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A New Species of the *Hypsiboas pulchellus* Group from the Serra da Mantiqueira, Southeastern Brazil (Amphibia: Anura: Hylidae)

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Abstract: A new species of the *Hypsiboas pulchellus* group is described from the Mantiqueira range, in the Município de Rio Preto, State of Minas Gerais, Brazil. We describe adults, tadpoles, and the advertisement call. The new species is morphologically similar to *H. freicanecae*, a species known from a few localities in the states of Alagoas and Pernambuco, northeastern Brazil, ~1640 km north. Adults differ from *H. freicanecae* in having a slender body, smaller male size, larger calcar, and hidden surfaces of thighs and feet orange in life. Tadpoles have a ventral oral disc, with labial tooth row formula 2(2)/3–4(1), with one to three narrow posterior gaps on the marginal papillae located on the oral disc emarginations. The advertisement call is composed of two nonpulsed notes with dominant frequency at the second harmonic. The species is known only from its type locality, in an unprotected area.

Key words: Cophomantini; Species description; Tadpoles; Taxonomy; Treefrogs; Vocalization

The *Hypsiboas pulchellus* group is the most species rich of the seven species groups of *Hypsiboas* Wagler 1830 (Faivovich et al. 2005). The group currently includes 38 species, representing more than one-third of the described species in the genus (91 spp.; Frost 2016). The monophyly of the group has been corroborated by several analyses on the basis of molecular data (Faivovich et al. 2004, 2005, 2013; Wiens et al. 2010; Pyron and Wiens 2011). The only putative phenotypic synapomorphy known for the group so far is the absence of the slip of the depressor mandibulae muscle of scapular origin (Faivovich et al. 2005).

The species of the *H. pulchellus* group inhabit both streams and lentic water bodies in forests and grasslands, from northeastern Brazil in the State of Pernambuco to the pampean grasslands of Argentina, and westward to the eastern slopes of the Andes, from northern Argentina to central Peru. Phylogenetic analyses of the group (Faivovich et al. 2004, 2005, 2013; Köhler et al. 2010; Lehr et al. 2010) show two Andean clades including four species each, whereas the bulk of the species included in the group are distributed in the Atlantic Forest in Brazil (20 species; only two reach adjacent areas in Argentina and Paraguay), seven species are distributed in the Cerrado formations, one mostly in pampean grasslands, and one in the Central Sierras of Argentina.

During a field trip in the mountains of Serra Negra, part of the Serra da Mantiqueira (Mantiqueira mountain range) in the State of Minas Gerais, Brazil, we collected a new species of the *H. puchellus* group, morphologically similar to *H. freicanecae* (Carnaval and Peixoto 2004). In this paper, we describe its adult and larval morphology and its advertisement call, and provide comments on the conservation status of Serra Negra.

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Materials and Methods

Adult Morphology and Species Description

Adults were euthanized in 5% lidocaine, fixed in 10% formalin, and preserved in 70% ethanol. Voucher specimens are housed in the Celio F.B. Haddad Amphibian Collection, Rio Claro, São Paulo, Brazil (CFBH); Amphibian Collection of Centro de Coleções Taxonômicas da Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil (UFMG); and Museu de Zoologia João Moojen de Oliveira, Universidade Federal de Viçosa, Viçosa, Minas Gerais, Brazil (MZUFV). Additional specimens used for comparisons are listed in the Appendix; museum acronyms follow Sabaj Pérez (2014). We measured specimens to the nearest 0.1 mm using digital calipers under a Zeiss Stemi SV 11 stereomicroscope. Measurements (in mm) follow Duellman (1970): snout–vent length (SVL), head length (HL), head width (HW), eye diameter (ED), eye–nostril distance (END), internarial distance (IND), eyelid width (EW), interorbital distance (IOD), tympanum diameter (TD), tibia length (TL), tarsal length (TAL), and foot length (FL). We also measured snout length (SL; Cei 1980); thigh length (THL; Heyer et al. 1990); finger III disc diameter (3FD), and toe IV disc diameter (4TD; Napoli and Caramaschi 1999). Additionally, we measured calcar length (CAL; distance from the base to the tip of the calcar). Terminology for external morphology follows Duellman (1970), except for the dorsal outline of the snout, which follows Heyer et al. (1990). Webbing formulae follow Savage and Heyer (1967) as modified by Myers and Duellman (1982). Sex was determined by the development of a prepollex, vocalization, or presence of vocal slits in males, and presence of mature oocytes in the female specimen.

Tadpoles

Tadpoles were collected in the same pond where the adults were collected, euthanized in 5% lidocaine solution, then preserved in 10% formalin (one specimen was preserved in ethanol 95% as tissue for DNA analysis). Voucher lots are housed in the CFBH collection. To confirm the identity of the tadpoles, we used sequences of cytochrome oxidase c subunit I (primers AnF1 and AnR1; Jungfer et al. 2013; GenBank accessions KX241479—KX241481 [tadpole, holotype, and recorded male paratype, respectively]) showing 100% similarity between adult and larva. Descriptions, measurements, and proportions of tadpole external morphology are based on six tadpoles in Gosner's (1960) stages 34–36 (lots CFBH 39392, 39405). To assess ontogenetic variation, 23 specimens in stages 25–39 were also analyzed (lots CFBH 39392, 39405). Measurements and terminology follow Altig and McDiarmid (1999): total length (TL), body length (BL), tail length (TAL), maximum tail height (MTH), IND, IOD, tail muscle width (TMW), and tail muscle height (TMH); Lavilla and Scrocchi (1986): body width (BW), body width at narial level (BWN), body width at eye level (BWE), body height (BH), eye–snout distance (ESD), END, nostril–snout distance (NSD), ED, narial diameter (ND), snout–spiracular distance (SSD), and oral disc width (ODW). We also measured dorsal fin height (DFH) and ventral fin height (VFH; Grosjean 2005); spiracle length (SL), spiracle distal edge height (SDH), and dorsal-fin insertion angle (DFiA; Pinheiro et al. 2012); oral-disc position (ODP; angle formed by the tangent of the extended line connecting the anterior and posterior lips and the plane of longitudinal axes of the tadpole, characterized as ventral [$0° < \times < 30°$] and anteroventral [$31° < \times < 80°$]; adapted from Altig and Johnston 1989). Tadpoles were measured using ImageTool v3.00 (Wilcox et al. 1996) on digital photographs. To obtain high-quality photos we used an adjustable platform for the support of the tadpoles immersed in water (Schacht and McBrayer 2009). Lateral line system terminology and descriptions follow Lannoo (1987) and Kolenc et al. (2008). Terminology for tooth morphology follows Vera Candioti and Altig (2010).

Recording and Vocalization Analysis

We recorded two specimens of the new species at the same locality where we collected the entire series, using a Marantz PMD 660 digital recorder coupled to a Sennheiser K6/ME66 microphone at 44.1 kHz with 16-bit sampling size. Air temperature was measured with an alcohol thermometer. The data were analyzed using software Raven Pro 64 v1.4 (Cornell Lab of Ornithology, Ithaca, NY). Spectrograms and power spectra were produced with window size of 256 samples, 75% overlap, hop size of 64 samples, and window type Hann. Resolution, contrast, and brightness were those of the default settings. Voucher specimens and recordings are housed at CFBH (recordings CFBH/PDPP_1 and CFBH/PDPP_2).

The following acoustic parameters were considered: number of notes, note duration (time from the beginning to the end of one note, measured on the oscillogram), interval between notes (time from the end of one note to the beginning of the following note, measured on the oscillogram), interval between calls (time from the end of last note of one call to the beginning of the first note of the following call, measured on the oscillogram), dominant frequency range (band of frequency in which the energy of the note is concentrated, measured on the spectrogram), and peak frequency (the specific frequency with higher energy of the note, accessed directly from Raven Pro software). Note definition follows Duellman and Trueb (1986). For all parameters we analyzed eight calls from two males (four calls from each male).

TABLE 1.—Some measurements and proportions of the type series of *Hypsiboas cambui*. Values (mm) are reported as ranges (mean ± 1 SD). See text for explanation of measurement abbreviations.

	Measurement			Body ratios	
	Males (n = 16)	Female (n = 1)		Males (n = 11)	Female (n = 1)
SVL	26.3–32.8 (30.3 ± 1.7)	32.7	HW/HL	0.90–1.00	0.97
HL	9.3–11.3 (10.6 ± 0.5)	11.8	HL/SVL	0.33–0.36	0.36
HW	9.2–10.8 (10.2 ± 0.4)	11.5	HW/SVL	0.32–0.35	0.35
ED	3.2–3.9 (3.5 ± 0.2)	3.5	EN/ED	0.69–0.89	0.90
EN	2.4–3.0 (2.8 ± 0.2)	3.1	IOD/ED	0.75–1.09	0.84
IND	1.8–2.1 (1.9 ± 0.1)	2.1	IOD/HL	0.27–0.34	0.25
EW	2.1–3.0 (2.6 ± 0.2)	2.8	IOD/HW	0.28–0.36	0.25
IOD	2.6–3.5 (3.1 ± 0.2)	2.9	ED/HL	0.31–0.38	0.29
TD	1.3–1.7 (1.5 ± 0.1)	1.8	ED/HW	0.32–0.39	0.30
TL	14.0–16.8 (16.0 ± 0.7)	16.9	EW/HL	0.20–0.27	0.24
TAL	8.3–10.3 (9.4 ± 0.5)	10.3	TD/3FD	0.88–1.26	1.20
FL	11.6–14.1 (13.2 ± 0.6)	14.0	TD/ED	0.38–0.47	0.53
SL	4.0–4.8 (4.5 ± 0.2)	4.9	TD/HL	0.12–0.15	0.16
THL	12.7–15.9 (14.8 ± 0.9)	15.9	TAL/SVL	0.29–0.33	0.31
3FD	1.2–1.6 (1.4 ± 0.1)	1.5	FL/SVL	0.42–0.45	0.43
4TD	1.1–1.5 (1.3 ± 0.1)	1.3	SL/HL	0.41–0.47	0.42
CAL	0.6–1.1 (0.9 ± 0.1)	1.1	SL/HW	0.42–0.48	0.43
			THL/SVL	0.46–0.52	0.48
			TL/SVL	0.50–0.55	0.52
			CAL/TAL	0.07–0.11	0.11
			4TD/3FD	0.78–0.99	0.87

Species Account

Hypsiboas ***cambui*** sp. nov.
(Table 1; Figs. 1–3)

Holotype.—CFBH 39397, an adult male from Brazil: State of Minas Gerais: Município de Rio Preto: Vilarejo do Funil (22°0′19″S, 43°53′20″W, 905 m above sea level; datum WGS84), collected on 27 February 2015 by P.D.P. Pinheiro, B. Blotto, and B. Lisboa.

Paratypes.—All adults (15 males, one female), collected in the type locality. CFBH 39393 (female); CFBH 39394–39396, 39398–39402 (males), collected with the holotype. CFBH 39403, 39404 (males), collected on 6 March 2015 by P.D.P. Pinheiro and F.A. Brusquetti. UFMG 12449–12451 (males) collected on 27 January 2007 by B.G. Pacheco. MZUFV 9016–9017 (males) collected between 30 November and 4 December 2008 by E.F. Oliveira, J.T. Santos, and I.G. Dias.

Diagnosis.—A member of the *H. pulchellus* group, as indicated by the absence of a scapular origin of the depressor mandibulae muscle. This new species is distinguished by the following combination of characters: male SVL 26.3–32.8 (n = 16), single known female SVL 32.7; slender body; palpebral membrane almost entirely translucent; large, triangular calcar (CAL/TAL 0.07–0.11); dorsum pale to dark brown, with a whitish-cream (female) to pale and light-

Fig. 1.—(A) *Hypsiboas cambui*, holotype in life (CFBH 39397; snout-vent length [SVL] = 32.8 mm). Photo: Barnagleison S. Lisboa. (B–E) Variation in coloration pattern of adults; B–D are males. (B) CFBH 39398 (SVL = 30.2 mm), with no light spots on dorsum, and many tiny red dots on dorsal surfaces of body and limbs. (C) CFBH 39400 (SVL = 31.6 mm) with absence of the cream line that contours the dorsolateral bands and triangle, and irregular border between loreal coloration and labial stripe. (D) CFBH 39403 (SVL = 30.6 mm) with poor differentiation of the dorsolateral bands and triangle. (E) Female, CFBH 39393 (SVL = 32.7 mm), dorsolateral bands and triangle cream and a dark lateral stripe on tibia. A color version of this figure is available online.

