Zootaxa 3972 (4): 595–598
www.mapress.com/zootaxa/

Correspondence

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3972.4.11
http://zoobank.org/urn:lsid:zoobank.org:pub:0F78D5E5-19F8-4BCC-92CA-EEF02A4844F5

Reinterpreting features of the advertisement call of *Dermatonotus muelleri* (Boettger, 1885; Anura, Microhylidae)

ARIOVALDO ANTONIO GIARETTA[1,3], PACIFIC VO[2], JESSE HERCHE[2],
JUSTINE NICOLE TANG[2] & MARCOS GRIDI-PAPP[2]

[1]*Laboratório de Taxonomia de Anuros (Lissamphibia) Neotropicais, Universidade Federal de Uberlândia, Faculdade de Ciências Integradas do Pontal, Rua 20, n 1600, Bairro Tupã, 38.304-402, Ituiutaba, MG, Brazil*
[2]*Department of Biological Sciences. University of the Pacific, 3601 Pacific Ave., Stockton, CA 95211 USA.*
[3]*Corresponding author: E-mail: aagiaretta@gmail.com*

The advertisement call of *Dermatonotus muelleri* was originally described by Nelson (1973) in a brief section of a review on the mating calls of the Microhylinae. He used two calls from São Leopoldo, state of Minas Gerais, in Brazil to determine that they have i) dominant frequency between 1.500−2.200 kHz (mean 1.854 $\pm$ 0.216 kHz), and *ii*) harmonic intervals between 0.140 and 0.150 kHz (0.146 +/- 0.005 kHz). Nelson (1973) based his description on an audiospectrogram produced with high frequency resolution and did not quantify the pulse structure of the calls. More recently, Giaretta and colleagues (2013) expanded on the original description using a larger set of calls recorded from Gurinhat, state of Minas Gerais, in Brazil. They quantified the temporal structure of the call and confirmed that the dominant frequency is around 1.8 kHz. In addition, they identified a secondary low frequency band at 667 Hz.

A closer examination of the low frequency band described by Giaretta and colleagues (2013) indicate that this band is not harmonically related to the dominant frequency of the call and that the timing of the low frequency band is alternated with that of the dominant frequency, leaving no silence in between. These observations indicated that *D. muelleri* might vocalize both during expiration and inspiration, or make use of two sound sources in the production of its advertisement calls. In this study, we reanalyzed the calls of *D. muelleri* and compared them to those of a better known microhylid, the North American great plains narrow-mouthed toad (*Gastrophryne olivacea,* Hallowell).

The analysis of advertisement calls in *D. muelleri* was based on recordings presented in Giaretta *et al.* (2013; municipality of Gurinhatã, MG, Brazil). The spectral analysis was restricted to files 14–22 (nine males) in which the calls were not clipped. These were recorded with ME67 or ME66 Sennheiser microphones connected to a Boss BR-864 or M-Audio Microtrack II digital recorders, respectively. Calls were acquired at sampling rates of 44.1 kHz and a sample size of 16 bit. The air temperature was 22°C and the water temperature was 26°C throughout the recordings. For the frequency analysis, amplitude spectra were produced calculating FFTs with a Hanning window of 256 samples using a custom-written procedure within SoundRuler (Gridi-Papp, 2007). The spectrogram was generated in Seewave (Sueur *et al.*, 2008) with a Hanning window of 256 samples and 90% overlap between successive FFTs. High quality call samples are available at Amphibiaweb (http://amphibiaweb.org/). The analysis of advertisement calls for *G. olivacea* was based on eight individuals from Stengl Ranch in Bastrop, Texas, USA. They were recorded by MGP on 05/03/00 and 05/07/00 at 21–22°C air temperature with a Sennheiser ME66 microphone and a Marantz PMD-430 recorder using metal tapes (type IV). The cuts were digitized at a 44.1 kHz sampling rate and 16 bits sample size, and they were cataloged as MGP 1165, 1169, 1176, 1182, 1183, 1184, 1185, and 1186.

The advertisement call of *D. muelleri* is formed by a set of primary pulses that lasts on average 4.4 +/- 0.4 ms SD (n = 13 males with 10 pulses/male), has a pulse rate of 126.50 +/- 3.75 Hz SD (n = 13 males), and a dominant frequency of 1.733 +/- 0.119 kHz SD (Fig. 1A–C). A pronounced harmonic structure with a fundamental frequency of 0.146 kHz was described by Nelson (1973) but it actually represented the very fast pulse rate of the calls because he employed a narrowband analysis. Giaretta and colleagues (2013) described a harmonic structure with a fundamental frequency of 0.667 kHz (Fig. 1B in Giaretta *et al.* 2013). Our data confirmed the mismatch already indicated by their data. The dominant frequency (1.75 kHz in Giaretta *et al.* 2013 and 1.73 kHz in this study) is not a multiple integer of the low frequency band (0.667 kHz in Giaretta *et al.* 2013 and 0.715 +/- 0.59 kHz SD in this study).

As evidenced in the spectrograms, the low frequency band at 0.715 kHz is not harmonically related to the dominant frequency and the two are alternated in timing. We will refer to the stronger, high frequency pulses (1.7 kHz) as primary

Accepted by M. Vences: 12 May 2015; published: 15 Jun. 2015