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Advertisement call and new distribution records of *Hypsiboas leucocheilus* (Anura: Hylidae)ANDRÉ PANSONATO¹, ROBSON W. ÁVILA², RICARDO A. KAWASHITA-RIBEIRO² & DRÁUSIO H. MORAIS³¹ Pós-Graduação em Biologia Animal, Universidade Estadual Paulista – UNESP, R. Cristóvão Colombo, 2265, Jardim Nazareth, CEP 15054-000, São José do Rio Preto, São Paulo, Brazil² Coleção Zoológica de Vertebrados, Instituto de Biociências, Universidade Federal de Mato Grosso (UFMT), Av. Fernando Corrêa da Costa, 2367, Boa Esperança, CEP 78060-900, Cuiabá, MT, Brazil³ Pós-Graduação em Ciências Biológicas, Universidade Estadual Paulista – UNESP, Instituto de Biociências, Departamento de Parasitologia, Distrito de Rubião Júnior s/n. CEP 18618-000, Botucatu, São Paulo, Brazil

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The hylid genus *Hypsiboas* Wagler, 1830 comprises currently more than 80 species in the seven species groups of *H. albopunctatus*, *H. benitezi*, *H. faber*, *H. pellucens*, *H. pulchellus*, *H. punctatus* and *H. semilineatus* (FAIVOVICH et al. 2005, FROST 2010). According to FAIVOVICH et al. (2005), the *H. albopunctatus* group is only defined on a molecular basis and currently comprises ten species distributed in Central and South America: *Hypsiboas albopunctatus* (SPIX, 1824), *Hypsiboas calcaratus* (TROSCHEL, 1848), *Hypsiboas dentei* (BOKERMANN, 1967), *Hypsiboas fasciatus* (GÜNTHER, 1858), *Hypsiboas heilprini* (NOBLE, 1923), *Hypsiboas lanciformis* COPE, 1871, *Hypsiboas leucocheilus* (CARAMASCHI & NIEMEYER, 2003), *Hypsiboas multifasciatus* (GÜNTHER, 1859), *Hypsiboas paranaíba* CARVALHO, GIARETTA & FACURE, 2010, and *Hypsiboas raniceps* COPE, 1862. Within this group, the use of acoustic parameters has been considered crucial for species recognition (CARVALHO et al. 2010).

Hypsiboas leucocheilus (Fig. 1) was described by CARAMASCHI & NIEMEYER (2003) from few localities in the Brazilian states of Mato Grosso and Rondônia along the contact zone of “Cerrado” and Amazon rain forest. While conducting fieldworks at several places in northern Mato Grosso, including the type locality, individuals of *H. leucocheilus* were found at seven localities (Fig. 2). At all localities, the habitats consisted of primary forests along small streams, near tributaries of the Aripuanã, Juruena and Teles Pires rivers. Herein, we add new data on the distribution of *H. leucocheilus* and describe its advertisement call, comparing it to previous published calls of members of the *H. albopunctatus* group.

Calls were recorded using a professional digital recorder Marantz PMD 660 equipped with a Yoga EM-9600 external directional microphone and saved as uncompressed files on flash memory cards. Recordings were resampled

at 44.1 kHz with a 16 bit resolution (FFT width 1024) with Cool Edit 96 (Syntrillium Corp.) and Raven Pro 1.3. They are archived as WAVE files in the Banco de Registros Bioacústicos, housed at the Laboratório de Herpetologia do Instituto de Biociências of the Universidade Federal de Mato Grosso (IB-UFMT, Cuiabá, MT), under accession numbers LH 234 (no collected voucher specimen) and LH 246 (voucher specimen UFMT 11486). Voucher specimens were captured after calls were recorded, photographed (Fig. 2), euthanised, preserved in 70% ethanol, and deposited in the Coleção Zoológica de Vertebrados of the Universidade Federal de Mato Grosso (UFMT). Terminology for acoustic parameters follows HEYER et al. (1990) and MARTINS & JIM (2003). The following seven call variables were analysed: call duration, call interval, mean call rate, note duration, inter-note intervals, inter-pulse intervals, and dominant frequency.

The first call recording for *H. leucocheilus* was made at the type-locality (Aripuanã municipality, 10°08'34" S, 59°25'44" W) on 09 January 2008, 22:58 h, at 26°C air temperature. The male called while perched on vegetation at 1.5 m above the ground, ca. 0.5 m from a small stream (ca. 1.0 m wide, 0.4 m deep) inside primary forest. Eleven other anuran species were found calling in sympatry with *H. leucocheilus* at this site: *Dendropsophus minutus* (PETERS, 1872), *D. marmoratus* (LAURENTI, 1768), *D. cf. riveroi* (COCHRAN & GOIN, 1970), *Hyalinobatrachium carlesvilai* CASTROVIEJO-FISHER, PADIAL, CHAPARRO, AGUAYO & DE LA RIVA, 2009, *Leptodactylus knudseni* HEYER, 1972, *L. rhodomystax* BOULENGER, 1884, *Phyllomedusa camba* DE LA RIVA, 2000, *Pristimantis cf. fenestratus* (STEINDACHNER, 1864), *Rhaebo guttatus* (SCHNEIDER, 1799), *Scinax aff. nebulosus* (SPIX, 1824), and *S. ruber* (LAURENTI, 1768). Another call of *H. leucocheilus* was recorded in the Paranaíta municipality (09°33'20.1" S, 56°42'14.4" W) on 1 Novem-



