



## A new species of the *Ololygon catharinae* group from the Brazilian Cerrado (Anura, Hylidae, Scinaxini)

DANIELE CARVALHO<sup>1,2,3\*</sup>, ALEJANDRO VALENCIA-ZULETA<sup>2,7</sup>, KATYUSCIA ARAUJO-VIEIRA<sup>4,8</sup>, JULIÁN FAIVOVICH<sup>4,5,9</sup>, NATAN M. MACIEL<sup>2,10</sup> & REUBER A. BRANDÃO<sup>4,6,11</sup>

<sup>1</sup>Programa de Pós-Graduação em Zoologia, Departamento de Zoologia, Instituto de Biologia, Universidade de Brasília, Distrito Federal, Brazil.

<sup>2</sup>Laboratório de Herpetologia e Comportamento Animal, Departamento de Ecologia, Instituto de Ciências Biológicas, Universidade Federal de Goiás, Goiás, Brazil.

<sup>3</sup>Centro Nacional de Pesquisa e Conservação de Répteis e Anfíbios (RAN-ICMBio), Setor Central, Goiânia, Goiás, Brazil.

<sup>4</sup>División Herpetología, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” – CONICET, Buenos Aires, Argentina.

<sup>5</sup>Departamento de Biodiversidad y Biología Experimental, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina.

<sup>6</sup>Laboratório de Fauna e Unidades de Conservação, Departamento de Engenharia Florestal, Faculdade de Tecnologia, Universidade de Brasília, Distrito Federal, Brazil.

<sup>7</sup>✉ [alejandrovalencia08@gmail.com](mailto:alejandrovalencia08@gmail.com); <https://orcid.org/0000-0003-2515-6709>

<sup>8</sup>✉ [katy.vieira@gmail.com](mailto:katy.vieira@gmail.com); <https://orcid.org/0000-0002-8193-2736>

<sup>9</sup>✉ [jfaivovich@gmail.com](mailto:jfaivovich@gmail.com); <https://orcid.org/0000-0001-7157-8131>

<sup>10</sup>✉ [nmaciel@gmail.com](mailto:nmaciel@gmail.com); <https://orcid.org/0000-0001-5654-0645>

<sup>11</sup>✉ [reuberbrandao@gmail.com](mailto:reuberbrandao@gmail.com); <https://orcid.org/0000-0003-3940-2544>

\*Corresponding author: ✉ [danielecarvalho.bio@gmail.com](mailto:danielecarvalho.bio@gmail.com); <https://orcid.org/0000-0002-4234-1597>

### Abstract

We describe a new species of the *Ololygon catharinae* group from the Cerrado biome, in the state of Minas Gerais, Brazil. *Ololygon paracatu* **sp. nov.** is morphologically similar to *O. goya* and *O. skaios*, although in phylogenetic analyses, it is recovered as the poorly supported sister taxon of *O. pombali*. It is distinguished from other species of the *O. catharinae* group by having a *canthus rostralis* marked and curved; subovoid snout in dorsal view and protruding in profile; inverted triangle shaped interocular blotch, exceeding the posterior margin of the eyes; inguinal region and hidden areas of thighs with dark brown irregular blotches on a pale yellow background in life; and advertisement call composed of 3–5 pulsed notes and dominant frequency of 2.5–3.5 kHz. *Ololygon paracatu* **sp. nov.** inhabits gallery forests associated with streams in the Cerrado biome.

**Key words:** Amphibia, Hylinae, taxonomy, phylogeny, calls, gallery forest

### Introduction

The genus *Ololygon* currently includes 53 valid species and 19 candidate species, assigned to seven species groups: the *O. agilis*, *O. argyreornata*, *O. belloni*, *O. cardosoi*, *O. catharinae*, *O. feioi*, and *O. perpusilla* groups (Araujo-Vieira *et al.* 2023; Roberto *et al.* 2025). The *O. catharinae* group is the most species-rich, comprising 33 valid species and 12 candidate species (Araujo-Vieira *et al.* 2023). Its species occur mainly in the Atlantic Forest and Cerrado biomes, with *O. berthae* also inhabiting humid grasslands in other biomes in Argentina, Uruguay, and Paraguay (e.g., Faivovich 2005; Lourenço *et al.* 2014; Lacerda *et al.* 2021; Araujo-Vieira *et al.* 2023). The species group is a well-supported clade delimited by molecular evidence and two phenotypic synapomorphies: the arytoid cartilages subcircular in dorsal view, and the postaxial webbing of toe I reaching the distal margin of the subarticular tubercle (Araujo-Vieira *et al.* 2023). Furthermore, the species in the *O. catharinae* group are diagnosed from other species groups of *Ololygon* by a combination of eight morphological characters of adults and larvae, such as the presence of a concave posterior margin of the folded oral disc (e.g., Heyer *et al.* 1990; Faivovich 2002; Pezzuti *et al.* 2016, 2021; Araujo-Vieira *et al.* 2023).

Seven valid species and five candidate species of the *Ololygon catharinae* group are found in the Cerrado biome, all of which are associated with gallery forests around fast-flowing streams or rivulets: *O. machadoi* (Bokermann & Sazima, 1973), *O. canastrensis* (Cardoso & Haddad, 1982), *O. luizotavioi* (Caramaschi & Kisteumacher, 1989), *O. centralis* (Pombal & Bastos, 1996), *O. skaios* (Pombal, Carvalho, Canelas & Bastos, 2010), *O. pombali* (Lourenço, Carvalho, Baêta, Pezzuti & Leite, 2013), and *O. goya* Andrade, Santos, Rocha, Pombal & Vaz-Silva, 2018, as well as the confirmed candidate species *Ololygon* sp. 14 and the unconfirmed candidate species *Ololygon* sp. 7, *O.* sp. 10, *O.* sp. 12, and *O.* sp.13 (sensu Araujo-Vieira *et al.* 2023).

In this paper, we describe *Ololygon* sp. 14, a new species of the *O. catharinae* group from the Brazilian Cerrado. This taxon was previously identified by Araujo-Vieira *et al.* (2023) as a confirmed candidate species (*O.* sp. 14) based on its phylogenetic position. The new species is described based on adult external morphology and advertisement call parameters, and differs from the other species of the *O. catharinae* group by a combination of morphological and acoustic characteristics.

## Materials and Methods

Specimens were euthanized with 5% lidocaine, fixed in 10% formaldehyde, and preserved in 70% ethanol in the Brazilian herpetological collections of CFBH (Coleção Célio F. B. Haddad, Universidade Estadual Paulista “Júlio de Mesquita Filho”, Rio Claro, São Paulo), CHUNB (Coleção Herpetológica da Universidade de Brasília, Brasília, Distrito Federal), MNRJ (Museu Nacional do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro), and ZUFG (Coleção Zoológica da Universidade Federal de Goiás, Goiânia, Goiás).

Sex was determined by the presence of nuptial pads and vocal slits in males, and oocytes in females, observed through the translucent skin. Eleven measurements were taken following Duellman (1970): SVL (snout-vent length), HL (head length), HW (head width), IND (internarial distance), IOD (interorbital distance), ED (diameter of the eye), SL (snout length), UEW (width of eyelid), TD (diameter of the tympanum), TL (tibia length), and FL (foot length), and two measurements follow Napoli (2005): 3FD (third finger disc diameter) and 4TD (fourth toe disc diameter). All measurements were taken with a digital caliper to the nearest 0.1 mm. Fingers are numbered II to V following Fabrezi & Alberch (1996); webbing formulae follow Savage & Heyer (1967) as modified by Myers & Duellman (1982); snout shape standards are those of Heyer *et al.* (1990), as modified by Lourenço *et al.* (2014) for dorsal view; the terminology for nuptial pad is that of Luna *et al.* (2018), for describing the pupil is that of Cervino *et al.* (2021), and for the egg spawn is that of Altig & McDiarmid (2007). Comparisons of adult specimens were based on observations of museum specimens (Appendix 1) and literature information.

