sensu stricto*, gallery forest and semi-deciduous forest (Sanchez & Pedroni 2011). The average annual rainfall in PESA is 1528 mm and the average temperature 25.5 °C (Pirani *et al.* 2009). One recorded male is deposited at Museu de Biodiversidade do Cerrado, Universidade Federal de Uberlândia, municipality of Uberlândia, state of Minas Gerais, Brazil (AAG-UFU 1310).

**TABLE 1.** Advertisement call variables of *Ameerega berohoka* from the Parque Estadual Serra Azul (PESA), municipality of Barra do Garças, State of Mato Grosso, Brazil. Mean±SD (minimum-maximum). N = number recorded males; fifty analyzed calls/male.

Variables	<i>Ameerega berohoka</i> N=5 (250)
Call duration (s)	0.119±0.012 (0.090–0.173)
Intercall interval (s)	0.319±0.060 (0.140–0.695)
Calls/minute	144.02±21.55 (124.38–179.00)
Calls/second	2.60±0.55 (2.0–3.0)
Peak of dominant frequency (Hz)*	4118.2±63.7 (3919.0–4478.9)
Min. dominant frequency (Hz)*	2763.3±93.3 (2496.1–3092.9)
Max. dominant frequency (Hz)*	5056.5±158.7 (4618.3–5586.2)
Peak of fundamental frequency (Hz)	2165.4±135.3 (1921.9–2484.4)
Peak of 3 <sup>rd</sup> harmonic frequency (Hz)	6165.3±114.4 (5625.0–6468.8)
Air temperature (°C)	25–26

\* = 2<sup>nd</sup> harmonic

having a slightly higher dominant frequency (see Table 2 and Figure 1 C and E). Our data on number of note types, note duration and frequency range of the dominant frequency are in accordance with Vaz-Silva and Maciel (2011).

Regarding the other species of the *A. picta* species group, *A. berohoka* is distinguished from *A. boehmei* by having a higher fundamental frequency (1.16–1.63 kHz in *A. boehmei*) and a higher call rate (1.28–1.97 calls/s in *A. boehmei*) (Lötters *et al.* 2009). The length of call of *Ameerega berohoka* (90–173 ms) is much longer than *A. picta* (50 ms), *A. altamazonica* (60–80 ms) and *A. hahneli* (11–18 ms) (Schlüter 1980; Morales 1992; Haddad & Martins 1994; De La Riva *et al.* 1996; Köhler & Lötters 1999; Twomey & Brown 2008). This species also differs from *A. hahneli* by having a lower pulse rate (5–9 calls/s in *A. hahneli*) (Schlüter 1980; Morales 1992; Haddad and Martins 1994; De La Riva *et al.* 1996; Köhler and Lötters 1999).

The occurrence of high frequency and harmonically-related acoustic bands have been neglected in many *Ameerega* call descriptions (Haddad & Martins 1994; Toledo *et al.* 2004; Costa *et al.* 2006; Magrini *et al.* 2010; Forti *et al.* 2010; Martins & Giaretta 2012). In our comparative analyses (Table 2), the fundamental frequency is always discernible, but weaker than the dominant (2<sup>nd</sup> harmonic). The presence of different harmonic bands in frog calls may be related to features such as sexual selection (Gridi-Papp *et al.* 2006) and to environs with different background noises (Lima & Eterovick 2013).

Recently, Andrade *et al.* (2013) expanded the known distribution of *A. berohoka* for the state of Mato Grosso (Itiquira), this record refers to the westernmost known locality for the species and the only one outside the Araguaia River basin. Our new record represents the northernmost (about 90 km northwest to its type locality) locality for the species.

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## Appendix 1

Sound files (wav) of analyzed calls. All archives deposited in AAG's acoustic collection and are also available at AmphibiaWeb (<http://amphibiaweb.org/>).

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 AB\_BG1:Ameerega\_berohokaBarraGarcasMT1aIAH\_AAGmt.wav  
 AB\_BG2:Ameerega\_berohokaBarraGarcasMT2aFSA\_AAGb.wav  
 AB\_BG3:Ameerega\_berohokaBarraGarcasMT3aFSA\_AAGb.wav  
 AB\_BG4:Ameerega\_berohokaBarraGarcasMT4aAAGm671.wav  
 AB\_BG4:Ameerega\_berohokaBarraGarcasMT4bAAGm671.wav  
 AB\_BG5:Ameerega\_berohokaBarraGarcasMT5aAAGm671.wav  
 AB\_MT:Ameerega\_braccataSVicenteMT1aTRC\_AAGmt.wav  
 AF\_MG1: Ameerega\_flavopCipoMG1bAAGb.wav  
 AF\_MG2: Ameerega\_flavopCipoMG2aAAGb.wav  
 AF\_MG3: Ameerega\_flavopCipoMG3aAAGb.wav