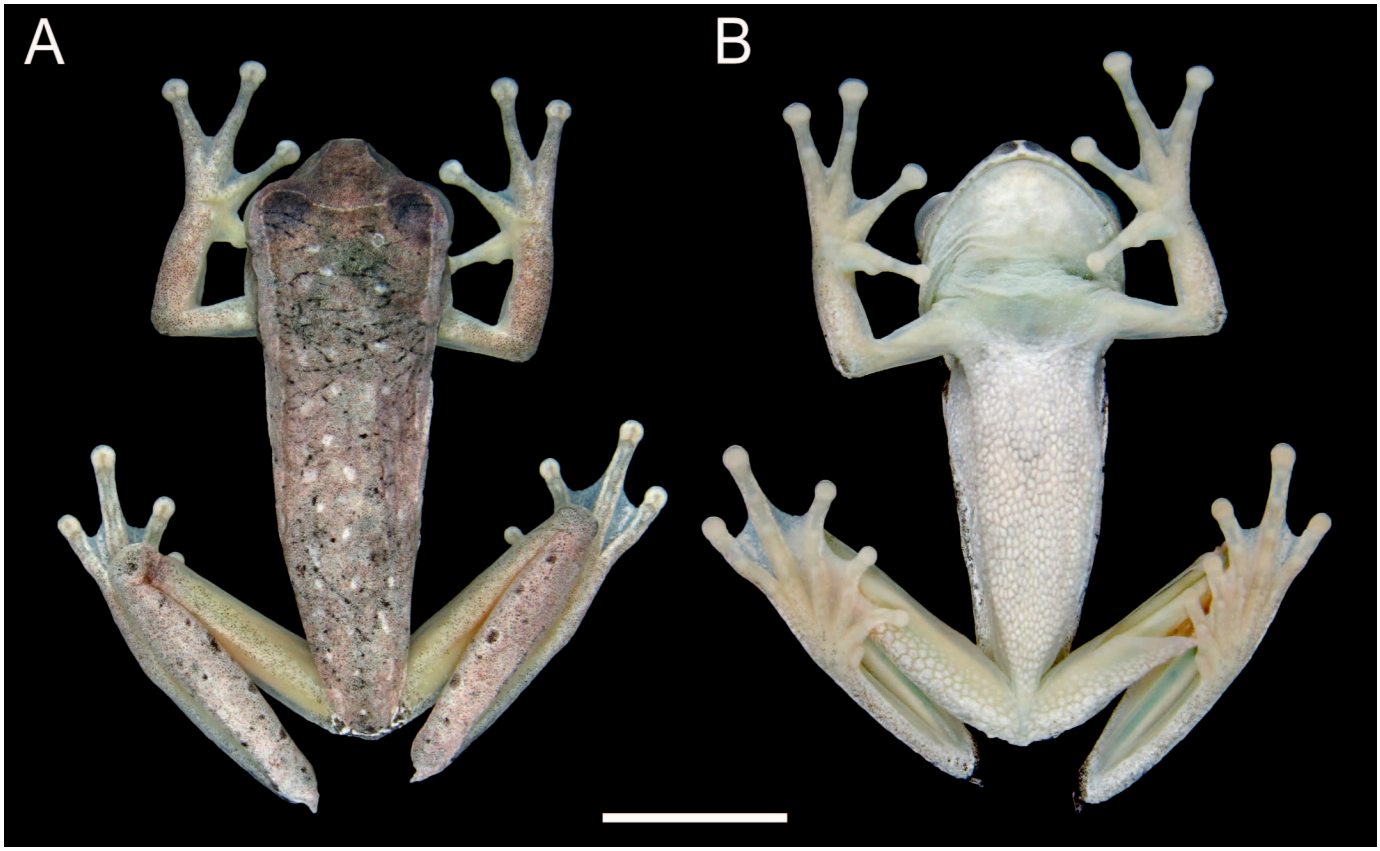

FIG. 2.—*Hypsiboas cambui*, holotype (CFBH 39397). (A) Dorsal view. (B) Ventral view. Scale bar = 10 mm. A color version of this figure is available online.

brown (males) dorsolateral band on each side of the dorsum, that contours the posterior outer half of the eyelid and expands anteriorly into a triangle that covers the dorsal surface between the orbits and the tip of the snout (Figs. 1–3); hidden parts of thighs orange; absence of bars and spots on flanks and hidden surfaces of thighs; nuptial pads absent; vomerine teeth in two short and transverse series; tadpoles with oral disc 33–39% of body width; labial tooth row formula (LTRF) 2(2)/3–4(1), with P2 larger than P1, and P4 shorter than P3; row of marginal papillae with anterior gap and small posterior gaps on the oral disc emarginations; spiracle free distally; tail muscle cream colored, finely reticulated with melanophores contrasting with rounded light, unpigmented spots; fins translucent with scattered small light blotches; advertisement call composed of two nonpulsed notes of equal duration, with the dominant frequency at the second harmonics.

Comparisons.—The coloration pattern with a dorsolateral band on each side of the dorsum that contours the posterior outer half of the eyelid and expands anteriorly into a triangle that covers the dorsal surface between the orbits and the tip of the snout in *H. cambui* resembles that of *H. freicanecae* (Carnaval and Peixoto 2004) and promptly distinguishes these two species from all other species of the *H. pulchellus* group. The new species differs from *H. freicanecae* by having a more slender body (robust in *H. freicanecae*), a smaller male SVL (26.3–32.8; 37.3–42.2 in *H. freicanecae*), a larger calcar (CAL/TAL 0.07–0.11; 0.03 in *H. freicanecae*; see also Carnaval and Peixoto 2004), and hidden surfaces of thighs and feet orange in life (pale cream in *H. freicanecae*).

Male SVL also differentiates *H. cambui* (26.3–32.8) from *H. aguilari* (33.7–43.8), *H. alboniger* (47.0–56.0), *H. balzani* (33.3–49.9), *H. bischoffi* (36.0–47.0), *H. callipleura* (37.2–43.3), *H. cordobae* (39.0–50.0), *H. cymbalum* (44.8–46.2), *H. gladiator* (35.3–49.4), *H. guentheri* (33.0–40.0), *H. joaquini* (40.3–56.4), *H. latistriatus* (34.9–40.6), *H. marginatus* (37.5–53.6), *H. marianitae* (36.5–56.8), *H. melanopleura* (43.6–50.0), *H. palaestes* (36.2–50.4), *H. poaju* (33.5–42.7), *H. prasinus* (41.0–47.0), *H. pulchellus* (37.0–49.0), *H. riojanus* (48.0–56.0), *H. secedens* (55.0–57.0), *H. semiguttatus* (36.1–45.2), and *H. stellae* (40.7–49.9; Boulenger 1912; Bokermann 1963; Lutz 1963, 1973; Barrio 1965; Heyer et al. 1990; Duellman et al. 1997; Garcia et al. 2001, 2003, 2007, 2008; Caramaschi and Cruz 2004; Kwet 2008; Köhler et al. 2010; Lehr et al. 2010).

The absence of vertical bars or spots on hidden parts of thighs differentiates *H. cambui* from *H. alboniger* (Nieden 1923), *H. balzani* (Boulenger 1898), *H. bischoffi* (Boulenger 1887), *H. caingua* (Carrizo 1991), *H. callipleura* (Boulenger 1902), *H. cordobae* (Barrio 1965), *H. curupi* (Garcia et al. 2007), *H. cymbalum* (Bokermann 1963), *H. gladiator* (Köhler et al. 2010), *H. guentheri* (Boulenger 1886), *H. marianitae* (Carrizo 1992), *H. prasinus* (Burmeister 1856), *H. pulchellus* (Duméril and Bibron 1841), *H. riojanus* (Koslowsky 1895), *H. secedens* (Lutz 1963), and *H. stellae* (Kwet 2008; vertical bars or spots on hidden parts of thighs present in these species). The absence of vertical bars or

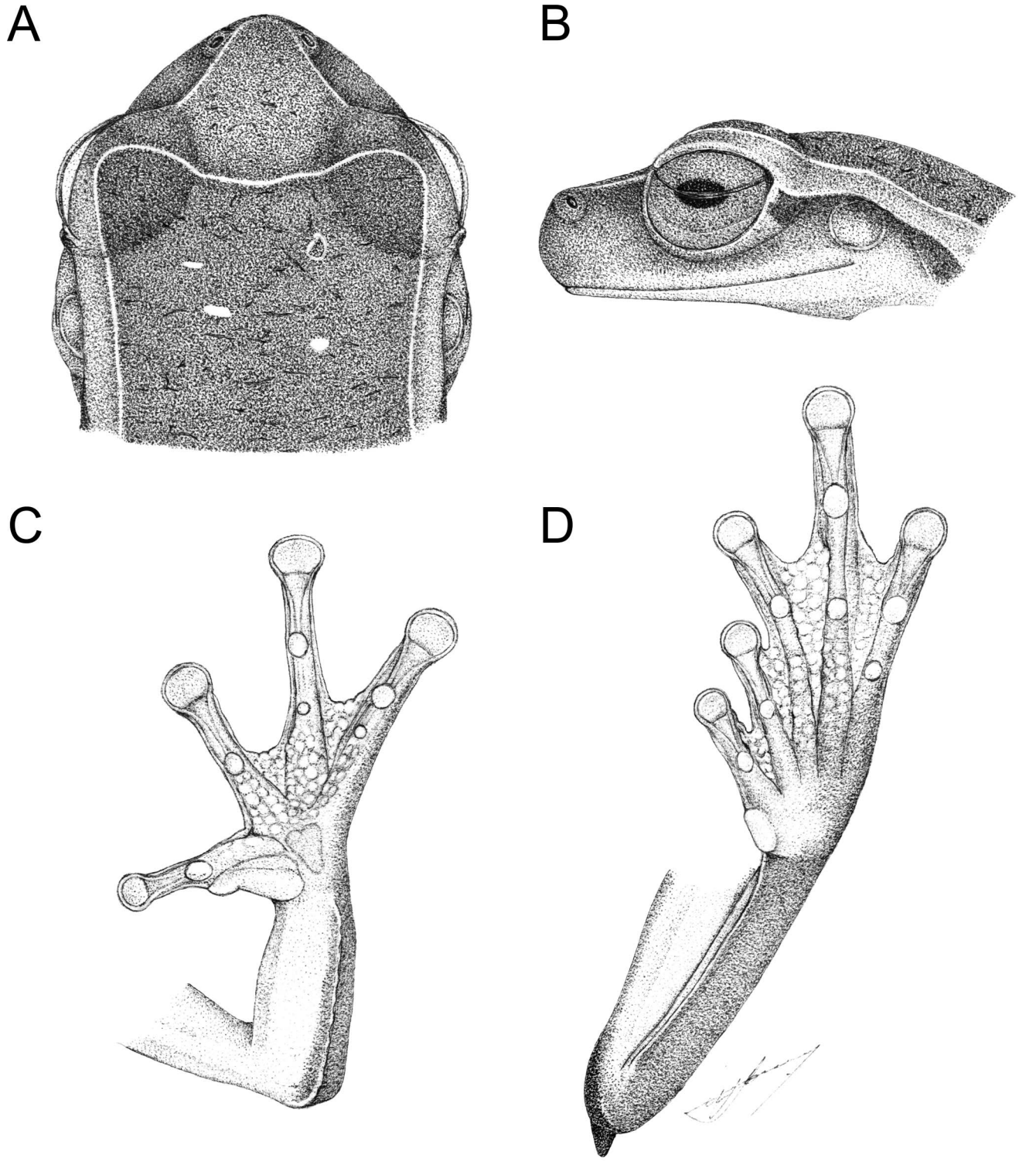

Fig. 3.—*Hypsiboas cambui*, holotype (CFBH 39397). (A) Head in dorsal view. (B) Head in lateral view. (C) Left hand in ventral view. (D) Left foot in ventral view. Scale bar = 5 mm.

spots on flanks differentiates *H. cambui* from *H. aguilari* (Lehr et al. 2010), *H. alboniger* (Nieden 1923), *H. balzani* (Boulenger 1898), *H. caingua* (Carrizo 1991), *H. caipora* (Antunes et al. 2008), *H. callipleura* (Boulenger 1902), *H. curupi* (Garcia et al. 2007), *H. cymbalum* (Bokermann 1963), *H. ericae* (Caramaschi and Cruz 2000), *H. gladiator* (Köhler et al. 2010), *H. guentheri* (Boulenger 1886), *H. joaquini* (Lutz 1968a), *H. marianitae* (Carrizo 1992), *H. melanopleura* (Boulenger 1912), *H. poaju* (Garcia et al. 2008), *H. prasinus* (Burmeister 1856), *H. pulchellus* (Duméril and Bibron 1841), *H. riojanus* (Koslowsky 1895), *H. secedens* (Lutz 1963), *H. semiguttatus* (Lutz 1925), and *H. stellae* (Kwet

2008; vertical bars or spots on flanks present in these species).