Calls were recorded with a Marantz PMD 660 digital recorder set at 44.100 Hz sample rate and 16-bits resolution coupled to a directional microphone Sennheiser ME66. They were analyzed using Raven Pro 1.5 (Bioacoustics Research Program 2014) with window type Hanning, window size = 256 samples, 3dB filter bandwidth = 270 Hz, brightness = 75%, overlap = 85%, and DFT = 1.024 samples. Audiospectrograms and waveforms figures were obtained using the Seewave v. 2.1.0 package (Sueur *et al.* 2008) on the R software v. 3.6.1. (R Development Core Team 2019). Seewave settings were window type = Hanning, sampling rate = 44.100 Hz, overlap = 90%, window length = 256 points of resolution. The call terminology follows Köhler *et al.* (2017), using the call-centered approach. All recordings are deposited in the Fonoteca Neotropical Jacques Vielliard (FNJV) of the Universidade Estadual de Campinas (Unicamp), Campinas, São Paulo, Brazil (Appendix 2). The vocal repertoire of the new species was classified as advertisement and aggressive calls based on the functional categorization proposed by Wells (2007), Toledo *et al.* (2015), and Köhler *et al.* (2017). Advertisement calls were the most frequently emitted (Wells 2007), and aggressive calls were emitted during close contact with other calling males as observed in the field (Toledo *et al.* 2015; Köhler *et al.* 2017).

## Results

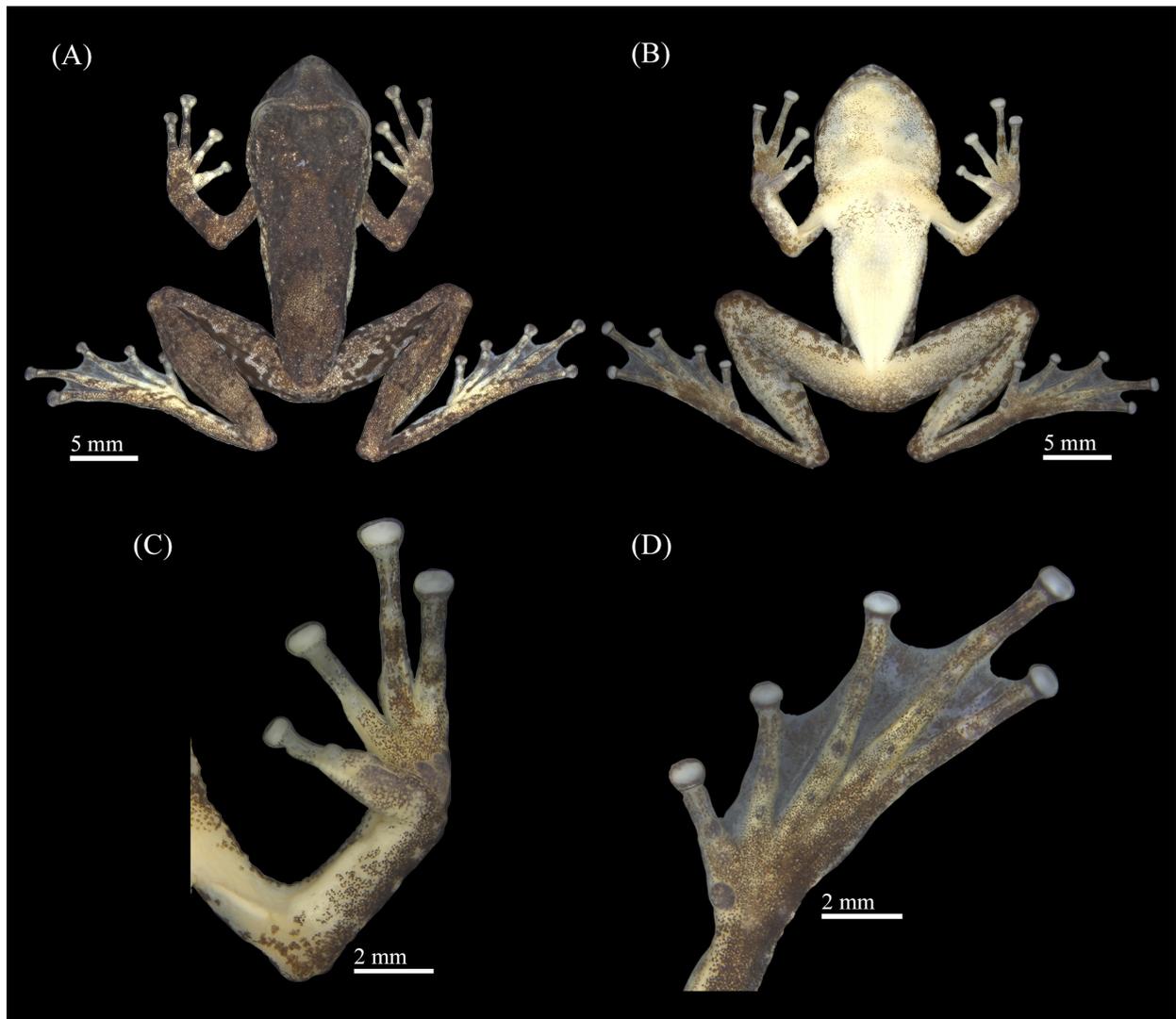
### *Ololygon paracatu* sp. nov.

urn:lsid:zoobank.org:act:E8A326E6-0A03-452C-878F-1940BFE347FD

(Fig. 1A–D)

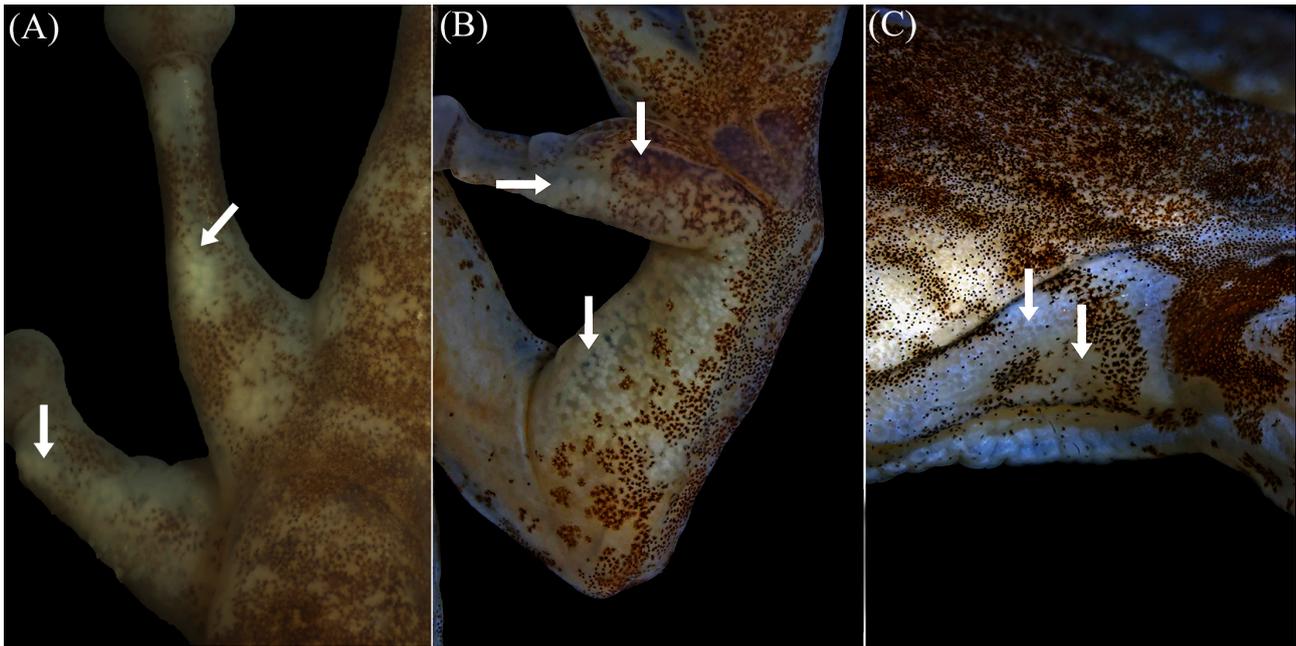
*Ololygon* sp. 14 — Araujo-Vieira *et al.* (2023:70, fig. 25, appendix S1). Phylogenetic analysis and recognition as candidate species.