Figure 1. A live specimen of *Hypsiboas leucocheilus* from the type-locality (Aripuanã municipality), Mato Grosso, Brazil.

ber 2009, 21:40 h, at 22°C air temperature. The calling male was not collected, because it was perched about 3 m above the ground. Nine other anuran species were found calling in sympatry with *H. leucocheilus* at this site: *Ameerega* cf. *picta* (BIBRON in TSCHUDI, 1838), *Dendropsophus marmoratus*, *Hypsiboas cinerascens* (SPIX, 1824), *H. geographicus* (SPIX, 1824), *Leptodactylus lineatus* (SCHNEIDER, 1799), *L. rhodomystax*, *Phyllomedusa hypochondrialis* (DAUDIN, 1800), *Pristimantis* cf. *fenestratus* and *Rhaebo guttatus*.

The advertisement call of *H. leucocheilus* consists of a series of 4–5 notes, produced at rates of 2.9 ± 1.7 calls/minute (see Table 1). The mean duration of a call was 1.05 ± 0.13 s with inter-call intervals of 8.10 ± 6.35 s. Note duration was 0.14 ± 0.4 s, and duration of intervals between notes 0.13 ± 0.03 s. Frequency ranged from 548–4064 Hz and mean dominant frequency was 1821 ± 73.6 (Fig. 3). Some para-

eters, such as the inter-note and inter-call intervals differed considerably among the studied localities, and these differences may be explained by a variety of factors, such as the lower sample size in Aripuanã. The lower temperature at Paranaíta may also be related to these differences, as call rates in frogs presumably increases with temperature (PRESTWICH 1994). The social context and individual motivation is another variable that might affect the call parameters (SULLIVAN & WAGNER 2003).

The advertisement call of *H. leucocheilus* shares its pulsed character with other species of the group (e.g. *H. albopunctatus* – DE LA RIVA et al. 1997, BUENO et al. 2003; *H. lanciformis* and *H. fasciatus* – MÁRQUEZ et al. 1993; *H. raniceps* – MÁRQUEZ et al. 1993, GUIMARÃES & BASTOS 2003; *H. multifasciatus* – CARVALHO et al. 2010; *H. paranaíba* – GUIMARÃES et al. 2001, CARVALHO et al. 2010). The

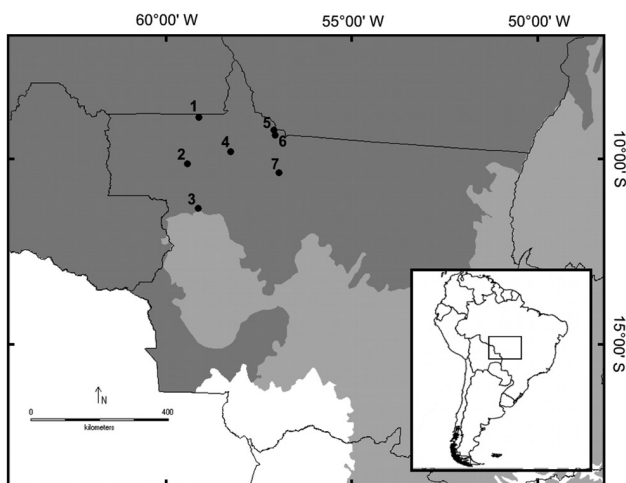


Figure 2. Geographic distribution of *Hypsiboas leucocheilus* in Mato Grosso state, Brazil. 1) Colniza; 2) Aripuanã; 3) Juína; 4) Cotriguaçu; 5) Apicás; 6) Paranaíta; 7) Alta Floresta.

Table 1. Numerical parameters of the advertisement call of two males of *Hypsiboas leucocheilus* recorded in the Aripuanã and Paranaíta municipalities, Mato Grosso, Brazil. Values are mean \pm standard deviation, range in parentheses.

	Aripuanã	Paranaíta
Number of calls analysed	2	7
Call duration (s)	1.04 ± 0.1 (0.96–1.11)	1.06 ± 0.15 (0.94–1.35)
Inter-call interval (s)	9.0	27.6 ± 6.0 (20.1–36.8)
Note duration (s)	0.16 ± 0.04 (0.12–0.24)	0.13 ± 0.03 (0.8–0.21)
Inter-note interval (s)	0.09 ± 0.02 (0.07–0.13)	0.14 ± 0.02 (0.1–0.21)
Dominant frequency (Hz)	1801.7 ± 98.4 (1732.1–1871.3)	1826.6 ± 73.8 (1744.6–1915.7)
Mean call rate /min	6.6	2.2 ± 0.5