The new species can be distinguished from *H. bandeirantes* (Caramaschi and Cruz 2013), *H. beckeri* (Caramaschi and Cruz 2004), *H. botumirim* (Caramaschi et al. 2009), *H. buriti* (Caramaschi and Cruz 1999), *H. caingua*, *H. cipoensis* (Lutz 1968b), *H. goianus* (Lutz 1968b), *H. guentheri, H. jaguariaivensis* (Caramaschi et al. 2010), *H. latistriatus* (Caramaschi and Cruz 2004), *H. leptolineatus* (Braun and Braun 1977), *H. phaeopleura* (Caramaschi and Cruz 2000), *H. polytaenius* (Cope 1870), and *H. stenocephalus* (Caramaschi and Cruz 1999) by the absence of longitudinal stripes and lines on dorsum (dorsal stripes and lines present in all these species).

The calcar is a character that *H. cambui* shares only with *H. bischoffi*, *H. freicanecae*, *H. polytaenius*, and *H. secedens*. It is also present in some specimens of *H. caingua* (e.g., CFBH 8605). *Hypsiboas cambui* does not have nuptial pads on the thumbs or reticulations on the palpebrae, and its vomerine teeth series are short and transverse, whereas *H. secedens* has nuptial excrescences on thumbs, reticulations on the inferior portion of the palpebrae, and vomerine teeth series long and oblique, forming an inverted V.

Description of the holotype.—Adult male; SVL 32.8; body slender; head wider than body, nearly as wide as long (HW/HL = 0.94); snout rounded in dorsal view (SL/HL = 0.43; SL/HW = 0.43), round in profile (Fig. 3A,B); END shorter than ED (END/ED = 0.75); canthus rostralis slightly curved in dorsal view and rounded in cross-section; loreal region slightly concave; lips thin, not flared; internarial region barely depressed; nostrils not protuberant, dorsolaterally directed; interorbital area flat, shorter than ED (IOD/ED = 0.79), more than three times shorter than HW (IOD/HW = 0.28). Eyes large and protuberant (ED/HL = 0.33; ED/HW = 0.35); palpebral membrane translucent, without reticulations, and its lower portion poorly pigmented. Supratympanic fold poorly developed, covering the upper portion of tympanic ring, extending to arm insertion. Tympanum small (TD/ED = 0.46), distinct, directed dorsolaterally, separated from eye by a distance slightly longer than TD.

Arm slender, not hypertrophied, lacking an axillary membrane; a row of small and juxtaposed ulnar tubercles extend from proximal limit of hand to the elbow. Fingers long, bearing round discs; disc diameter on finger III slightly narrower than tympanum (TD/3FD = 1.05); relative finger length I < II < IV < III; webbing formula I—II 2—$3^{1/2}$ III 3^{-}—$2^{1/2}$ IV; presence of lateral fringes on fingers; subarticular tubercles distinct, nonbifid, and rounded in ventral view; subarticular tubercles conical in profile on fingers I and II and flat on III and IV; supernumerary tubercles present; inner metacarpal tubercle flat and elongated; outer metacarpal tubercle bifid, flat, and large (Fig. 3C). Nuptial pad absent; prepollex enlarged and pointed as a bony spine that is evident under the skin.

Hind limbs long and slender (THL/SVL = 0.47; TL/SVL 0.51); tarsal fold present, extending from inner metatarsal tubercle to the heel; calcars large (CAL/TAL = 0.09) and triangle shaped in dorsal view. Toes long, bearing round discs, slightly smaller than those on fingers (4TD/3FD = 0.93); relative toe length I < II < III = V < IV; webbing formula I 1—2^{-} II 1—2 III $1^{1/2}$—2^{+} IV 2^{+}—1^{+} V; presence of lateral fringes on toes; presence of a thickened layer of tissue at midline of webbing between toes IV and V. Subarticular tubercles moderately large, round in ventral view, slightly conical in profile; supernumerary tubercles present; outer metatarsal tubercle absent; inner metatarsal tubercle distinct, flat, and elliptical in ventral view (Fig. 3D).

Skin smooth except pectoral and abdominal areas, and ventral surfaces of thighs, where it is granular. Pectoral fold absent. Cloacal opening directed posteroventrally at upper level of thighs; cloacal sheath absent; a white, supracloacal dermal ridge present; cloacal tubercles present, scattered, extending to midlevel of thighs.

Tongue ovoid, barely free behind; dentigerous processes of vomers prominent, in two separate, nearly straight series converging medially, bearing six (right) and eight (left) teeth. Choanae large, almost rounded, spaced 2.4 mm from each other. Vocal slits moderately long, extending from midlateral base of tongue, almost reaching the angle of jaws. Vocal sac single, median, subgular.

Measurements of holotype (mm).—SVL 32.8, HL 10.9, HW 10.8, ED 3.8, EN 2.9, IND 2.0, EW 2.7, IOD 3.1, TD 1.6, TL 16.7, TAL 9.3, FL 13.6, SL 4.7, THL 15.9, 3FD 1.6, 4TD 1.3, CAL 1.1.

Coloration.—In life, at night, dorsum dark brown, with light-brown dots (Fig. 1). Dorsum dark brown with a light-brown dorsolateral band on each side that contours the posterior outer half of the eyelid and expands anteriorly into a triangle that covers the dorsal surface between the orbits and the tip of the snout (for simplicity, we hereinafter refer to this pattern as "dorsolateral bands and triangle"). A cream line delimits the dorsolateral bands internally, and the triangle, running along the canthus rostralis, and extending anteriorly to the tip of the snout where it joins a labial stripe. Upper part of loreal region dark brown, like the dorsum of the body, with the limit between it and the labial stripe with a gradual change in colors. Palpebral membrane translucent with its lower portion partially pigmented, following the pattern of the loreal region. Laterally, a dark-brown band ventrally delimited by a cream line extends from behind the eye, covering the upper portion of tympanum, to inguinal region. Ulnar tubercles, tip of calcar, and cloacal crest whitish cream. Dorsally, limbs and thickened layer of tissue at midline of webbing between toes IV and V light brown. Small, irregular dark blotches on dorsal surface of tibia. Hidden surfaces of thigh and foot webbing orange. Posterior region of elbow and ankle and dorsal region of cloaca dark brown. Ventral surfaces of arm and body cream. Iris copper to golden, with fine black reticulation. Bones green, visible through the skin.

During the day, the colors are paler and the contrast between dark and light colors decreases. Also, it is possible to see tiny red dots all over the dorsal surfaces.

In preservative, the colors fade, turning into pale tones, with scattered melanophores. The red dots disappear, and the light brown dots of the dorsum become whitish. The orange colors of the hidden surfaces of thighs and webbing turn paler or completely vanish. The contrast between the dorsolateral bands and triangle and the dorsum also diminishes (Fig. 2).

Variation.—Some measurements and body proportions are provided in Table 1. Webbing formulae on hands varies as follows: I—II (2–2^{+})—(3–$3^{1/2}$) III ($2^{1/2}$–3)—(2–$2^{1/2}$) IV,

whereas webbing on feet varies as I (1^{-}–$1^{1/2}$)—(2^{-}–2^{+}) II (1–1^{+})—(2–2^{+}) III (1–$1^{1/2}$)—(2–$2^{1/2}$) IV (2^{+}–$2^{1/2}$)—(1–1^{+}) V. Light dots on dorsum can vary in number or might be absent in some specimens (CFBH 39394, 39396, 39398, 39399; UFMG 12250–12251; variation illustrated in Fig. 1B–D). The dorsolateral bands and triangle and dorsum of limbs can be yellowish (CFBH 39400); some males that were collected during vocal activity showed pale tones and weaker contrast with the dorsum (CFBH 39403). The cream line that contours the dorsolateral bands and triangle can be absent (CFBH 39400; UFMG 12449–12251; MZUFV 9017). The loreal region can have a well-defined upper dark-brown band, with the limit between it and the labial stripe marked with a sinuous pattern, and not a gradual change in colors as in the holotype (CFBH 39400). In some specimens, the dorsolateral bands and triangle have small dark-brown spots or blotches (CFBH 39400; UFMG 12249, 12250; MZUFV 9016). In one specimen (CFBH 39400), forearm with a lateral dark-brown blotch, and tibia with a lateral dark-brown stripe. Dark-brown blotches on tibia may be absent (CFBH 39394).

The only known female (CFBH 39393) has the dorsolateral bands and triangle, spots on dorsum, and dorsal parts of arms and legs whitish cream. The lateral dark-brown stripe covers the entire tympanum; and the tibia presents a dark-brown lateral stripe (Fig. 1E). There is no difference in SVL or development of forearms between sexes, but the female has a less developed prepollex than the males.

Etymology.—"Cambuí" is a Portuguese word derived from the tupi "Kãbu'i," attributed to many species of small- to medium-size twisted trees of Myrtaceae that occur close to streams and wet soils, like those of the locality where we found the species. Also, the local people know the area where the animals were collected with the name Cambuí. The name is used here as a noun in apposition.

Tadpole.—(stages 34–36; lots CFBH 39392, 39405; Table 2; Fig. 4) Body depressed (BH/BW = 0.91–0.95; Fig. 4A,B), BL 0.31–0.36 times TL; elliptical in dorsal view; in lateral view, ventral contour flat in peribranchial region, slightly convex in abdominal region. Snout oval in dorsal view (BWN/BWE = 0.74–0.77) and rounded in lateral view. Nostrils large (ND/BL = 0.06–0.07), elliptical, dorsolaterally directed, with a triangular fleshy projection on the medial margin that gives it a reniform appearance (Fig. 4E); nostrils dorsally located (IND/BWN = 0.44–0.51), closer to snout than to the eyes (NSD/ESD = 0.43–0.48). Eyes medium sized (ED/BWE = 0.23–0.25), dorsally located (IOD/BWE = 0.82–0.90), dorsolaterally directed. Spiracle sinistral, lateral, visible in dorsal and lateral views (SDH/BH = 0.38–0.60), medium sized (SL/BL = 0.10–0.13), posteriorly projected, its inner wall barely free from the body and slightly longer than the external wall; opening located at the posterior third of the body (SSD/BL = 0.75–0.86; Fig. 4B,D).

Lateral line system barely distinct, with the infraorbital and middle lines (in the dorsal body region) being the most noticeable series. Cumuli of neuromasts anterolaterally to the base of the vent tube are also barely noticeable (Fig. 4F). Intestinal tube circularly coiled, its switchback point located at the center of abdominal region. Vent tube large with dextral opening, its mid-ventral portion fused to ventral fin (Fig. 4G).

Table 2.—Measurements (in mm) of tadpoles of *Hypsiboas cambui* in two groups of stages of Gosner (1960). Values (mm) are reported as ranges (mean ± 1 SD). See text for explanation of measurement abbreviations.