**Holotype.** CHUNB 82767, adult male, from the municipality of Paracatu (datum WGS84, 17°32'19"S, 47°03'48"W, 714 m a.s.l.), Minas Gerais, Brazil, collected on 24 June 2018 by Daniele Carvalho, Alejandro Valencia-Zuleta, and Natan M. Maciel.



**FIGURE 1.** *Ololygon paracatu* sp. nov. holotype (CHUNB 82767, male). (A) Body in dorsal and (B) ventral views. (C) Right hand and (D) foot in ventral views.

**Paratypes.** Adult males (27): CFBH 44959–44962, CHUNB 82768–82776, 82780, MNRJ 93627–93630, and ZUFG 15214–15221, 15223, collected on 23 and 24 June 2018. Adult females (9): CFBH 44963, CHUNB 82777–82779, MNRJ 93626, and ZUFG 15212, 15213, 15222, collected on 23 and 24 June 2018, and ZUFG 9644 (sequenced), collected on 10 October 2015. All specimens were collected at the type locality. All except ZUFG 9644 were collected by Daniele Carvalho, Alejandro Valencia-Zuleta, and Natan M. Maciel. Specimen ZUFG 9644 was collected by Nathane Queiroz Costa and Werther P. Ramalho.



**FIGURE 2.** (A) Nuptial pad of fingers II and III in dorsal view of *Ololygon paracatu* **sp. nov.** (CFBH 44959, male). (B) Nuptial pad of Finger II in ventral view and glandular acini on forearm, and (C) externally evident inguinal gland of *O. paracatu* **sp. nov.** (CFBH 44961, male). White arrows indicate glandular acini.

**Diagnosis.** The new species is assigned to the *Ololygon catharinae* species group based on the phylogenetic analysis of Araujo-Vieira *et al.* (2023) that included the paratype ZUFG 9644, and on the presence of one of the known phenotypic synapomorphies of the group: the postaxial webbing of toe I reaching the distal margin of the subarticular tubercle (Araujo-Vieira *et al.* 2023: ch. 58.1).

*Ololygon paracatu* **sp. nov.** is diagnosed from other species of the *O. catharinae* group by the following set of characters: (1) male SVL 20.4–28.2 mm (n = 28), female SVL 29.3–35.2 mm (n = 9); (2) snout subovoid in dorsal view and protruding in profile; (3) *canthus rostralis* marked and curved; (4) vocal sac not externally expanded (internal vocal sac) in males; (5) vocal slits present in males; (6) forearms in males as thick as the arms, not hypertrophied; (7) inverted triangle shaped interocular blotch, extending well beyond the posterior margin of the eyes, reaching or slightly exceeding the posterior margin of the tympanum; (8) nuptial pad on Finger II not protruded, at the level of the adjacent skin, in males; (9) nuptial pad on Finger III (glandular acini) present in males; (10) glandular acini on the medial region of forearms in males; (11) inguinal glands externally evident in males; (12) inguinal region and hidden areas of thighs with irregular dark brown blotches on a pale yellow background in life; and (13) advertisement call composed of 3–5 pulsed notes, with dominant frequency of 2.5–3.5 kHz.

**Comparison with other species.** Males of *Ololygon paracatu* **sp. nov.** (SVL 20.4–28.2 mm) are smaller than those of *O. ariadne*, *O. catharinae*, and *O. longilinea* (combined SVL of males in these species 30.2–43.2 mm; this study), while females of the new species (SVL 29.1–38.2 mm) are larger than those of *O. berthae*, *O. caissara*, *O. luizotavioi*, *O. machadoi*, and *O. ranki* (combined SVL of females in these species 13.2–27.5 mm; Bokermann & Sazima 1973; Andrade & Cardoso 1987; Caramaschi & Kisteumacher 1989; Pombal & Bastos 1996; Lourenço *et al.* 2014) and smaller than those of *O. albicans*, *O. ariadne*, *O. flavoguttata*, *O. heyeri*, and *O. strigilata* (combined SVL of females in these species 38.9–46.9 mm; Pimenta *et al.* 2007; Lourenço *et al.* 2009a; this study).

*Ololygon paracatu* **sp. nov.** differs from all species of the *O. catharinae* group, except for *O. caissara*, *O. canastrensis*, *O. centralis*, *O. goya*, *O. longilinea*, *O. machadoi*, *O. rizibilis*, and *O. skaios*, by its subovoid snout in dorsal view (snout subelliptical in dorsal view in *O. aromothyella*, *O. berthae*, and *O. pombali*; subelliptical with acute tip in *O. jureia* and *O. luizotavioi*; rounded in *O. ariadne*, *O. brieni*, *O. catharinae*, *O. garibaldi*, *O. obtriangulata*, and *O. ranki*; rounded with mucronate tip in *O. albicans*, *O. angrensis*, *O. flavoguttata*, *O. heyeri*, *O. hiemalis*, *O. humilis*, *O. littoralis*, *O. muriciensis*, *O. pixinguinha*, *O. strigilata*, *O. trapicheiroi*, and *O. tripui*; and mucronate in *O. carnevallii* and *O. kautskyi*; Bokermann 1967; Lutz 1973a, b; Caramaschi & Kisteumacher 1989;

Carvalho-e-Silva & Peixoto 1991; Pombal & Gordo 1991; Faivovich 2005; Lourenço *et al.* 2009a, 2013, 2019; Cruz *et al.* 2011; Lacerda *et al.* 2021). The new species is also distinguished from *O. albicans*, *O. aromothyella*, *O. berthae*, *O. machadoi*, *O. ranki*, and *O. rizibilis* by its marked and curved *canthus rostralis* (not marked or rounded in these species; Bokermann & Sazima 1973; Andrade & Cardoso 1987; Faivovich 2005).

*Ololygon paracatu* **sp. nov.** also differs from *O. aromothyella*, *O. berthae*, *O. garibaldiae*, and *O. rizibilis* by its internal vocal sac in males (external vocal sac in these species; Faivovich 2005; Lourenço *et al.* 2019; Araujo-Vieira *et al.* 2023: ch. 63). The vocal slits present in males distinguish *O. paracatu* **sp. nov.** from *O. ariadne* (vocal slits absent in this species; Lourenço *et al.* 2014, 2016).

The new species differs from *Ololygon garibaldiae*, *O. pixinguinha*, and *O. rizibilis* by its forearms in males as thick as the arms, not hypertrophied (males with hypertrophied forearms in these species; Andrade *et al.* 2018; Lacerda *et al.* 2021), and from *O. aromothyella* and *O. caissara* (forearms more robust than arms in these species; Faivovich 2005; Lourenço *et al.* 2016).

