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Description of the advertisement call of Physalaemus lisei (Anura: Leiuperidae)

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Physalaemus lisei (Fig. 1) occurs in the southern portion of the Brazilian Atlantic rainforest, in northeastern Rio Grande do Sul and adjacent Santa Catarina states, where it is found in damp woodland, secondary forests, or transition zones from woodland to grassland (Kwet et al. 2010). Although Both et al. (2006) provided some information on the breeding ecology of P. lisei, the advertisement call of this species has remained undescribed. Bioacoustic information is particularly important for future ecological and taxonomic studies in this genus, as there are species with very similar morphologies, and advertisement calls may help to properly identify them. Hence, we describe for the first time the advertisement call of P. lisei from southern Brazil.

Recently, Kwet & Márquez (2010) edited an acoustic guide with two audio CDs containing the calls of 109 amphibian species from southern Brazil and Uruguay, including the advertisement call of P. lisei (see also call clipping at http://www.kwet.de/; accessed on May 29, 2012), but no numerical parameters for these calls are available to date.

For our call analyses, we used the advertisement calls of three males of P. lisei recorded in the municipalities of São Francisco de Paula (29°26’S, 50°15’W; 1 December 1995; 3:00 h; air temperature 17°C) and Canela (29°28’S, 50°45’W; 3 December 1995; 23:30 h; air temperature 17°C), Rio Grande do Sul state, Brazil. We obtained these recordings from the Fonoteca Zoológica (Museo Nacional de
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Ciencias Naturales; http://www.fonozoo.com/; accessed on May 29, 2012). Recordings were edited with sampling frequencies of 22 kHz and 16 bit resolution. The voucher specimen of the call depicted in Figure 2 was collected and is now deposited in the collection of the Museu de Ciência e Tecnologia (MCT) at Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), within a series of four specimens, MCT 1786–1789. The calls were analysed with Cool Edit 96® (i.e., spectral variables) and Avisoft-SASLab Lite® (i.e., temporal variables) software. Frequency information was obtained through Fast Fourier Transformation (FFT; width 1024 points). The spectrograms and oscillograms were created with Sound Ruler software (Grialdi-Papp 2007) with overlap (75%), FFT of 256 in the Hamming window function. Note duration (s), fundamental frequency (Hz), dominant frequency (Hz), time intervals between calls (s), and repetition rate (calls/minute) were measured. Call description and terminology follows Gerhardt (1998). In numerical parameters, the range is followed by mean ± standard deviation in parentheses.

The rather gentle, whine-like advertisement call of P. lisei (Fig. 2) is composed of a single, unpulsed note, emitted isolated or in short series of two or three notes. The average note duration ranged from 0.71–2.14 s (1.3 ± 0.38 s; N = 16 calls). Notes were emitted at rather irregular time intervals of 0.21–87.70 s (X = 18.83 ± 27.52 s; N = 16 calls), with repetition rates of 2.00–5.66 calls/minute (3.77 ± 1.83; N = 3 males). The notes exhibit a gradually increasing amplitude (call intensity) towards the end of the call and slight frequency modulation (ascendant frequency modulation at the end of the call). Parallel frequency bands are recognizable and a harmonic structure was observed in the advertisement call of P. lisei, in which the fundamental harmonic varied from 430–602 Hz (516 ± 60.81; N = 6 calls) and the dominant frequency was modulated between 1023 and 1464 Hz (1272 ± 354; N = 6 calls).

Compared with the published calls of the other species in the P. gracilis group, the advertisement call of P. lisei differed considerably, confirming the specific identity of this taxon. The mean dominant frequency of the advertisement call of P. lisei is lower than that of P. barrioi (2265 Hz; Prove et al. 2012), P. evangelistai (2000–4000 Hz; Bokermann 1967), and P. gracilis (4000–5000 Hz; Bokermann 1965). In the original description of the call of P. jordanensis, there were no dominant frequency values given, however estimating it from the spectrogram provided by Bokermann (1967), the fundamental frequency in this species may be close to that observed in P. lisei, varying approximately between 100 and 500 Hz. The call duration of P. lisei was on average longer than in P. barrioi (1.24 s; Prove et al. 2012), P. evangelistai (1.0–1.2 s; Bokermann 1967), and P. gracilis (0.9–1 s; Bokermann 1965), but shorter than in P. jordanensis (1.4–1.6 s; Bokermann 1967). The mean repetition rate of the calls of P. lisei was considerably lower than in P. barrioi (7.64 calls/min; Prove et al. 2012), P. evangelistai (8 calls/min; Bokermann 1967), P. gracilis (40 calls/min; Bokermann 1965), and P. jordanensis (10 calls/min; Bokermann 1967), although this difference could be partly due to the low air temperature (17°C) at the time of our recordings and differences in male motivation.

Apart from the specific differences mentioned, the harmonic composition and overall structure of the advertisement call of P. lisei is similar to the calls of other species in the P. gracilis group, thus corroborating a close relationship between the species in this clade of frogs (see Goicoechea et al. 2010).

Figure 2. (A) Oscillogram and (B) spectrogram of the advertisement call of Physalaemus lisei from Pró-Mata, São Francisco de Paula municipality, Rio Grande do Sul state, southern Brazil (recording AK 2B12; record number of Fonoteca = 5850; 1 December 1995; 3:00 h; air temperature 17°C; voucher specimen within the series MCT 1786–1789).
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References