	Stages 34–36 (n = 6)	Stages 37–39 (n = 4)
TL	38.8–44.7 (41.1 ± 2.0)	48.8–54.5 (51.9 ± 2.9)
BL	13.4–15.1 (14.0 ± 0.7)	15.5–16.9 (16.3 ± 0.6)
TAL	24.6–30.5 (27.1 ± 1.9)	32.5–37.6 (35.3 ± 2.6)
MTH	8.2–10.6 (9.5 ± 0.8)	10.2–11.9 (11.3 ± 0.8)
IND	2.7–3.0 (2.8 ± 0.1)	3.0–3.2 (3.1 ± 0.1)
IOD	6.1–7.4 (6.8 ± 0.4)	7.3–8.3 (7.8 ± 0.4)
TMW	3.2–4.3 (3.6 ± 0.4)	4.5–5.2 (4.8 ± 0.3)
TMH	3.8–5.0 (4.2 ± 0.5)	5.1–5.6 (5.3 ± 0.2)
BW	8.5–10.3 (9.2 ± 0.6)	10.5–11.7 (11.0 ± 0.5)
BWN	5.5–6.7 (6.0 ± 0.5)	6.5–7.2 (6.8 ± 0.3)
BWE	7.4–8.9 (7.9 ± 0.6)	8.7–9.2 (9.0 ± 0.2)
BH	7.9–9.5 (8.5 ± 0.6)	9.2–10.8 (10.1 ± 0.7)
ESD	5.2–6.3 (5.6 ± 0.4)	6.2–6.4 (6.4 ± 0.1)
END	2.7–3.3 (3.1 ± 0.3)	3.4–3.8 (3.6 ± 0.2)
NSD	2.4–2.9 (2.6 ± 0.2)	2.5–3.1 (2.8 ± 0.2)
ED	1.7–2.0 (1.9 ± 0.1)	2.0–2.3 (2.2 ± 0.1)
ND	0.8–1.0 (0.9 ± 0.1)	0.9–1.1 (1.0 ± 0.1)
SSD	10.1–11.9 (11.3 ± 0.6)	11.5–13.3 (12.7 ± 0.8)
ODW	3.1–3.7 (3.4 ± 0.2)	3.6–4.0 (3.9 ± 0.2)
DFH	2.9–3.5 (3.3 ± 0.2)	3.0–4.4 (3.8 ± 0.7)
VFH	2.2–3.1 (2.7 ± 0.3)	2.9–3.1 (3.0 ± 0.1)
SL	1.5–1.9 (1.8 ± 0.1)	1.9–2.1 (2.0 ± 0.1)
SDH	3.4–5.7 (4.4 ± 0.8)	4.3–5.7 (5.0 ± 0.6)
DFiA	4.4–15.1 (10.2 ± 4.7)	10.9–12.9 (12.0 ± 0.9)
ODP	19.0–28.2 (24.0 ± 3.8)	23.8–26.9 (24.8 ± 1.5)

Tail moderately high (MTH/TAL = 0.31–0.39), slightly higher than body (MTH/BH = 1.03–1.17); tail musculature slightly robust (TMH/BH = 0.44–0.53) reaching the tip of the pointed tail. Dorsal fin moderately high (DFH/TAL = 0.11–0.14), with the free margin convex, emerging on posterior third of the body at a low slope (DFiA = 4.4–15.13°), its maximum height at the anterior third of the tail. Ventral fin moderately high (VFH/TAL = 0.08–0.12), with its free margin almost parallel to the longitudinal axis of tail muscle; origin concealed by vent tube.

Oral disc (Fig. 5A,B) ventrally positioned (ODP = 18.9–28.2°), medium sized (ODW/BW = 0.35–0.39, measured with oral disc folded), with three posterior emarginations (one medial and two lateral); a single row of 99–121 conical marginal papillae with bases offset throughout the oral disc; presence of an anterior narrow gap (about 0.15 of ODW), and from one to three narrow posterior gaps located on the emarginations (corresponding to the absence of two to four papillae; Fig. 5A–C); one to six submarginal papillae located laterally in the angular region. Labial tooth row formula 2(2)/4(1); gaps in A2 and P1 about 0.27 and 0.08 mm, respectively; A1 and A2 of the same length; P2 longer than P1 and P3, which are equal in length; P4 smaller than the others, consisting of 4–32 labial teeth; teeth density on P1 35–39 teeth/mm; presence of flaps with labial teeth laterally in the oral disc; teeth continuously curved from base to tip, with an obtuse oral angle; sheath 6.6 times wider than tip; body marked; head long, flattened, and curved with six to eight marginal cusps; cusps from the tip higher than those from the base (Fig. 5D). Narrow jaw sheaths darkly pigmented and finely serrated on the margins (34 to 48 triangular serrations on the upper jaw sheath); upper jaw sheath arc shaped, lower jaw sheath V shaped. Measurements for developmental stages 34–36 and 37–39 are shown in Table 2.

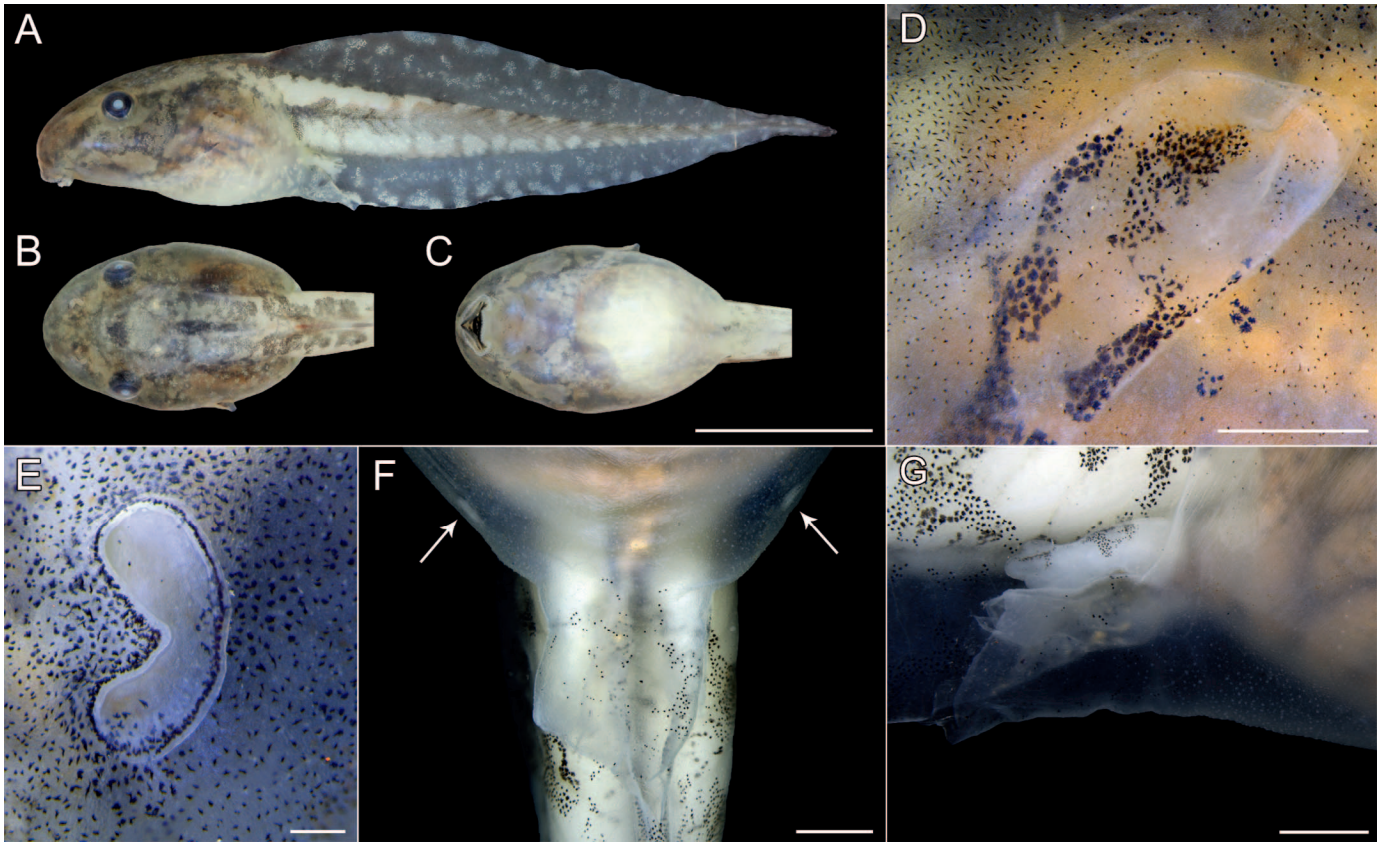

FIG. 4.—Tadpole of *Hypsiboas cambui* in Stage 35 (lot CFBH 39392). (A) Lateral view. (B) Dorsal view. (C) Ventral view. Scale bar = 10 mm. (D) Detail of spiracular aperture in a specimen in Stage 36. Scale bar = 1 mm. (E) Detail of the margin of the left nostril with triangular fleshy projection in a specimen in Stage 36. Scale bar = 0.2 mm. (F) Details of vent tube and cumuli of neuromasts (white arrows) in a specimen in Stage 35, in ventral view. Scale bar = 2 mm. (G) Dextral vent tube in lateral view of a specimen in Stage 35. Scale bar = 2 mm. A color version of this figure is available online.

Coloration of tadpole in life.—Body with brownish background and marbled with black. Black dots and sparse silver blotches scattered dorsally over the body. Distal portion of spiracle lighter than the rest of the body. Intestinal coil visible ventrally. Tail musculature cream, finely reticulated with melanophores contrasting with rounded unpigmented spots; fins translucent with scattered, small light blotches. Dorsal region of dorsal fin reddish brown. A dark longitudinal stripe starting from posterior end of body extends posteriorly between dorsal and ventral caudal myotomes, reaching the proximal fourth of tail; dorsal margin of the caudal musculature with an interrupted, narrow brown line. Iris centrally copper to gold and peripherally with greenish tones. A golden rim surrounds the pupil. The anterior, posterior, dorsal, and ventral areas of iris are dark.

Coloration of tadpole in preservative.—Silver blotches might disappear in the majority of specimens; the brownish background is paler, and the spiracle is whitish. The intestinal mass is visible both ventrally and laterally. The reddish brown on dorsal fin is paler or might totally disappear. Iris black (Fig. 4A–C).

Morphological variation in tadpoles.—The inner wall of the spiracle is totally fused to the body in Stage 25; it grows and separates during subsequent development. The switchback point of the intestine is dislocated anteriorly and to the left in two specimens in Stage 29, one in Stage 31, and one in Stage 37. ODW/BW varies between 0.33 and 0.39 when measures of specimens between stages 37 and 39 are included. The row of marginal papillae is aligned anteriorly in Stage 25. The presence of narrow posterior gaps in the row of marginal papillae can be variable: four specimens in stages 28 (1), 34 (1), and 35 (2) have only the posterolateral gaps, and do not possess the medial one; five individuals (in stages 28, 29, 30, 30, and 39) have only the medial gap; posterior gaps are absent in two specimens in stages 28 and 29. Flaps with labial teeth are absent in eight specimens in stages 28 (3), 29 (2), 30 (1), 35 (1), and 39 (1). One specimen in Stage 39 presents one medial flap, between A1 and A2 labial tooth rows. P4 is reduced (approximately ¼ of P3 length) in two specimens (stages 36 and 39); laterally to it, some papillae bear few teeth. In one specimen in Stage 28 and four in Stage 31, P3 is smaller than P2. One specimen in Stage 29 presents P3 fused to P2 on its mid-portion. Seven specimens with LTRF 2(2)/3(1) in stages 28 (3), 29 (2), 30 (1), and 31 (1). The black line on the tail muscle axis is absent in some specimens (mostly in stages 25–28).

Comparison with tadpoles of other species of the *H. pulchellus* group.—From the 38 described species of the *H. pulchellus* group, the tadpoles of 15 remain undescribed. These include: *H. alboniger*, *H. beckeri*, *H. botumirim*, *H. buriti*, *H. callipleura*, *H. cymbalum*, *H. ericae*, *H. gladiator*, *H. guentheri*, *H. jaguariaivensis*, *H. phaeopleura*, *H. prasinus*, *H. secedens*, *H. stellae*, and *H. stenocephalus*.