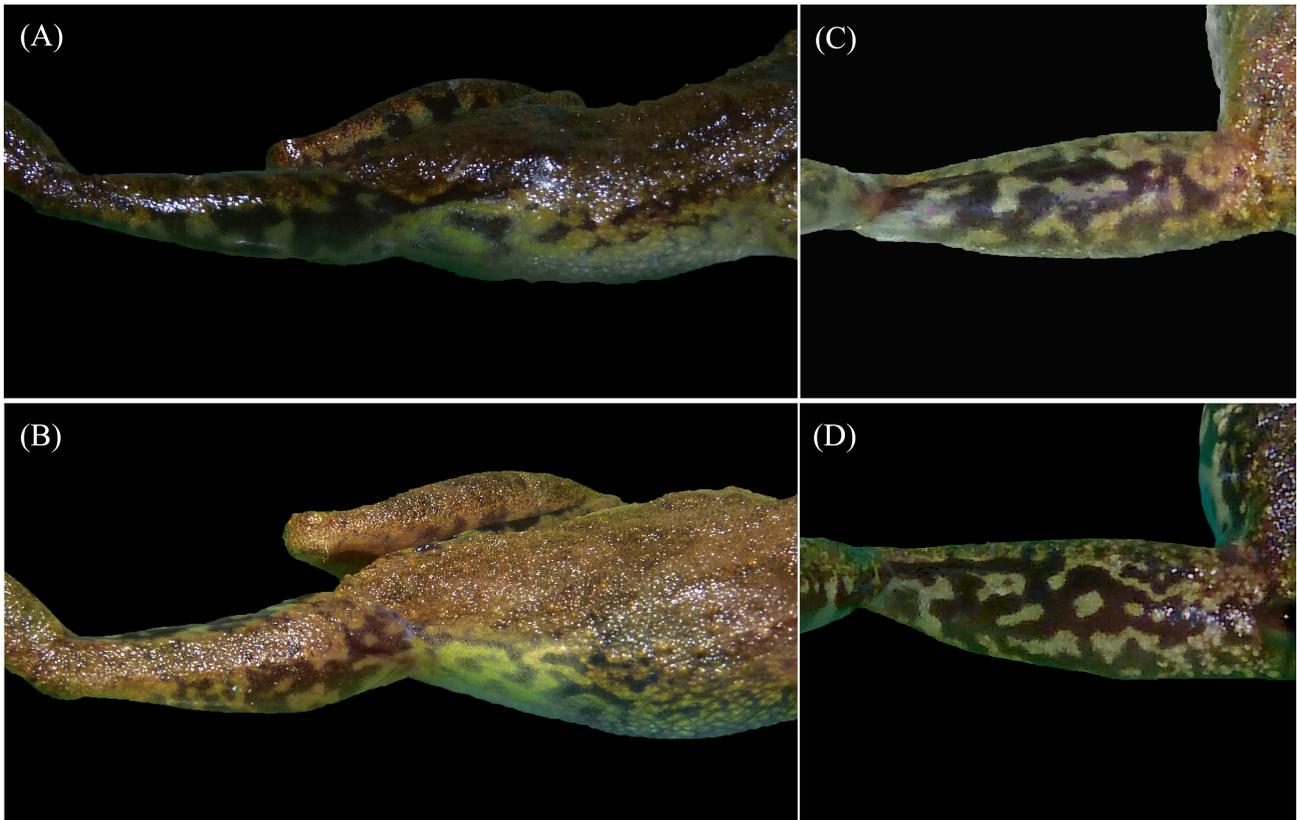
*Ololygon paracatu* **sp. nov.** has an inverted, triangular interocular blotch extending well beyond the posterior margin of the eyes, reaching or slightly exceeding the posterior border of the tympanum, which differentiates it from *O. albicans*, *O. caissara*, *O. carnevallii*, *O. flavoguttata*, *O. garibaldiae*, *O. heyeri*, *O. kautskyi*, *O. machadoi*, *O. muriciensis*, *O. rizibilis*, *O. strigilata*, *O. tripui* (W-shaped blotch that does not exceed, or slightly exceeds, the posterior margin of the eyes; Lourenço *et al.* 2016, 2019), *O. angrensis*, *O. humilis*, *O. littoralis* (narrow irregular band, like a subtle W-shaped blotch; Pombal & Gordo 1991; Lourenço *et al.* 2020), *O. aromothyella*, *O. berthae* (irregular band or inverted, trapezoid- or triangle-shaped blotch that does not exceed, or slightly exceeds, the posterior margin of the eyes; Faivovich 2005; Lourenço *et al.* 2016), and *O. pixinguinha* (variably shaped blotches that do not exceed, or slightly exceed, the posterior margin of the eyes; Lacerda *et al.* 2021).

The nuptial pad on Finger II not protruded, at the level of the adjacent skin (Fig. 2A), differentiates the new species from *Ololygon albicans*, *O. aromothyella*, *O. catharinae*, *O. garibaldiae*, *O. kautskyi*, *O. pixinguinha*, *O. rizibilis*, and *O. trapicheiroi* (protruded, forming an elevated structure on the skin in these species; particularly hypertrophied in *O. rizibilis*; Lourenço *et al.* 2009a, 2019; Lacerda *et al.* 2021).

*Ololygon paracatu* **sp. nov.** differs from *O. ariadne*, *O. berthae*, *O. centralis*, *O. garibaldiae*, *O. heyeri*, *O. hiemalis*, *O. ranki*, and *O. strigilata* by having nuptial pad on Finger III in males (nuptial pad on Finger III absent in males of these species; Lourenço *et al.* 2019, 2020; Araujo-Vieira *et al.* 2023: ch. 65; Fig. 2A), and from *O. albicans*, *O. angrensis*, *O. ariadne*, *O. aromothyella*, *O. berthae*, *O. brieni*, *O. caissara*, *O. catharinae*, *O. centralis*, *O. littoralis*, *O. heyeri*, *O. hiemalis*, *O. humilis*, *O. garibaldiae*, *O. luizotavioi*, *O. obtriangulata*, *O. pombali*, *O. ranki*, *O. rizibilis*, and *O. trapicheiroi* by having glandular acini on the medial region of forearms in males (glandular acini absent in males of these species; Lourenço *et al.* 2016, 2019, 2020; Araujo-Vieira *et al.* 2023: ch. 49; Fig. 2B).

The externally evident inguinal gland (Fig. 2C) distinguishes males of *Ololygon paracatu* **sp. nov.** from those of *O. albicans*, *O. angrensis*, *O. aromothyella*, *O. berthae*, *O. carnevallii*, *O. heyeri*, *O. humilis*, *O. kautskyi*, *O. littoralis*, *O. muriciensis*, *O. pombali*, *O. strigilata*, and *O. trapicheiroi* (inguinal gland not externally evident in these species). The new species also differs from *O. centralis*, which has a particularly hypertrophied inguinal gland (Pombal & Bastos 1996; Cruz *et al.* 2011; Lourenço *et al.* 2013, 2019; Araujo-Vieira *et al.* 2023: ch. 48).

The inguinal region and hidden areas of the thighs with irregular dark brown blotches on a pale yellow background in life (Fig. 3A–D) differentiates *Ololygon paracatu* **sp. nov.** from *O. ariadne* (light brown irregular blotches on a violet or pink background; Lourenço *et al.* 2016), *O. aromothyella* (inguinal region uniform dark yellow, and hidden areas of thighs with dark marks separated by dark yellow areas; Faivovich 2005), *O. brieni* (irregular dark blotches on a pale bluish background; Lutz 1973a), *O. caissara* (irregular black markings on a pale background; Lourenço *et al.* 2016), *O. canastrensis* (yellow blotches on a dark background; Cardoso & Haddad 1982), *O. carnevallii* (dark brown blotches on a whitish background; Caramaschi & Kisteumacher 1989), *O. catharinae*, *O. humilis*, *O. trapicheiroi* (dark brown blotches on light blue or white background; Lourenço *et al.* 2016), *O. centralis* (yellow blotches on a dark brown background; Pombal & Bastos 1996), *O. flavoguttata*, *O. heyeri* (brown spots on an orange background; Lourenço *et al.* 2016), *O. hiemalis* (black blotches on a green background; Haddad & Pombal 1987), *O. kautskyi* (white blotches on a dark brown background; Carvalho-e-Silva & Peixoto 1991), *O. longilinea*, *O. machadoi* (vermiculate spots on a yellow or pale background; Lourenço *et al.* 2016), *O. luizotavioi* (light brown blotches on a pale background; Lourenço *et al.* 2013), *O. obtriangulata* (dull grayish violet; Lutz 1973a), *O. pixinguinha* (black blotches on a whitish-green background; Lacerda *et al.* 2021), *O. ranki* (dark brown blotches on a greenish background; Lourenço *et al.* 2016), *O. strigilata*, and *O. tripui* (irregular brown blotches on a light green or greenish background; Pimenta *et al.* 2007; Lourenço *et al.* 2009a).