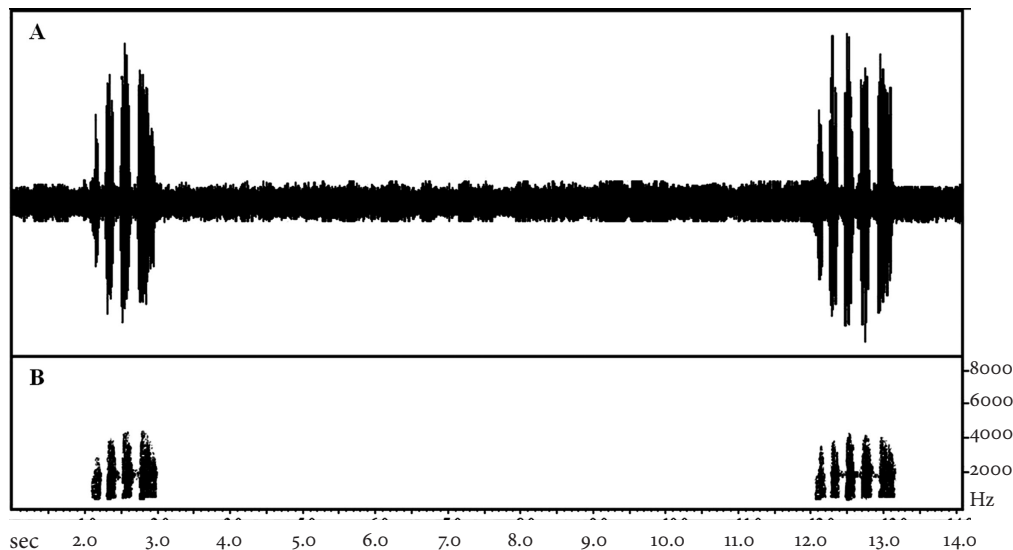


Figure 3. (A) Oscillogram and (B) spectrogram of the advertisement call of *Hypsiboas leucocheilus* (UFMT 11486), recorded in the municipality of Aripuanã, Mato Grosso State, on 09 January 2008, 22:58 h, at an air temperature of 26°C.

call of *H. leucocheilus* is most similar to those of *H. albopunctatus*, *H. lanciformis*, *H. paranaíba*, and *H. multifasciatus*. Although the morphological differences are sufficient for identification of these species (e.g., presence of white stripes on both the upper and lower lips instead of presence on the lower lip only in *H. albopunctatus*, *H. multifasciatus*, *H. paranaíba*, and *H. raniceps*, versus only on the upper lip in *H. lanciformis*; the absence of spots and stripes on the anterior and posterior faces of thighs distinguishes *H. leucocheilus* from *H. albopunctatus*, *H. multifasciatus*, *H. paranaíba*, and *H. raniceps*; and the absence of dark and white spots in the gular region and on the chest separate *H. leucocheilus* from *H. lanciformis*; see CARAMASCHI & NIEMEYER, 2003), some parameters in vocalization are useful for species differentiation within this species group. The note duration in calls of *H. leucocheilus* is shorter compared to other species (0.12–0.24 s versus 0.27–0.43 s in Uruguayan populations of *H. albopunctatus*, 0.27–0.68 s in Argentinean populations of *H. albopunctatus* – KWET et al. 2002; 0.43–0.48 s in Bolivian populations of *H. albopunctatus* – DE LA RIVA et al. 1997; 0.25–0.57 s in *H. lanciformis* – MÁRQUEZ et al. 1993; 0.40–0.70 s in *H. paranaíba*; and 0.24–0.60 s in *H. multifasciatus* – CARVALHO et al. 2010). The note repetition rate is relatively lower in calls of *H. leucocheilus* as compared to three other species of the group (56–57 notes/min. versus 87.4–101.3 notes/min. in *H. albopunctatus* – DE LA RIVA et al. 1997; 68–109 notes/min. in *H. lanciformis* – MÁRQUEZ et al. 1993; 101–205 notes/min. in *H. raniceps* – MÁRQUEZ et al. 1993). The dominant frequency is similar to that reported for calls of *H. lanciformis* (1654.3 Hz, MÁRQUEZ et al. 1993), higher than in calls of *H. raniceps* (761.3 and 900.64 Hz, MÁRQUEZ et al. 1993 and GUIMARÃES & BASTOS 2003, respectively) and lower than in calls of *H. albopunctatus* (1400–3300, 2202.7 and 2692.3 Hz; KWET et al. 2002, BUENO et al. 2003 and DE LA RIVA et al. 1997, respectively), *H. multifasciatus* (2920 Hz; CARVALHO et al. 2010) and *H. paranaíba* (2309.63 Hz; GUIMARÃES et al. 2001).

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Appendix

Collection records of *Hypsiboas leucocheilus* in Mato Grosso state obtained during this study

Alta Floresta (UFMT 9127), Apiacás (UFMT 7552), Aripuanã (UFMT 7035, UFMT 11486) Colniza (UFMT 6777, UFMT 7687, UFMT 8610), Cotriguaçu (UFMT 11263), Juína (UFMT 11485), Paranaíta (UFMT 7520, UFMT 8745, UFMT 9709, UFMT 9724, UFMT 9816, UFMT 10069).