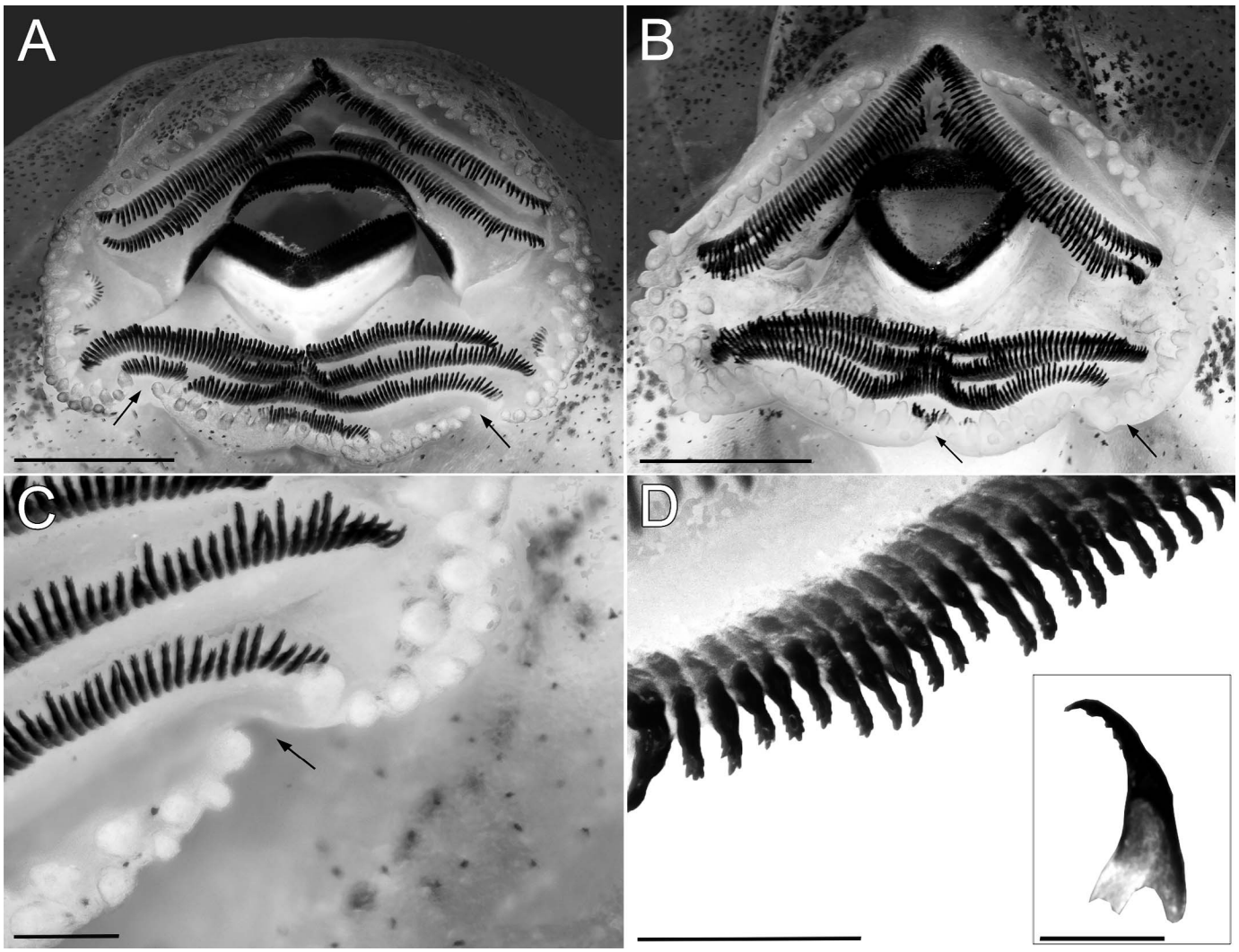

Fig. 5.—Oral disc of *Hypsiboas cambui* (lot CFBH 39392). (A) Stage 36. (B) Stage 34. Scale bar = 1 mm. (C) A detail of the posterolateral gap of an individual in Stage 36. Scale bar = 0.2 mm. The arrows show the variable position of the narrow posterior gaps in the row of marginal papillae. (D) A portion of A2 labial tooth row of an individual in Stage 36, showing the general shape of the labial teeth. Scale bar = 0.2 mm. On inset at right bottom, lateral view of a typical A1 labial tooth. Scale bar = 0.05 mm.

From the remaining 23 species, the tadpole of *H. cambui* is distinguished from those of *H. bischoffi*, *H. caipora*, *H. curupi*, *H. joaquini*, *H. marianitae*, and *H. poaju* by the relative width of the oral disc (OD/BW 0.33–0.39 in *H. cambui* and OD/BW > 0.45 in the others; Heyer et al. 1990; Faivovich 1996; Lötters et al. 1999; Garcia et al. 2003, 2008; Antunes et al. 2008). As with most species of the *H. pulchellus* group, *H. cambui* has an anterior gap in the row of marginal papillae (the exception is *H. curupi*, which has complete marginal papillation in the oral disc; Faivovich 1996). The presence of narrow posterior gaps in the row of marginal papillae, as described for *H. cambui*, has been reported only in two species of the *H. pulchellus* group (*H. freicanecae*, Carnaval and Peixoto 2004; *H. marianitae*, Lötters et al. 1999).

The LTRF in species of the *H. pulchellus* group varies commonly from 2(1,2)/3–4(1,2), reaching 2(2)/5(1) in *H. poaju* (Garcia et al. 2008), 3(1,2)/4(1) in *H. balzani* (Duellman et al. 1997), and 3(1,3)/5(1) in *H. curupi* (Faivovich 1996). With respect to species with LTRF 2/3–4, *H. cambui* has gaps on the A2 and P1 rows of labial teeth, whereas in addition to these two gaps, *H. caingua*, *H. goianus*, *H. latistriatus*, and *H. polytaenius* have a gap on A1 (Eterovick et al. 2002; Orrico et al. 2007; Kolenc et al. 2008; Pinheiro et al. 2012); *H. bandeirantes* has a gap on P2 (Heyer et al. 1990, as *Hyla polytaenia*); *Hypsiboas palaestes* can show gaps on A1, P2, and P3 (Duellman et al. 1997) and *H. pulchellus* can show gap on P2 (Fernandéz 1927). *Hypsiboas cambui* has P2 longer than P1, whereas *H. aguilari*, *H. balzani*, *H. bandeirantes*, *H. bishoffi*, *H. caingua*, *H. caipora*, *H. cordobae*, *H. curupi*, *H. goianus*, *H. melanopleura*, *H. palaestes*, *H. poaju*, *H. polytaenius*, *H. pulchellus*, *H. riojanus*, and *H. semiguttatus* have P2 equal to P1 in length (Heyer et al. 1990; Faivovich 1996; Duellman et al. 1997; Eterovick et al. 2002; Garcia et al. 2007, 2008; Antunes et al. 2008; Kolenc et al. 2008; Lehr et al. 2011; Pinheiro et al. 2012). As with most species of the group, *H. cambui* has, polymorphically in this case, flaps with labial teeth laterally in the oral disc.

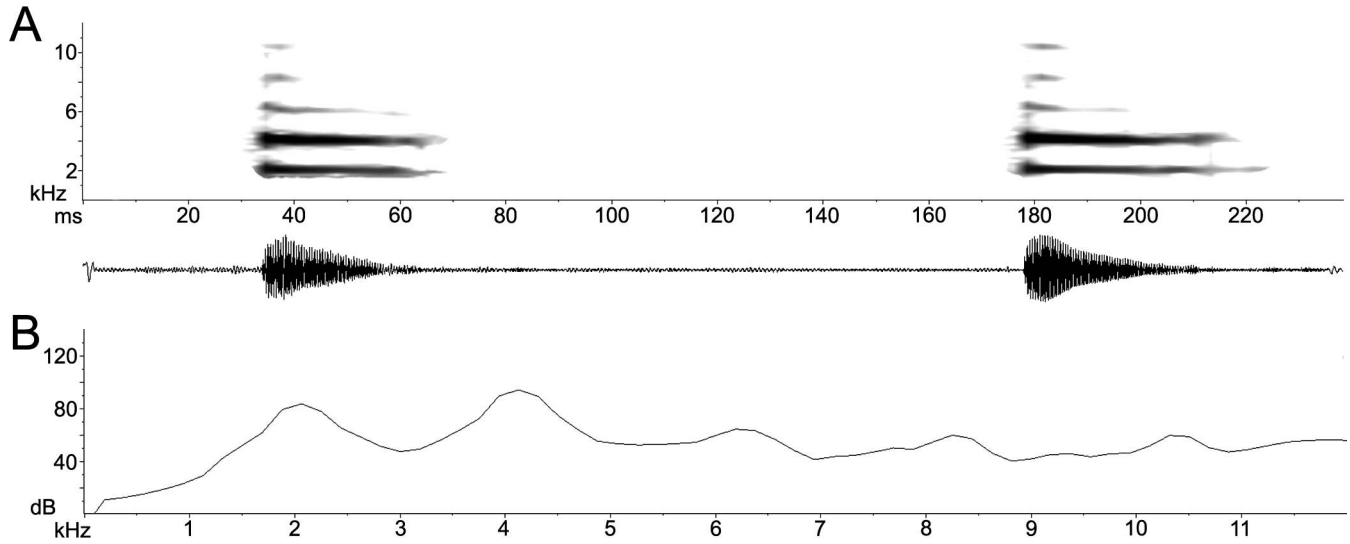

FIG. 6.—Advertisement call of *Hypsiboas cambui*. (A) Spectrogram (top) and waveform (bottom) of the two-note call. (B) Power spectrum of the second note in (A). Recording CFBH/PDPP_1; voucher specimen CFBH 39403. Recorded at Vilarejo do Funil, Município de Rio Preto, State of Minas Gerais, Brazil, on 6 March 2015 at 2300 h (air temperature = 17°C).

Hypsiboas cambui has a spiracle with only the distal portion of its inner wall free from the body (but see the variation reported for tadpoles in Stage 25), whereas *H. caingua* possesses an inner wall entirely free (Kolenc et al. 2008) and *H. cipoensis*, *H. goianus*, *H. leptolineatus*, *H. marginatus*, and *H. palaestes* have the inner wall entirely fused to the body (Duellman et al. 1997; Garcia et al. 2001; Eterovick et al. 2002; Both et al. 2007). The tadpoles of *H. cambui* can be differentiated from those of *H. freicanecae* by a shorter P4 (in *H. freicanecae*, P4 is ~50% of P3, whereas in *H. cambui* it reaches only 30% of P3) and a different pattern of tail coloration (*H. freicanecae* has dark-brown to black coloration, with large dark-brown to black spots on tail; Carnaval and Peixoto 2004).

We found adults of *H. faber* and larvae of *H. albomarginatus* in the same pond where we found the new species. Both *H. albomarginatus* and *H. faber* present a tube-like spiracle with its inner wall entirely free from the body, differing from *H. cambui*, in which only the distal end of inner wall is free (Lutz 1973; Peixoto and Cruz 1983; Kolenc et al. 2008). Also, tadpoles of *H. albomarginatus* have smaller nostrils (ND/BL 0.03–0.05; $n = 12$; stages 28–36; lots UFMG 1854, 1855; see Appendix). The tadpoles of *H. faber* have much more noticeable cumuli of neuromasts, a brown to black tail, and fins with dark blotches (Kolenc et al. 2008).

Advertisement call.—(Recordings CFBH/PDPP_1 and CFBH/PDPP_2) The call described here is probably the advertisement call of the species (as defined by Wells 1977). We infer this because the two males were found vocalizing in isolated situations—the first individual started its activity around 2030 h (air temperature = 19°C) and the second individual at 2300 h (air temperature = 17°C). In both cases, no other males were calling or, as far as we could see, perched nearby. The males were found calling perched on grass and a branch, 20 and 40 cm above water level, respectively, in the middle of a swampy pond. Values are reported as range (mean ± 1 SD).

The call of *H. cambui* (Fig. 6) is composed of one (25% of analyzed calls) or two nonpulsed notes (75% of analyzed calls). Note duration is 23–54 ms (34 ± 9 ms; $n = 14$). When composed of two notes, the interval between them varies between 69 and 121 ms (88 ± 19 ms; $n = 6$). The fundamental frequency of the note is 2062.5 Hz. The dominant frequency is on the second harmonic and ranges between 3382.6 and 5076.7 Hz, and the peak frequency is normally at 4125 Hz ($n = 11$; one male presented the peak frequency of three notes at 4312.5 Hz). Other harmonics, with less energy than the fundamental and dominant frequencies, were found at 6187.5, 8250, and 10,312.5 Hz. Interval between calls varies between 2.13 and 4.73 s (3.39 ± 1.24 s; $n = 4$).

Comparison with advertisement calls of other species of the *H. pulchellus* group.—From the 38 described species of the *H. pulchellus* group, the advertisement call of 12 remain undescribed: *H. alboniger*, *H. buriti*, *H. caingua*, *H. cipoensis*, *H. cymbalum*, *H. freicanecae*, *H. guentheri*, *H. jaguariaivensis*, *H. latistriatus*, *H. leptolineatus*, *H. secedens*, and *H. stenocephalus*. Although calls of *H. latistriatus* and *H. leptolineatus* are undescribed, they have a very similar structure to the calls of *H. bandeirantes*, *H. beckeri*, and *H. polytaenius* (P.D.P. Pinheiro, personal observation). The nonpulsed notes of *H. cambui* are distinct from those of *H. aguilari*, *H. balzani*, *H. bandeirantes*, *H. beckeri*, *H. bischoffi*, *H. botumirim*, *H. caipora*, *H. callipleura*, *H. curupi*, *H. ericae*, *H. gladiator*, *H. joaquini*, *H. latistriatus*, *H. leptolineatus*, *H. marginatus*, *H. marianitae*, *H. melanopleura*, *H. palaestes*, *H. poaju*, *H. polytaenius*, *H. prasinus*, *H. semiguttatus*, and *H. stellae*, which emit pulsed notes (Barrio 1965; Heyer et al. 1990; Márquez et al. 1993; Duellman et al. 1997; Garcia et al. 2001, 2007, 2008; Köhler et al. 2006, 2010; Acioli and Toledo 2008; Antunes et al. 2008; Garcia and Haddad 2008; Kwet 2008; Caramaschi et al. 2009; Lehr et al. 2010; Pinheiro et al. 2012; Delgado and Haddad 2015).