**FIGURE 3.** (A, B) Flanks and inguinal region, and (C, D) posterior surface of thighs of *Ololygon paracatu* **sp. nov.** (A, C: ZUFG 15221, male; B, D: ZUFG 15212, female).

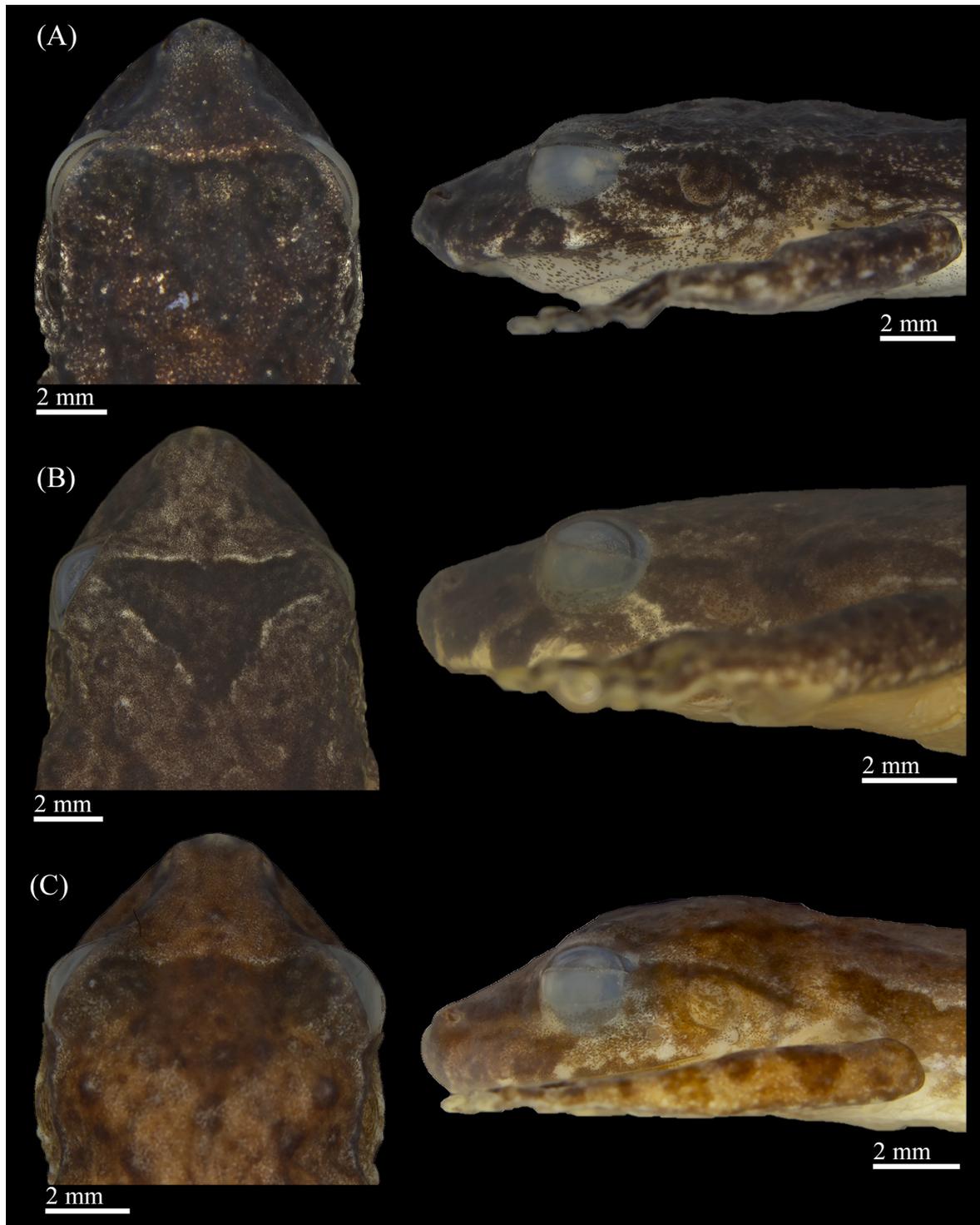
The dominant frequency (2.5–3.5 kHz) of the advertisement call of the new species differs from *Ololygon aromothyella* (4.7–5.4 kHz; Pereyra *et al.* 2012) and *O. berthae* (4.4–5.2 kHz; Pereyra *et al.* 2012). Also, the smaller number of notes (3–5 notes) of the advertisement call of *O. paracatu* **sp. nov.** differentiates it from *O. pinguinha* (12–30 notes, Lacerda *et al.* 2021) and *O. rizibilis* (7–23 notes; Pombal *et al.* 1995).

*Ololygon paracatu* **sp. nov.** is morphologically more similar to *O. goya* and *O. skaios*, from which it differs by the combination of the following characters: snout protruding in profile (snout rounded in profile; Andrade *et al.* 2018; Pombal *et al.* 2010; this study; Fig. 4A–C: right side), forearms not hypertrophied and externally evident inguinal glands in males (hypertrophied forearms and inguinal glands not externally evident in males of *O. goya*; Andrade *et al.* 2018; Araujo-Vieira *et al.* 2023: ch. 48), presence of vocal slits (absent in *O. skaios*; Lourenço *et al.* 2014, 2016), inguinal region and hidden areas of thighs with irregular dark brown blotches on a pale yellow background in life (vermiculate dark brown spots on a light green background in life in *O. skaios*; Pombal *et al.* 2010), and advertisement call composed of 3–5 notes, with dominant frequency of 2.5–3.5 kHz (advertisement call with 42–73 notes and dominant frequency of 2.2 kHz in *O. skaios*; Pombal *et al.* 2010).

**Description of the holotype.** Body slender (Fig. 1A). Head slightly longer than wide, HL 36% SVL, HW 35% SVL. Snout subovoid in dorsal view, protruding in profile. Nostril elliptical, protruding, opening dorsolaterally directed; IND 21% HW. *Canthus rostralis* marked and curved. Loreal region markedly concave and oblique. Eye large, protuberant; ED 34% HW; IOD 59% HW; horizontal pupil. Tympanum round, TD 42% ED; tympanic annulus rounded, with upper portion hidden by the supratympanic fold. Supratympanic fold evident, extending from the posterior corner of the eye to near the insertion of the arm. Tongue oval, free posteriorly and laterally, shallowly notched posteriorly. Vocal slits present, extending from the lateral base of tongue to the corner of the mouth. Choanae elliptical. Vomerine teeth in two contiguous series located between choanae, each bearing four teeth. Vocal sac not expanded externally (Fig. 1B). Pectoral fold absent. Axillary membrane absent.

Forearms as thick as the arms, not hypertrophied. Ulnar tubercles small. Fingers with a thin fringe; relative finger length II < III < V < VI; HL 30% SVL. Discs elliptical, wider than long, 3FD 31% ED and 74% TD.

