

THE ADVERTISEMENT CALL OF *PHYLLODYTES EDELMOI* (ANURA, HYLIDAE)

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ABSTRACT. Currently there are 12 recognized species in the genus *Phyllodytes*; however, advertisement calls are known for only three species. Herein, we describe the advertisement call of *Phyllodytes edelmoi*, from males recorded at the type-locality, in remnants of Atlantic Rain Forest in northeastern Brazil. The advertisement call duration is 4.28-5.73 s and it is composed of 22-29 pulsed notes. Each note has 6-32 pulses. The dominant frequency along the call ranges from 1.49-3.32 kHz. The call is compared with available call descriptions of *P. kautskyi*, *P. luteolus*, and *P. melanomystax*. Despite clear differences among their advertisement calls, apparently the calls of *P. edelmoi* and *P. luteolus* share a few similarities. Phylogenetic relationships in the genus *Phyllodytes* are unresolved and descriptions of vocalizations of additional *Phyllodytes* species could help to decipher these relationships.

KEYWORDS. *Phyllodytes edelmoi*, Alagoas, northeastern Brazil, Atlantic Rain Forest, advertisement call.

INTRODUCTION

The Brazilian Atlantic Rain Forest exhibits one of the richest anuran fauna in the world, with nearly 90% of endemic species (Duellman, 1999). Unfortunately, this biome is undergoing an enormous destruction; currently only approximately 7% of the original forest remains (Dean, 1995; Morellato and Haddad, 2000). Anuran studies in the northeastern part of the Atlantic Rain Forest have increased considerably in the last few years, with descriptions and revalidations of several new species (e.g., Caramaschi and Peixoto, 2004; Caramaschi *et al.*, 2004; Carvalho e Silva *et al.*, 2003; Carnaval and Peixoto, 2004; Cruz *et al.*, 1999; Peixoto *et al.*, 2003). One of the anuran groups in which new species have been recently described is the frog genus *Phyllodytes*.

Phyllodytes is distributed in southeastern and northeastern Brazil, throughout the Atlantic Rain Forest, with only one species occurring disjunctly in Trinidad (Caramaschi and Peixoto, 2003; Peixoto *et al.*, 2003). The genus currently consists of 12 species (Cruz *et al.*, 2006) and half of the species were recognized in the last 20 years. However, little information is available on the ecology and advertisement calls of this group.

Herein we describe the advertisement call of *P. edelmoi*, recorded at the type-locality.

MATERIAL AND METHODS

The frogs were observed at Mata do Catolé, type-locality of *P. edelmoi*, Maceió Municipality (9°40'S, 35°43'W), State of Alagoas, Brazil. Advertisement calls of four males (N = 17 calls) were recorded in terrestrial bromeliads on April 13, 2005 (24.5°C air temperature) and May 09, 2005 (25.7°C air temperature). Voucher specimens and vocalizations are deposited at the Museu de História Natural, Universidade Federal de Alagoas (MUFAL 4317-20).

Vocalizations were recorded with a Sony TCM 5000 EV tape recorder and Azden ECZ990 directional microphone. Tapes were digitized at 22.050 kHz with 16 bits on PC microcomputer. Spectrogram of an entire call was produced with Avisoft-SASLab Light with Fast Fourier Transformation (256 points), overlap (zero %) and window (Flat Top); the spectrogram of two isolated notes was produced with overlap (93.75%). The dominant frequencies and oscillograms were obtained with Cool Edit 96 using Fast Fourier Transformation (1024). All values are presented as mean values with standard deviation and amplitude [$\bar{x} \pm SD$ (Min-Max)].

RESULTS AND DISCUSSION

The advertisement call of *Phyllodytes edelmoi* is a pulsed call, with duration of 4.28-5.73 s (5.2 ± 0.44),

composed of 22-29 notes (26.46 ± 2.33) (Figure 1). Each note has 6-32 pulses. Pulses in each note are more spaced at the beginning of the note. At the end of each note, the pulses are grouped so near that sometimes it is difficult to discern each pulse (Figure 2). The dominant frequency along the call ranges from 1.49-3.32 kHz, but the lowest values, around 1.49-1.7 are always in the first two notes. From the third note on, the dominant frequency ranges from 2.5-3.32.

Descriptions of advertisement calls of other *Phyllodytes* species are scarce and are available only for: *P. luteolus*, *P. kautskyi*, and *P. melanomystax*. The data available for *P. luteolus* consist of a simple description of some vocalizations, including an advertisement call and an aggressive call, obtained from specimens kept in captivity (Weygoldt, 1981). The advertisement call of *P. kautskyi* was described with recordings obtained from a single specimen at the type-locality (Simon and Gasparini, 2003) and the advertisement call of *P. melanomystax* was recently described from three recorded males (Nunes *et al.*, 2007). Advertisement call data for the genus *Phyllodytes* are summarized in Table 1.