The dominant frequency in the advertisement call of *H. cambui* is on the second harmonic, between 3382.6 and 5076.6 Hz, whereas *H. cordobae*, *H. goianus*, *H. phaeopleura*, *H. pulchellus*, and *H. riojanus* have the dominant

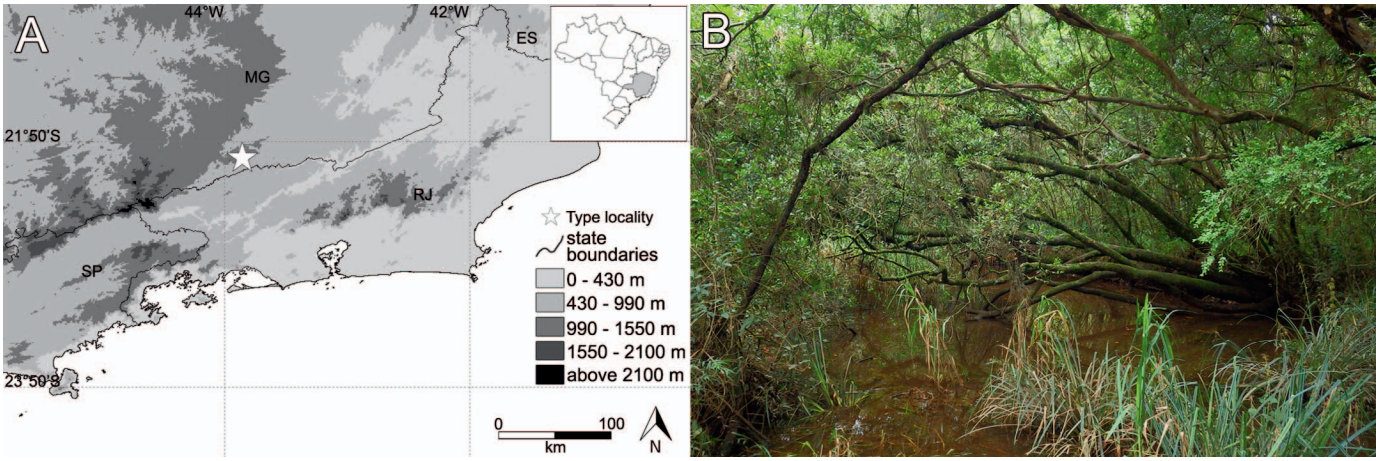

FIG. 7.—(A) Map showing type locality of *Hypsiboas cambui* at Vilarejo do Funil, Município de Rio Preto, State of Minas Gerais (highlighted in gray on right top), Brazil (22°0′19″S, 43°53′20″W, 905 m above sea level; datum = WGS84). (ES) Espírito Santo, (MG) Minas Gerais, (RJ) Rio de Janeiro, and (SP) São Paulo. (B) Pond where the new species was found. A color version of this figure is available online.

frequency coincident with the fundamental frequency, between 1160 and 2450, 2925 and 3694, 2557.3 and 3554.8, 1203 and 3428, and 1700 and 2800 Hz, respectively (Barrio 1962, 1965; Márquez et al. 1993; Di Tada et al. 1996; Salas et al. 1998; Guimarães et al. 2001; Menin et al. 2004; Baraquet et al. 2007, 2013; Köhler et al. 2010; Pinheiro et al. 2012). The ability of an individual to change the emphasized frequencies has been documented in at least two species of *Hypsiboas*, however, as shown by Napoli and Cruz (2005) and Brunetti et al. (2015) for *H. atlanticus* and *H. punctatus*, respectively. Therefore, the dominant frequency on the second harmonic of all calls compared above could be biased by the small sample size. Whereas there is no difference in note duration in *H. cambui*, the last note of calls emitted by *H. cordobae* and *H. pulchellus* is longer than the first, and the first note is longer than the subsequent ones in *H. riojanus* (Márquez et al. 1993; Di Tada et al. 1996; Salas et al. 1998; Baraquet et al. 2007, 2013).

Natural history.—We found the new species in a swampy pond (Fig. 7B) completely covered by vegetation, at the side of a stream locally known as Riacho do Funil. The area is a fragment of primary forest in an area known by local people as Cambuí. At 2030 h, a few males were calling from grass directly above the water, or from lianas and shrubs at the margin of the pond (air temperature = 19°C). These males were perched 0.4–2.0 m above the water surface. One specimen was bitter to the taste (P.D.P. Pinheiro, personal observation). Shortly after 2030 h, a heavy rain fell on the area and the vocal activity of the frogs increased. Individuals started calling from >3 m high, which suggests that they take shelter at the treetop when not active. The single female was found perched 1.6 m above the soil, approximately 5 m away from the pond. During this first night, there was no contact between the river and the pond. Also, we did not find any fish in the pond. Besides the adults and larvae of *H. cambui*, other species present include adults of *Rhinella crucifer*, *H. faber*, *H. polytaenius*, *Dendropsophus berthalutzae*, *D. microps*, *D.* cf. *oliveirai*, and *Scinax argyreornatus*, and tadpoles of *H. albomarginatus*, *D. microps*, *Dendropsophus* sp., *Scinax* sp. 1 (*S. catharinae* group), and *Scinax* sp. 2 (*S. ruber* clade).

After a week of continuous rain (6 March 2015), with air temperature ~17°C, the activity at the pond was reduced compared with the previous observation. The water level of both river and pond had increased and there were two points of contact between them. Very few tadpoles were found and there were small fish in the pond. The only two males that were calling alone were recorded as described above in the advertisement call section. Those males were perched over grass and lianas, 20 and 40 cm above the water surface, respectively.

DISCUSSION

Hypsiboas cambui is morphologically more similar to *H. freicanecae* than to any other species of the *H. pulchellus* group. Interestingly, *H. freicanecae* has a distribution that is isolated from all other species of the group, being known only from the mountain forests in northeastern Brazil (Carnaval and Peixoto 2004; Cardoso et al. 2006), at Borborema Plateau. The southernmost known population of *H. freicanecae* is from Município de Murici, State of Alagoas (Cardoso et al. 2006), which is ~1640 km north (straight line) from the type locality of *H. cambui*.

The Serra da Mantiqueira is one of the most prominent Brazilian mountain ranges fully inserted in the Atlantic Forest biome. It is characterized by a high degree of endemism among the anuran fauna (Cruz and Feio 2007), where narrowly distributed species restricted to a single or few localities are common (e.g., Lutz 1958; Lutz and Carvalho 1958; Heyer 1982, 1983). *Hypsiboas cambui* is known from a single locality in the mountains of Serra Negra, part of the Serra da Mantiqueira, Município de Rio Preto, State of Minas Gerais, close to the border with the State of Rio de Janeiro (Fig. 7A). To our knowledge, *H. cambui* does not occur within protected areas. In addition to *H. cambui*, Serra Negra also harbors two narrowly distributed Mantiqueira endemic anurans, namely, *Physalaemus rupestris* Caramaschi, Carcerelli and Feio 1991 and *Hylodes perere* Silva and Benmaman 2008 (Oliveira et al. 2009). The former also occurs in the Parque Estadual do Ibitipoca (Caramaschi et al. 1991), a neighboring reserve located 32 km north of Serra Negra (straight line). The latter occurs 7.2

km northeast of the type locality of *H. cambui*, and is also known only from Serra Negra.

The Atlantic Forest is one of the most threatened tropical rain forests of the world (Mittermeier et al. 2005) where ~90% of the original vegetation has been removed (Ribeiro et al. 2009). Because of difficulty in access, mountainous regions of higher elevations within the Serra da Mantiqueira mountain range (e.g., Serra do Itatiaia, Serra Fina, Serra do Ibitipoca, Serra do Brigadeiro, Serra de Campos do Jordão, Serra do Papagaio, in the states of Minas Gerais, Rio de Janeiro, and São Paulo) harbor some of the larger forest remnants of southeastern Brazil. At the same time, the difficult access to some areas of Serra da Mantiqueira also hampers comprehensive amphibian inventories (as well as for other taxa). Thus, as exemplified by *H. cambui* at Serra Negra, many Mantiqueira anurans still wait to be discovered.

The rarity and endemism of these unexplored mountain forest patches reinforce the relevance of the Serra da Mantiqueira mountain range for the conservation of the Atlantic Forest biome. Having identified Serra Negra as the type locality for a vertebrate species, we hope to increase the scientific and conservation concern for this region, and stimulate a more committed stance of the Brazilian government concerning the conservation of this biodiversity heritage. The implementation of most conservation actions in the Serra da Mantiqueira has been delayed for years, however, jeopardizing the future of these highland remnants (Becker et al. 2013). The establishment of a reserve at Serra Negra is imperative to ensure the conservation of its unique biota.

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Resumo: Uma nova espécie do grupo de *Hypsiboas pulchellus* é descrita da Serra da Mantiqueira, Município de Rio Preto, Minas Gerais. Descrevemos adultos, girinos e o canto de anúncio. A nova espécie é morfologicamente similar a *H. freicanecae*, espécie conhecida para poucas localidades nos estados de Alagoas e Pernambuco, nordeste do Brasil, ~1640 km ao norte. Os adultos diferem de *H. freicanecae* por possuírem corpo delgado, menor comprimento dos machos, apêndice calcâneo grande e superfícies ocultas das coxas e pés de tons alaranjados em vida. Girinos possuem disco oral ventral, fórmula de dentes labiais 2(2)/3–4(1) e presença de uma a três pequenas interrupções posteriores na fileira de papilas marginais, localizadas nas emarginações do disco oral. O canto de anúncio é composto por duas notas não pulsadas com frequência dominante no segundo harmônico. A espécie é conhecida apenas da sua localidade tipo, em uma área não protegida.

Literature Cited

Acioli, E.C.S., and L.F. Toledo. 2008. Amphibia, Anura, Hylidae, *Hypsiboas beckeri*: Filling gap and description of its advertisement call. Check List 4:182–184.

Altig, R., and G.F. Johnston. 1989. Guilds of anuran larvae: Relations among developmental modes, morphologies, and habitats. Herpetological Monographs 3:81–109.

Altig, R., and R.W. McDiarmid. 1999. Tadpoles: The Biology of Anuran Larvae. University of Chicago Press, USA.

Antunes, A.P., J. Faivovich, and C.F.B. Haddad. 2008. A new species of *Hypsiboas* from the Atlantic forest of Southeastern Brazil (Amphibia: Anura: Hylidae). Copeia 2008:179–190.

Baraquet, M., N.E. Salas, and I.E. Di Tada. 2007. Variación geográfica en el canto de advertencia de *Hypsiboas pulchellus* (Anura, Hylidae) en Argentina. Revista Española de Herpetología 21:107–118.

Baraquet, M., N.E. Salas, and A.L. Martino. 2013. Advertisement calls and interspecific variation in *Hypsiboas cordobae* and *Hypsiboas pulchellus* (Anura, Hylidae) from Central Argentina. Acta Zoologica Bulgarica 65:479–486.

Barrio, A. 1962. Los Hylidae de Punta Lara, Provincia de Buenos Aires. Physis 23:129–142.

Barrio, A. 1965. Las subspecies de *Hyla pulchella* Duméril y Bibron (Anura, Hylidae). Physis 25:115–128.

Becker, C.G., D. Rodriguez, and K.R. Zamudio. 2013. The Brazilian Adirondacks? Science 340:428.

Bokermann, W.C.A. 1963. Una nueva especie de *Hyla* del sudeste Brasileño. Neotropica 9:27–30.

Both, C., A. Kwet, and M. Solé. 2007. The tadpole of *Hypsiboas leptolineatus* (Braun and Braun, 1977), a species in the *Hypsiboas polytaenius* clade (Anura; Hylidae). Brazilian Journal of Biology 67:309–312.

Boulenger, G.A. 1886. A synopsis of the reptiles and batrachians of the Province Rio Grande do Sul, Brazil. Annals and Magazine of Natural History 18:423–445.