Subarticular tubercles round; supernumerary tubercles small and rounded. Basal webbing between fingers, more reduced between fingers II–III (Fig. 1C). Inner metacarpal tubercle single, large, and elliptical; outer metacarpal tubercle large and bilobate. Nuptial pad on Finger II, light-colored, not protruded above the adjacent skin, covering the dorsomedial surface of Metacarpal II, extending from the base of the inner metacarpal tubercle, obscuring its proximal and outer margins, to the base of the disc. Distinct epidermal projections are present only up to the distal margin of the subarticular tubercle on the ventral surface; from that point to the base of the disc, only acini are observed, without epidermal projections. Nuptial pad on Finger III extends from dorsomedial surface of metacarpal III to the base of the disc, without epidermal projections.



**FIGURE 4.** Head in dorsal and lateral views of (A) *Ololygon paracatu* sp. nov. (ZUFG 15213, female), (B) *O. skaios* (ZUFG 15203, female; topotype), and (C) *O. goya* (CEPB 10032, female).

Hind limbs slender, TL 46% SVL, FL 42% SVL. Tarsal fold absent, no tarsal tubercles. Tubercles absent on heel. Toes fringed; relative toes length:  $I < II < III \leq V < IV$ . Discs elliptical, wider than long, 4TD 26% ED and 61% TD. Subarticular tubercles single and rounded; supernumerary tubercles single and rounded; inner metatarsal tubercle single and elliptical, larger than inner metatarsal tubercle; outer metatarsal tubercle single, rounded, small, and protruding. Webbing formula:  $I2^{-}1^{+}III1-1III1-2IV2^{-}1V$  (Fig. 1D). Cloacal opening directed posteriorly at upper level of thighs.

Dorsum and flanks covered by scattered tubercles; venter immaculate. Inguinal gland externally evident. Whitish glandular acini densely distributed on the medial region of the forearms. Small, round, scattered, translucent serous glands in the mental and pectoral regions.

**Measurements of holotype (mm).** SVL 25.33; HL 9.20; HW 8.98; IND 1.89; SL 2.71; ED 3.13; UEW 1.93; IOD 5.37; TD 1.33; TL 11.81; FL 10.86; 3FD 0.99; 4TD 0.82.

**Coloration in life of the holotype.** There are no notes of coloration in life of the holotype.

**Coloration in preservative.** Dorsum light brown. Upper lip cream with dark brown blotches and dots. Interocular inverted triangular blotch bordered by a dark to light brown discontinuous line. A dark, inverted V-shaped marking that extends toward both inguinal regions and converges near the mid-dorsal area. Dorsolateral region with dark brown blotches and dots on a light brown background. Flanks, inguinal region, and hidden areas of thighs with dark brown blotches on a light brown background. Dorsally, hind limbs light brown with dark brown bars, and dark brown dots on feet. Venter cream, gular and pectoral regions finely spotted with dark brown. Palms, soles, and tarsi densely spotted with dark brown, less evident on palms; forearms, shanks, and thighs spotted with dark brown, forming irregular, small to medium-sized blotches. Iris gray.

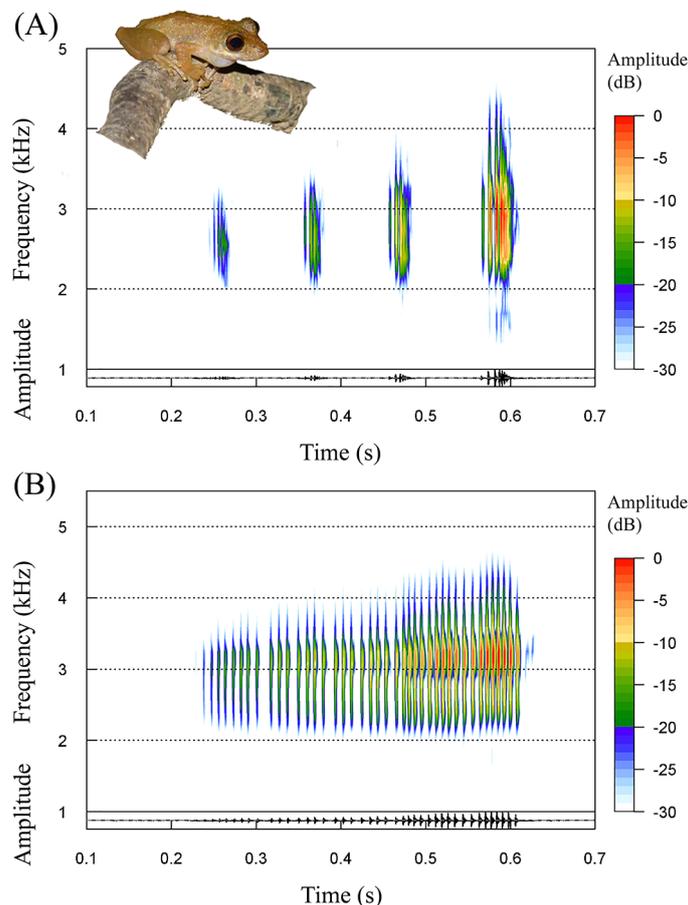
**Variation among paratypes.** Some measurements are presented in Table 1. Skin on dorsum with few to several tubercles, scattered or densely distributed. Toe webbing formula varies as follows:  $I2^{-} (1^{+}-2^{-}) III1 - 1-III1 - (1-2^{-}) IV (1^{+}-2^{-}) - 1V$ . Small, round, scattered acini in the mental and pectoral regions present or absent in males and females (87–96% of males and 71–86% of females); we interpret them as ordinary serous glands evident through the unpigmented skin. Females (SVL = 29.2–35.2 mm) are larger than males (SVL = 20.4–28.2 mm) and lack inguinal glands and acini on forearms and fingers.

**TABLE 1.** Measurements (in mm) of the type series of *Ololygon paracatu* **sp. nov.** (including the holotype). For abbreviations see the Material and Methods section. Mean  $\pm$  standard deviation, and range (in parentheses).