In addition, Weygoldt (1981) also observed that the intervals between the notes of *P. luteolus* apparently increase from the beginning to the end of the call and advertisement calls could be heard at night and also during the day. The study did not report if the calls had

pulsed or harmonic structure; however, the published spectrograms suggest that the calls are pulsed. Simon and Gasparini (2003) mentioned that after a playback a male of *P. kautskyi* emitted a call different from the advertisement call, possibly a territorial call, but this was not recorded. Nunes *et al.* (2007) described a territorial call for *P. melanomystax*, which consists of an initial multipulsed note always followed by the advertisement call. The advertisement call of *P. kautskyi* consists of 21 notes (Simon and Gasparini, 2003), instead of one note erroneously reported in the comparison with *P. melanomystax* (I. Nunes, pers. comm.). Males of *P. melanomystax* can increase considerably their number of notes when in chorus, and recorded males were calling alone (I. Nunes, pers. comm.).

The main differences among these four *Phyllodytes* advertisement calls are: the call duration and number of notes (calls of *P. edelmoi* are longer and have more notes than the calls of *P. kautskyi*, *P. luteolus*, and *P. melanomystax*); calls of *P. edelmoi* are pulsed and not harmonic like those reported for *P. kautskyi* and *P. melanomystax*.

Relationships among species of *Phyllodytes* remain unresolved. Peixoto *et al.* (2003) suggest that three color patterns could represent separate taxa, thereby defining three species groups. Caramaschi *et al.* (2004) proposed a new rearrangement that resulted in four species groups. All species with avail-

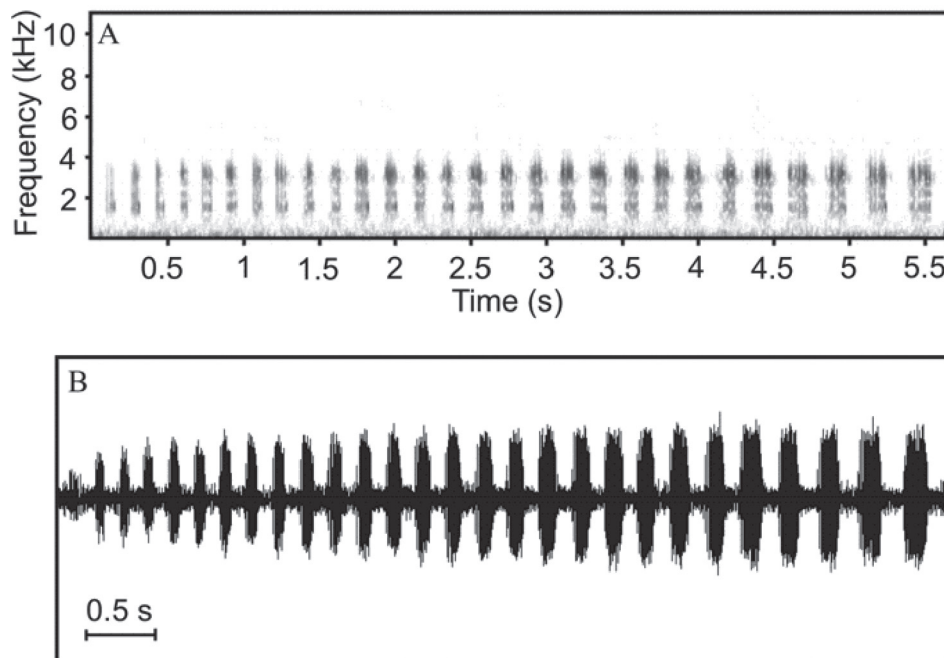


FIGURE 1. Spectrogram and oscillogram of advertisement call of *Phyllodytes edelmoi*. Mata do Catolé, Maceió, AL. Air temperature 25.3°C (MUFAL 4320).