Boulenger, G.A. 1887. Descriptions of new or little-known South-American frogs of the genera *Paludicola* and *Hyla*. Annals and Magazine of Natural History 20:295–300.

Boulenger, G.A. 1898. A list of the reptiles and batrachians collected by the late Prof. L. Balzan in Bolivia. Annali del Museo Civico di Storia Naturale di Genova 19:128–133.

Boulenger, G.A. 1902. Descriptions of new batrachians and reptiles from the Andes of Peru and Bolivia. Annals and Magazine of Natural History 10:394–402.

Boulenger, G.A. 1912. Descriptions of new batrachians from the Andes of South America, preserved in the British Museum. Annals and Magazine of Natural History 10:185–191.

Braun, P.C., and C.A.S. Braun. 1977. Nova espécie de *Hyla* do estado do Rio Grande do Sul, Brasil (Anura, Hylidae). Revista Brasileira de Biologia 37:853–857.

Brunetti, A.E., C. Taboada, and J. Faivovich. 2015. Extended vocal repertoire in *Hypsiboas punctatus* (Anura: Hylidae). Journal of Herpetology 49:46–52.

Burmeister, C.H.C. 1856. Erläuterungen zur Fauna Brasiliens, enthaltend Abbildungen und ausführliche Beschreibungen neuer oder ungenügend bekannter Thier-Arten. Georg Reimer, Germany.

Caramaschi, U., and C.A.G. Cruz. 1999. Duas espécies novas do grupo de *Hyla polytaenia* Cope, 1870 do Estado de Minas Gerais, Brasil. Boletim do Museu Nacional, Nova Série, Zoologia 403:1–10.

Caramaschi, U., and C.A.G. Cruz. 2000. Duas espécies novas de *Hyla* Laurenti, 1768 do Estado de Goiás, Brasil (Amphibia, Anura, Hylidae). Boletim do Museu Nacional, Nova Série, Zoologia 422:1–12.

Caramaschi, U., and C.A.G. Cruz. 2004. Duas novas espécies de *Hyla* do

grupo de *H. polytaenia* Cope, 1870 do sudeste do Brasil (Amphibia, Anura, Hylidae). Arquivos do Museu Nacional 62:247–254.
Caramaschi, U., and C.A.G. Cruz. 2013. A new species of the *Hypsiboas polytaenius* clade from southeastern Brazil (Anura: Hylidae). South American Journal of Herpetology 8:121–126.
Caramaschi, U., L.C. Carcerelli, and R.N. Feio. 1991. A new species of *Physalaemus* (Anura: Leptodactylidae) from Minas Gerais, Southeastern Brazil. Herpetologica 47:148–151.
Caramaschi, U., C.A.G. Cruz, and L.B. Nascimento. 2009. A new species of *Hypsiboas* of the *H. polytaenius* clade from Southeastern Brazil (Anura: Hylidae). South American Journal of Herpetology 4:210–216.
Caramaschi, U., C.A.G. Cruz, and M.V. Segalla. 2010. A new species of *Hypsiboas* of the *H. polytaenius* clade from the state of Paraná, southern Brazil (Anura: Hylidae). South American Journal of Herpetology 5:169–174.
Cardoso, M.C.S., C.A.G. Cruz, M.G. de Lima, and G.O. Skuk. 2006. Geographic distribution: Brazil, Alagoas: *Hypsiboas freicanecae*. Herpetological Review 37:489.
Carnaval, A.C.O.Q., and O.L. Peixoto. 2004. A new species of *Hyla* from northeastern Brazil (Amphibia, Anura, Hylidae). Herpetologica 60:387–395.
Carrizo, G.R. 1991. Sobre los hílidos de Misiones, Argentina, con la descripción de una nueva especie, *Hyla caingua* n.sp. Cuadernos de Herpetología 5:32–39.
Carrizo, G.R. 1992. Cuatro especies nuevas de anuros (Bufonidae: *Bufo* e Hylidae: *Hyla*) del norte de la Argentina. Cuadernos de Herpetología 7:14–23.
Cei, J.M. 1980. Amphibians of Argentina. Monitore Zoologico Italiano (Nuova Serie), Monografiche 2, Italy.
Cope, E.D. 1870. Seventh contribution to the herpetology of tropical America. Proceedings of the American Philosophical Society 11:147–169.
Cruz, C.A.G., and R.N. Feio. 2007. Endemismos em anfíbios em áreas de altitude na Mata atlântica no sudeste do Brasil. Pp. 117–126 in Herpetologia no Brasil II (L.B. Nascimento and M.E. Oliveira, eds.). Sociedade Brasileira de Herpetologia, Brasil.
Delgado, D.B., and C.F.B. Haddad. 2015. Calling activity and vocal repertoire of *Hypsiboas prasinus* (Anura, Hylidae), a treefrog from the Atlantic Forest of Brazil. Herpetologica 71:88–95.
Di Tada, I.E., M.V. Zavattieri, and A.L. Martino. 1996. Análisis structural del canto nupcial de *Hyla pulchella cordobae* (Amphibia: Hylidae) en la provincia de Córdoba (Argentina). Revista Española de Herpetología 10:7–11.
Duellman, W.E. 1970. Hylid Frogs of Middle America. Monographs of the Museum of Natural History, University of Kansas, USA.
Duellman, W.E., and L. Trueb. 1986. Biology of Amphibians. Johns Hopkins University Press, USA.
Duellman, W.E., I. De La Riva, and E.R. Wild. 1997. Frogs of the *Hyla armata* and *Hyla pulchella* groups in the Andes of South America, with definitions and analyses of phylogenetic relationships of Andean groups of *Hyla*. Scientific Papers, Natural History Museum, The University of Kansas 3:1–41.
Duméril, A.M.C., and G. Bibron. 1841. Erpétologie Générale ou Histoire Naturelle Complète des Reptiles, Volume 8. Librarie Enclyclopedique de Roret, France.
Eterovick, P.C., I.S. Barros, and I. Sazima. 2002. Tadpoles of two species in the *Hyla polytaenia* species group and comparison with other tadpoles of *Hyla polytaenia* and *Hyla pulchella* groups (Anura, Hylidae). Journal of Herpetology 36:512–515.
Faivovich, J. 1996. La larva de *Hyla semiguttata* A. Lutz, 1925 (Anura, Hylidae). Cuadernos de Herpetología 9:61–67.
Faivovich, J., P.C.A. Garcia, F. Ananias, L. Lanari, N.G. Basso, and W.C. Wheeler. 2004. A molecular perspective on the phylogeny of the *Hyla pulchella* species group (Anura, Hylidae). Molecular Phylogenetics and Evolution 32:938–950.
Faivovich, J., C.F.B. Haddad, P.C.A. Garcia, D.R. Frost, J.A. Campbell, and W.C. Wheeler. 2005. Systematic review of the frog family Hylidae, with special reference to Hylinae: Phylogenetic analysis and taxonomic revision. Bulletin of the American Museum of Natural History 294:1–240.
Faivovich, J., R.W. McDiarmid, and C.W. Myers. 2013. Two new species of *Myersiohyla* (Anura: Hylidae) from Cerro de la Neblina, Venezuela, with comments on other species of the genus. American Museum Novitates 3792:1–63.
Fernández, K. 1927. Sobre la biología y reproducción de batracios Argentinos, segunda parte. Boletín de la Academia Nacional de Ciencias de Córdoba 29:271–328.
Frost, D.R. 2016. Amphibian species of the world: An online eference, Version 6.0. American Museum of Natural History, USA. Available at http://research.amnh.org/herpetology/amphibia/index.html. Archived by WebCite at http://www.webcitation.org/6gmwzYEBN on 15 April 2016.
Garcia, P.C.A., and C.F.B. Haddad. 2008. Vocalizations and comments on the relationships of *Hypsiboas ericae* (Amphibia, Hylidae). Iheringia 98:161–166.
Garcia, P.C.A., G. Vinciprova, and C.F.B. Haddad. 2001. Vocalização, girino, distribuição geográfica e novos comentários sobre *Hyla marginata* Boulenger, 1887 (Anura, Hylidae, Hylinae). Boletim do Museu Nacional, Nova Série, Zoologia 460:1–19.
Garcia, P.C.A., G. Vinciprova, and C.F.B. Haddad. 2003. The taxonomic status of *Hyla pulchella joaquini* (Anura: Hylidae) with description of its tadpole and vocalization. Herpetologica 59:350–363.
Garcia, P.C.A., J. Faivovich, and C.F.B. Haddad. 2007. Redescription of *Hypsiboas semiguttatus*, with the description of a new species of the *Hypsiboas pulchellus* group. Copeia 2007:933–951.
Garcia, P.C.A., O.L. Peixoto, and C.F.B. Haddad. 2008. A new species of *Hypsiboas* (Anura: Hylidae) from the Atlantic Forest of Santa Catarina, southern Brazil, with comments on its conservation status. South American Journal of Herpetology 3:27–35.
Gosner, K.L. 1960. A simplified table for staging anuran embryo and larvae with notes on identification. Herpetologica 16:183–190.
Grosjean, S. 2005. The choice of external morphological characters and developmental stages for tadpole-based anuran taxonomy: A case study in *Rana* (*Sylvirana*) *nigrovittata* (Blyth, 1855) (Amphibia, Anura, Ranidae). Contributions to Zoology 74:61–76.
Guimarães, L.D., L.P. Lima, R.F. Juliano, and R.P. Bastos. 2001. Vocalizações de espécies de anuros (Amphibia) no Brasil Central. Boletim do Museu Nacional, Nova Série, Zoologia 474:1–14.
Heyer, W.R. 1982. Two new species of the frog genus *Hylodes* from Caparaó, Minas Gerais, Brasil (Amphibia: Leptodactylidae). Proceedings of the Biological Society of Washington 95:377–385.
Heyer, W.R. 1983. Variation and systematics of frogs of the genus *Cycloramphus* (Amphibia, Leptodactylidae). Arquivos de Zoologia 30:235–339.
Heyer, W.R., A.S. Rand, C.A.G. Cruz, O.L. Peixoto, and C.E. Nelson. 1990. Frogs of Boracéia. Arquivos de Zoologia 31:231–410.
Jungfer, K.-H., J. Faivovich, J.M. Padial, ..., C.F.B. Haddad. 2013. Systematics of spiny-backed treefrogs (Hylidae: *Osteocephalus*): An Amazonian puzzle. Zoologica Scripta 42:351–380.
Köhler, J., A. John, and W. Böhme. 2006. Notes on amphibians recently collected in the Yungas de La Paz region, Bolivia. Salamandra 42:21–27.
Köhler, J., D. Koscinski, J.M. Padial, J.C. Chaparro, P. Handford, S.C. Lougheed, and I. De la Riva. 2010. Systematics of Andean gladiator frogs of the *Hypsiboas pulchellus* species group (Anura, Hylidae). Zoologica Scripta 39:572–590.
Kolenc, F., C. Borteiro, L. Alcalde, D. Baldo, D. Cardozo, and J. Faivovich. 2008. Comparative larval morphology of eight species of *Hypsiboas* Wagler (Amphibia, Anura, Hylidae) from Argentina and Uruguay, with a review of the larvae of this genus. Zootaxa 1927:1–66.
Koslowsky, J.G. 1895. Batracios y reptiles de la Rioja y Catamarca, recogidos durante los meses de febrero a mayo de 1895. Revista del Museo de La Plata 6:359–365.
Kwet, A. 2008. New species of *Hypsiboas* (Anura: Hylidae) in the *pulchellus* group from southern Brazil. Salamandra 44:1–14.
Lannoo, M.J. 1987. Neuromast topography in anuran amphibians. Journal of Morphology 191:115–129.
Lavilla, E.O., and G.J. Scrocchi. 1986. Morfometría larval de los géneros de Telmatobiinae (Anura: Leptodactylidae) de Argentina y Chile. Physis 44:39–43.
Lehr, E., J. Faivovich, and K.-H. Jungfer. 2010. A new Andean species of the *Hypsiboas pulchellus* group: Adults, calls, and phyllogenetic relationships. Herpetologica 66:296–307.
Lehr, E., J. Faivovich, and K.-H. Jungfer. 2011. Description of the tadpoles of *Hypsiboas aguilari* and *H. melanopleura* (Anura: Hylidae: *Hypsiboas pulchellus* group). Salamandra 47:30–35.
Lötters, S., J. Köhler, and S. Reichle. 1999. Description of the tadpole of the Andean treefrog *Hyla marianitae* (Amphibia: Anura: Hylidae). Folia Zoologica 48:49–53.
Lutz, A. 1925. Batraciens du Brésil. Comptes Rendus des Séances de la Société de Biologie et des ses Filiales 1925:211–214.
Lutz, B. 1958. Anfíbios novos e raros das Serras Costeiras do Brasil (New or rare frogs from the coastal ranges of Brazil). Memórias do Instituto Oswaldo Cruz 56:372–399.