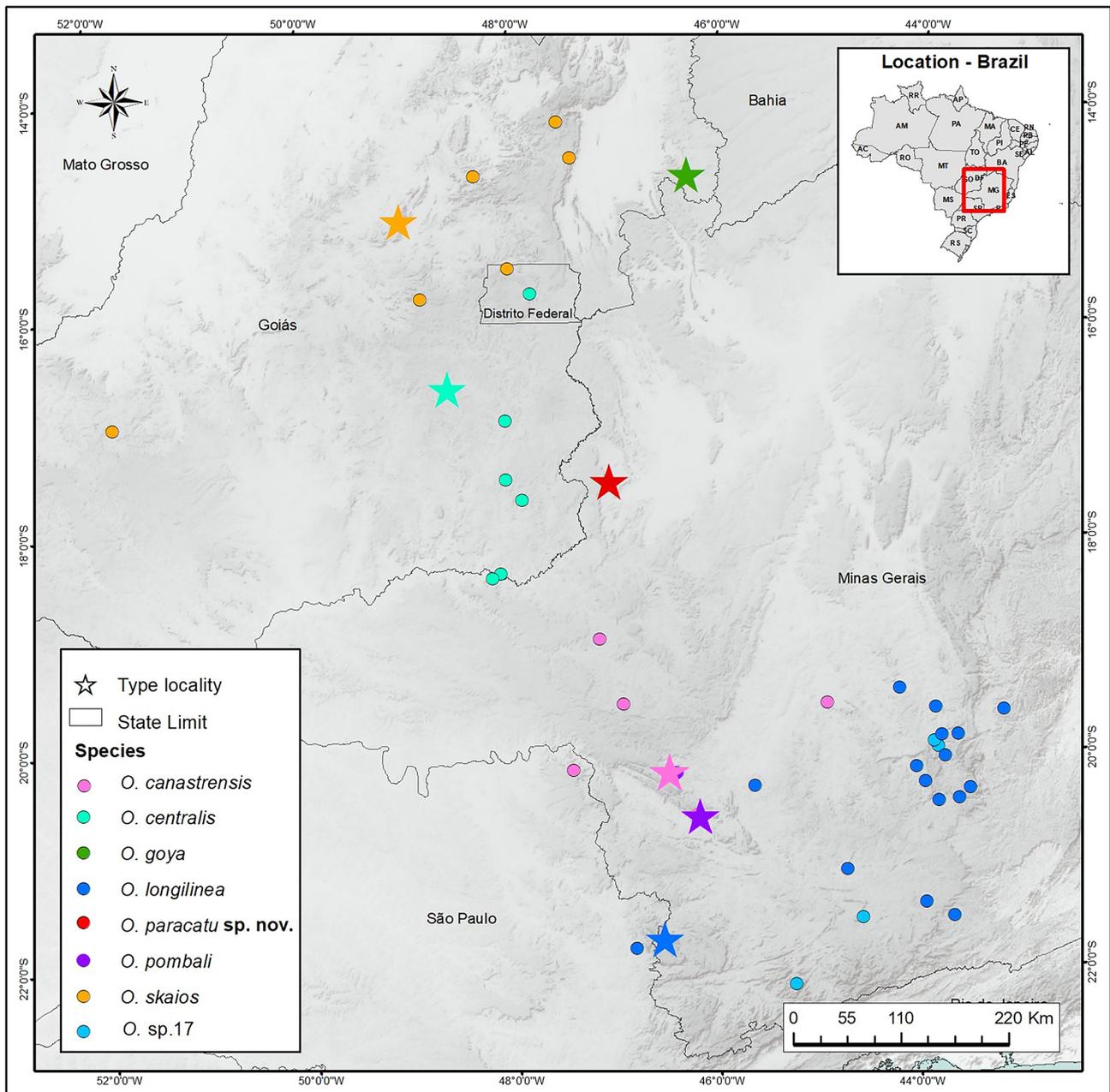
Measurements	Males (n= 28)	Females (n=9)
SVL	23.7 $\pm$ 1.4 (20.4–28.2)	31.9 $\pm$ 2.0 (29.1–35.2)
HL	9.0 $\pm$ 0.4 (7.9–10.1)	11.7 $\pm$ 0.7 (11.0–12.7)
HW	8.5 $\pm$ 0.4 (7.8–9.3)	11.2 $\pm$ 0.8 (10.2–12.4)
IND	2.0 $\pm$ 0.1 (1.5–2.3)	2.5 $\pm$ 0.3 (2.1–2.9)
SL	2.7 $\pm$ 0.2 (1.7–3.0)	3.5 $\pm$ 0.4 (2.9–4.1)
ED	3.3 $\pm$ 0.3 (2.5–3.7)	4.3 $\pm$ 0.3 (3.8–4.7)
UEW	2.0 $\pm$ 0.2 (1.7–2.3)	2.5 $\pm$ 0.4 (1.6–3.0)
IOD	4.9 $\pm$ 0.3 (4.2–5.7)	6.2 $\pm$ 0.4 (5.7–6.9)
TD	1.1 $\pm$ 0.1 (0.9–1.4)	1.3 $\pm$ 0.1 (1.1–1.5)
TL	11.6 $\pm$ 0.8 (9.8–13.7)	15.0 $\pm$ 1.0 (15.0–16.6)
FL	11.1 $\pm$ 0.7 (9.4–12.4)	14.2 $\pm$ 1.3 (12.7–16.0)
3FD	0.9 $\pm$ 0.1 (0.7–1.2)	1.3 $\pm$ 0.2 (1.1–1.6)
4TD	0.8 $\pm$ 0.1 (0.5–1.2)	1.1 $\pm$ 0.1 (0.9–1.3)

In life, dorsum light brown. Upper lip pale yellow with dark brown blotches and dots. Interocular inverted triangular blotch bordered by a discontinuous dark to light brown line. Dark inverted V-shaped marking extending toward both inguinal regions and converging near mid-dorsum. Dorsolateral region with dark brown blotches and dots on a light brown background. Flanks, inguinal region, and hidden surface of thighs with dark brown blotches on a pale yellow background. Dorsally, hind limbs light brown with dark brown bars; feet with dark brown dots. Venter pale yellow, with dark brown dots. Palms, soles, and tarsi densely spotted with dark brown, less evident on palms; forearms, shanks, and thighs spotted with dark brown, forming irregular, small to medium-sized blotches. Iris bronze, with irregular, sparse black reticulations; a thin, golden rim surrounding the pupil, interrupted in the anterior and posterior inflection points by dark fuzzy blotches that extend to nearly the outer margins of the iris; an irregular black blotch below the ventral inflexion point. In preservative, dorsum yellowish to light brown, with dots and spots of variable size and number. Blotches, stripes, and dots light to dark brown on dorsum. Venter coloration varies from whitish to pale yellow, with dark dots ranging from sparse to dense.

**Vocal repertoire.** All calls were recorded at the type locality on 23 and 24 June 2018, between 05:30 p.m. and 01:00 a.m., air temperature 15–18°C. The advertisement call of *Ololygon paracatu* **sp. nov.** (n = 53 calls; seven males; Fig. 5A; Table 2) consists of pulsed notes (short squawk-like notes *sensu* Hepp *et al.* 2017) and present ascending amplitude modulation, with amplitude peak at the end of the call, in the last notes. Call duration is 0.17–0.41 s (mean  $\pm$  SD,  $0.26 \pm 0.06$ ), with 3–5 notes of 0.016–0.065 s ( $0.032 \pm 0.01$ ), emitted at intervals of 0.022–0.086 s ( $0.05 \pm 0.01$ ). The call repetition rate is 1–8 calls per minute ( $4.42 \pm 2.43$ ). Notes consist of 4–10 pulses ( $7.15 \pm 1.73$ ) with duration of 0.002–0.005 s ( $0.002 \pm 0.000$ ). Dominant frequency is 2.5–3.5 kHz ( $3.12 \pm 0.21$ ).



**FIGURE 5.** Calls of *Ololygon paracatu* **sp. nov.** (CHUNB 82775, FNJV 013671). (A) Advertisement call composed of four notes: spectrogram (above) and oscillogram (below). (B) Aggressive call: spectrogram (above) and oscillogram (below).



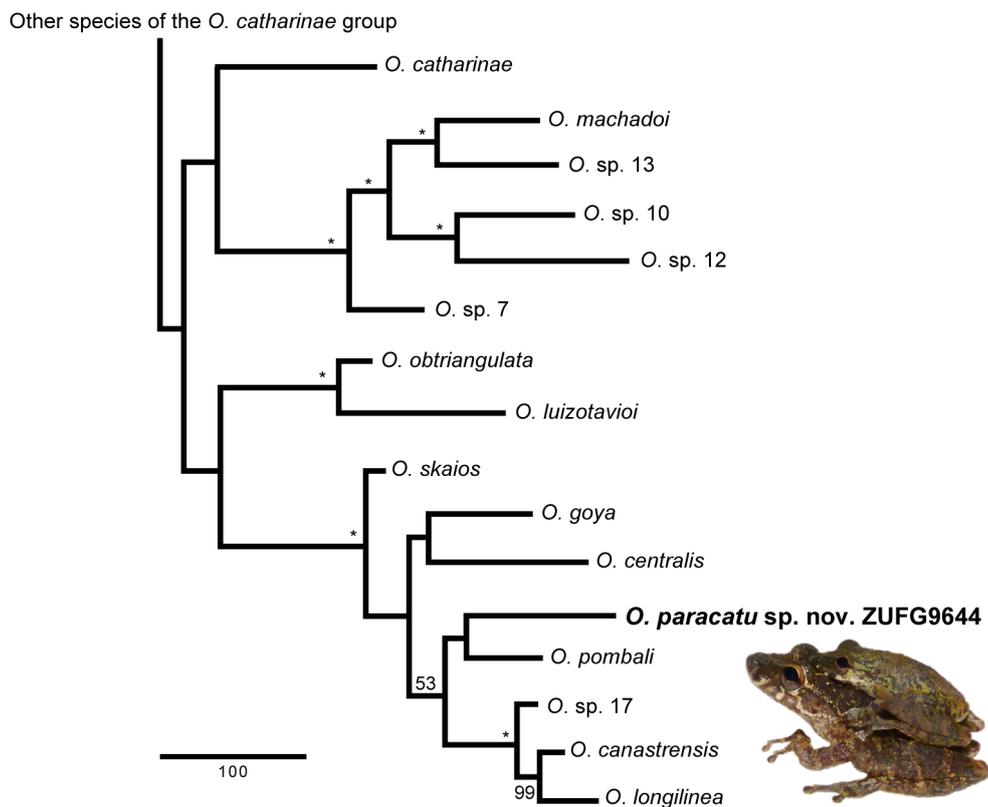
**FIGURE 6.** Known distribution of *Ololygon paracatu* **sp. nov.** in the municipality of Paracatu, state of Minas Gerais, Brazil, and closely related species.