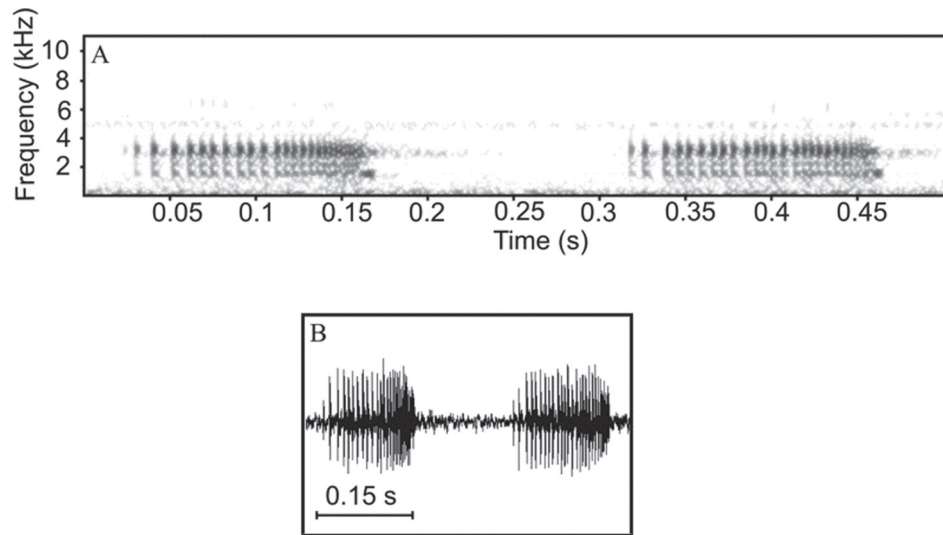


FIGURE 2. Spectrogram (A) and oscillogram (B) of the last two notes of the same call as in figure 1.

able call descriptions are in the *P. luteolus* group (sensu Caramaschi *et al.*, 2004). Among these four species, the advertisement calls are more similar between *P. edelmoi* and *P. luteolus*, given that the calls of *P. kautskyi* and *P. melanomystax* have a harmonic structure. The descriptions of vocalizations of additional species of *Phyllodytes* may provide additional information to resolve the relationships in the genus.

RESUMO

Atualmente há 12 espécies no gênero *Phyllodytes*, das quais são conhecidos os cantos de anúncio de somente três espécies. Aqui é descrito o canto de

anúncio de *Phyllodytes edelmoi*, a partir de machos gravados em sua localidade-tipo, em remanescentes de Mata Atlântica no nordeste do Brasil. O canto de anúncio tem duração de 4,28-5,73 s e é composto e é composto por 22-29 notas pulsionadas. Cada nota tem de 6-32 pulsos. A frequência dominante ao longo do canto varia de 1,49-3,32 kHz. O canto é comparado com as descrições dos cantos de *P. kautskyi*, *P. luteolus* e *P. melanomystax*. Apesar de claras diferenças entre seus cantos de anúncio, aparentemente os cantos de *P. edelmoi* e *P. luteolus* compartilham algumas semelhanças. As relações no gênero *Phyllodytes* são confusas e futuras descrições de cantos de anúncio de outras espécies de *Phyllodytes* poderão ajudar a solucionar as relações dentro do gênero.

TABLE 1. Advertisement calls of *Phyllodytes* species. (*P. edelmoi*: this paper; *P. kautskyi*: Simon and Gasparini, 2003; *P. luteolus*: Weygoldt, 1981; *P. melanomystax*: Nunes *et al.*, (2007). * Parameters estimated from spectrogram.

	<i>P. edelmoi</i> (n = 4 males)	<i>P. kautskyi</i> (n = 1 male)	<i>P. luteolus</i> (n = not available)	<i>P. melanomystax</i> (n = 3 males)
Call duration (s)	5.2 ± 0.44 (4.28-5.73)	3.55 ± 0.19	5.0 *	0.07 ± 0.04
Number of notes per call	26.46 ± 2.33 (22-29)	21	8-15	1
Duration of notes (s)	0.1 ± 0.003 (0.044-0.163)	0.085 ± 0.012	0.125*	0.07 ± 0.04
Pulses per note	20.26 ± 2.85 (6-32)	-	-	-
Interval between calls (s)	48.27 ± 8.33 (38.11-64.83)	46.66 ± 11.45	-	28.81 ± 12.48 (11.18-54.29)
Dominant frequency (kHz)	2.84 ± 0.16 (1.49-3.32)	1.37 (0.87-1.81)	2-6	1.39-3.11
Call structure	Pulsed	Harmonic	Pulsed	Harmonic

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Atualmente há 12 espécies no gênero *Phyllodytes*, das quais são conhecidos os cantos de anúncio de somente três espécies. Aqui é descrito o canto de anúncio de *Phyllodytes edelmoi*, a partir de machos gravados em sua localidade-tipo, em remanescentes de Mata Atlântica no nordeste do Brasil. O canto de anúncio tem duração de 4,28-5,73 s e é composto e é composto por 22-29 notas pulsionadas. Cada nota tem de 6-32 pulsos. A frequência dominante ao longo do canto varia de 1,49-3,32 kHz. O canto é comparado com as descrições dos cantos de *P. kautskyi*, *P. luteolus* e *P. melanomystax*. Apesar de claras diferenças entre seus cantos de anúncio, aparentemente os cantos de *P. edelmoi* e *P. luteolus* compartilham algumas semelhanças. As relações no gênero *Phyllodytes* são confusas e futuras descrições de cantos de anúncio de outras espécies de *Phyllodytes* poderão ajudar a solucionar as relações dentro do gênero.

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