Lutz, B. 1963. New species of *Hyla* from southeastern Brazil. Copeia 1963:561–562.
Lutz, B. 1968a. New Brazilian forms of *Hyla*. Pearce-Sellards Series 10:3–18.
Lutz, B. 1968b. Geographic variation in Brazilian species of *Hyla*. Pearce-Sellards Series 12:1–13.
Lutz, B. 1973. Brazilian Species of *Hyla*. University of Texas Press, USA.
Lutz, B., and A.L. de Carvalho. 1958. Novos anfíbios anuros das serras costeiras do Brasil. Memórias do Instituto Oswaldo Cruz 56:239–249.
Márquez, R., I. De la Riva, and J. Bosch. 1993. Advertisement calls of Bolivian species of *Hyla* (Amphibia, Anura, Hylidae). Biotropica 25:426–443.
Menin, M., R.A. Silva, and A.A. Giaretta. 2004. Reproductive biology of *Hyla goiana* (Anura, Hylidae). Iheringia 94:49–52.
Mittermeier, R.A., P.R. Gil, M. Hoffmann, J. Pilgrim, T. Brooks, C. Goettsch Mittermeier, J. Lamoreux, and G.A.B. Da Fonseca. 2005. Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions. Conservation International, USA.
Myers, C.W., and W.E. Duellman. 1982. A new species of *Hyla* from Cerro Colorado, and other tree frog records and geographical notes from western Panama. American Museum Novitates 2752:1–32.
Napoli, M.F., and U. Caramaschi. 1999. Geographic variation of *Hyla rubicundula* and *Hyla anataliasiasi*, with the description of a new species (Anura, Hylinae). Alytes 16:165–189.
Napoli, M.F., and I.C.S. Cruz. 2005. The advertisement call of *Hyla atlantica* Caramaschi & Velosa, 1996, with considerations on its taxonomic status (Amphibia, Anura, Hylidae). Arquivos do Museu Nacional 63:283–288.
Nieden, F. 1923. Anura I. Subordo Aglossa und Phaneroglossa, Sectio 1. Arcifera. Das Tierrich 46. Berlin, Germany.
Oliveira, E.F., J. Tolledo, and R.N. Feio. 2009. Amphibia, Anura, *Physalaemus rupestris* Caramaschi, Carcerelli and Feio, 1991: Distribution extension and geographic distribution map. Check List 5:815–818.
Orrico, V.G.D., M.M. Mongin, and A.M.P.T. Carvalho-e-Silva. 2007. The tadpole of *Hypsiboas latistriatus* (Caramaschi and Cruz, 2004), a species of the *Hypsiboas polytaenius* (Cope, 1870) clade (Amphibia, Anura, Hylidae). Zootaxa 1531:25–37.
Peixoto, O.L., and C.A.G. Cruz. 1983. Girinos de espécies de *Hyla* do grupo "Albomarginata" do sudeste brasileiro (Amphibia, Anura, Hylidae). Arquivos da Universidade Federal Rural do Rio de Janeiro 6:155–163.
Pinheiro, P.D.P., T.L. Pezzuti and P.C.A. Garcia. 2012. The tadpole and vocalizations of *Hypsiboas polytaenius* (Cope, 1870) (Anura, Hylidae, Hylinae). South American Journal of Herpetology 7:123–133.
Pyron, R.A., and J J. Wiens. 2011. A large-scale phylogeny of Amphibia including over 2800 species, and a revised classification of advanced frogs, salamanders, and caecilians. Molecular Phylogenetics and Evolution 61:543–583.
Ribeiro, M.C., J.P. Metzger, A.C. Martensen, F.J. Ponzoni, and M.M. Hirota. 2009. The Brazilian Atlantic Forest: How much is left, and how is the remaining forest distributed? Implications for conservation. Biological Conservation 142:1141–1153.
Sabaj Pérez, M.H. (ed.). 2014. Standard symbolic codes for institutional resource collections in herpetology and ichthyology: An online reference, Version 5.0. American Society of Ichthyologists and Herpetologists, USA. Available at http://www.asih.org/. Archived by WebCite at http://www.webcitation.org/6ZMAB5jIV on 17 June 2015.
Salas, N.E., M.V. Zavattieri, I.E. Di Tada, A.L. Martino, and M.E. Bridarolli. 1998. Bioacustical and etho-ecological features in amphibian communities of southern Córdoba province (Argentina). Cuadernos de Herpetología 12:37–46.
Savage, J.M., and R.W. Heyer. 1967. Variation and distribution of tree-frog genus *Phyllomedusa* in Costa Rica, Central America. Beiträge zur Neotropischen Fauna 5:11–131.
Schacht, M.C., and L.D. McBrayer. 2009. A method for constructing an adjustable platform to obtain lateral photographs of larval anurans. Herpetological Review 40:303–304.
Silva, H.R., and P. Benmaman. 2008. Uma nova espécie de *Hylodes* Fitzinger da Serra da Mantiqueira, Minas Gerais, Brasil (Anura: Hylodidae). Revista Brasileira de Zoologia 25:89–99.
Vera Candioti, M.F., and R. Altig. 2010. A survey of shape variation in keratinized labial teeth of anuran larvae as related to phylogeny and ecology. Biological Journal of the Linnean Society 101:609–625.
Wagler, J. 1830. Natürliches System der Amphibien mit vorangehender Classification der Säugthiere und Vögel: Mit Kupfern und einer Verwandtstafel. J.G. Cotta, Germany.
Wells, K.D. 1977. The social behaviour of anuran amphibians. Animal Behaviour 25:666–693.
Wiens, J.J., C.A. Kuczynski, X. Hua, and D.S. Moen. 2010. An expanded phylogeny of treefrogs (Hylidae) based on nuclear and mitochondrial sequence data. Molecular Phylogenetics and Evolution 55:871–882.
Wilcox, D.C., B.S Dove, D.W. McDaid, and D.B. Greer. 1996. Imagetool. The University of Texas Health Science Center at San Antonio, USA. Available at http://compdent.uthscsa.edu/imagetool.asp. Archived by WebCite at http://www.webcitation.org/6a4RVNr4J on 16 July 2015.

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APPENDIX

Specimens Examined

Hypsiboas albomarginatus (larvae).—BRAZIL: Minas Gerais: Rio Preto, Vilarejo do Funil: UFMG 1854, 1855.

Hypsiboas bandeirantes.—BRAZIL: São Paulo: Itapecerica da Serra: CFBH 36181, 36182. São José do Barreiro, Serra da Bocaina: CFBH 36064, 36065, 36067, 36080.

Hypsiboas beckeri.—BRAZIL: Minas Gerais: Botelhos: CFBH 35786, 35787. Poços de Caldas: CFBH 35880–35882.

Hypsiboas bischoffi.—BRAZIL: Paraná: Cruz Machado: CFBH 18261. Rio Grande do Sul: Itati, Reserva Biológica Estadual Mata Paludosa: CFBH 14595. Santa Catarina: Imbituba: CFBH 33732. São Paulo: Piedade, Vila Elvio CFBH 15988.

Hypsiboas botumirim.—BRAZIL: Minas Gerais: Botumirim: UFMG 3793.

Hypsiboas buriti.—BRAZIL: Distrito Federal: Brasília, Fazenda Água Limpa: CFBH 22785–22787, 22794.

Hypsiboas caingua.—BRAZIL: Rio Grande do Sul: Cerro Largo, Vila Santo Antônio: CFBH 12036, 12039. São Paulo: Assis: CFBH 18692, 20042. Guapiara: CFBH 14697. Pilar do Sul: CFBH 8605.

Hypsiboas caipora.—BRAZIL: São Paulo: São Miguel Arcanjo, Parque Estadual Carlos Botelho: CFBH 38435, 38461, 38462.

Hypsiboas cipoensis.—BRAZIL: Minas Gerais: Santana do Riacho: CFBH 286, 35057.

Hypsiboas curupi.—ARGENTINA: Misiones: San Vicente: CFBH 3444, 3445, 4908. Santa Catarina: Campos Novos: CFBH 23854. São Domingos: CFBH 9559, 9561. Vargem Bonita: UFMG 3267. Xanxerê: CFBH 21144. Xavantina: CFBH 20803, 21141.

Hypsiboas cymbalum.—BRAZIL: São Paulo: Santo André, Campo Grande da Serra: MZUSP 73697, 74194.

Hypsiboas ericae.—BRAZIL: Goiás: Alto Paraíso de Goiás: CFBH 3599, 3600, 3602, 3603, 6762–6764.

Hypsiboas freicanecae.—BRAZIL: Alagoas: Murici, Estação Ecológica de Murici: MUFAL 9472, 9475.

Hypsiboas goianus.—BRAZIL: Goiás: São João d'Aliança, Córrego Jatobazinho: UFMG 10347. Silvânia: CFBH 2666, 4167, 4168, 9510.

Hypsiboas guentheri.—BRAZIL: Rio Grande do Sul: Terra de Areia: CFBH 3384, 3385, 3387. Santa Catarina: Urussanga: CFBH 9855.

Hypsiboas joaquini.—BRAZIL: Santa Catarina: Urubici, Morro da Igreja: CFBH 3279, 3282, 3288, 3627, 3628.

Hypsiboas latistriatus.—BRAZIL: Minas Gerais: Itamonte, Brejo da Lapa: CFBH 139. Rio de Janeiro: Itatiaia, Brejo da Lapa: CFBH 9866. Maromba, Parque Nacional do Itatiaia: CFBH 35776.

Hypsiboas leptolineatus.—BRAZIL: Rio Grande do Sul: São Francisco de Paula: CFBH 3056, 3060, 8505, 19246, 19247.

Hypsiboas marginatus.—BRAZIL: Rio Grande do Sul: Cambará do Sul, road of access to Parque Nacional Aparados da Serra, Itaimbezinho: CFBH 3050, 3051. São Francisco de Paula: CFBH 3413. Santa Catarina: Treviso: CFBH 8495.

Hypsiboas phaeopleura.—BRAZIL: Goiás: Alto Paraíso de Goiás, Rio dos Couros: CFBH 3598; UFMG 10346.

Hypsiboas poaju.—BRAZIL: Santa Catarina: Anitápolis: CFBH 20263, 20264. Rancho Queimado: CFBH 3335, 3336, 3610, 5398.

Hypsiboas polytaenius.—BRAZIL: Minas Gerais: Belo Horizonte: UFMG 13713, 13714. Muriaé: CFBH 39040. Rio de Janeiro: Nova Friburgo: CFBH 36396, 36404. Petrópolis: UFMG 11545. Teresópolis: UFMG 11564.

Hypsiboas prasinus.—BRAZIL: Rio de Janeiro: Nova Friburgo: CFBH

36409. São Paulo: Apiaí, Parque Estadual Turístico do Alto Ribeira: CFBH 25604. Jundiaí, Serra do Japi: CFBH 729. Mairiporã, old road from São Paulo to Mairiporã: CFBH 9507.

Hypsiboas pulchellus.—BRAZIL: Rio Grande do Sul: São Francisco de Paula: CFBH 3376, 3377, 8533, 8544, 8545.

Hypsiboas riojanus.—ARGENTINA: San Miguel de Tucumán: Burruyacú: CFBH 4037–4040.

Hypsiboas secedens.—BRAZIL: Rio de Janeiro: Cachoeiras de Macacu, Reserva Ecológica de Guapiaçú: MNRJ 61476, 61477, 86331–86334, 86897–86899.

Hypsiboas semiguttatus.—BRAZIL: Paraná: Piraquara, Mananciais da Serra: CFBH 3579, 3705, 5000. Santa Catarina: Rio Vermelho: UFMG 13164, 13165. São Bento do Sul: UFMG 13875, 13888.

Hypsiboas stellae.—BRAZIL: Rio Grande do Sul: Road RS 471, 10 km from bifurcation to Herveiras: CFBH 25716.

Hypsiboas stenocephalus.—BRAZIL: Minas Gerais: Poços de Caldas: CFBH 98. São Roque de Minas, Serra da Canastra: CFBH 2946–2948; UFMG 15144, 15150, 15163, 15179.