A second type of call (aggressive call) was recorded ( $n = 16$  calls; four males; Fig. 5B). It was emitted less frequently than the advertisement call and seems to be emitted by males to keep a distance from other calling males. Calls were composed of one pulsed note (long squawk-like note *sensu* Hepp *et al.* 2017) with duration of 0.185–0.447 s ( $0.315 \pm 0.075$ ). Each note has 22–48 pulses ( $38.12 \pm 7.80$ ) and duration of 0.003–0.004 s ( $0.003 \pm 0.000$ ). Dominant frequency is 3.0–3.4 kHz ( $3.23 \pm 0.14$ ).

**Distribution.** *Ololygon paracatu* **sp. nov.** is known so far from two nearby localities in the municipality of Paracatu, state of Minas Gerais, Brazil: the type locality and another site (datum WGS84,  $17^{\circ}33'40''\text{S}$   $47^{\circ}03'43''\text{W}$ ; Fig. 6), located approximately 2.5 km away, where we identified males of the new species through their vocalizations (individuals not collected).

**Phylogenetic relationships.** Araujo-Vieira *et al.* (2023) recovered *Ololygon paracatu* **sp. nov.** (as *Ololygon* sp. 14, paratype ZUFG 9644), as the poorly supported (<50% jackknife) sister taxon of *O. pombali*, within a well-

supported clade (100% jackknife) including *O. canastrensis*, *O. centralis*, *O. goya*, *O. longilinea*, *O. skaios*, and the candidate species *O. sp. 17* (Fig. 7). *Ololygon paracatu* **sp. nov.** differs in UPDs of 5.1–9.2% from these taxa, particularly 6.7–9.2% from *O. goya* and *O. skaios*, the more morphologically similar species (Araujo-Vieira *et al.* 2023: appendix S10, table 17).



**FIGURE 7.** Phylogenetic relationships of *Ololygon paracatu* **sp. nov.** (ZUFG 9644) and its more closely related species in the *O. catharinae* group. Modified from Araujo-Vieira *et al.* (2023: fig. 25). The topology is condensed to species level and reflects the current taxonomy of Scinaxini (Araujo-Vieira *et al.* 2023). Values around the nodes represent jackknife support; nodes without values have support < 50%. An asterisk (\*) indicates 100% of jackknife support.

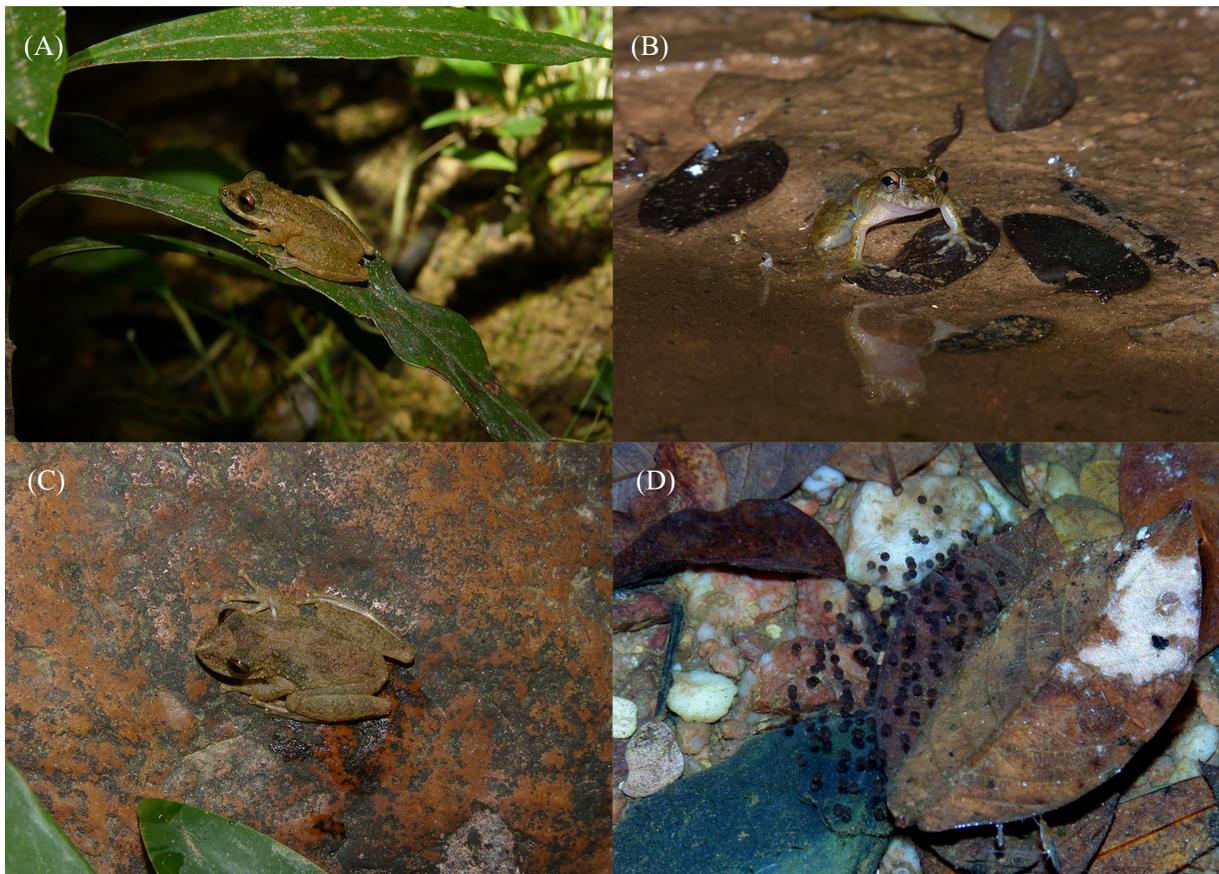
**Natural history.** The new species was found in small streams with stone beds in gallery forest, within the Cerrado biome (Fig. 8). The reproductive period of the species seems to occur in the driest and coldest season of the year in Cerrado, from June to July. Between 23 and 24 June 2018, males were heard vocalizing, pairs in amplexus were found, and both eggs and tadpoles (undescribed) were observed in the stream pools.

*Ololygon paracatu* **sp. nov.** began its vocal activity around 5:30 p.m., when the stream, shaded by the gallery forest, was getting dark. Males start calling at this time and stop vocalizing between 11:00 p.m. and midnight. The individuals were found on the ground, on rocks along the stream margins, and in shrubs around the stream, up to 50 cm from the ground. Males called on all these substrates (Fig. 9A–C). Amplexus is axillary, and oviposition occurs directly in the water; the spawn is submerged and apparently is a clump formed by the individual, adhered egg jelly capsules (Fig. 9D). A spawn contained approximately 110 eggs, as estimated from photographs. The eggs have a pigmented animal pole. *Ololygon paracatu* **sp. nov.** shares the same reproductive areas with *Boana lundii* (Hylidae) and *Ameerega flavopicta* (Dendrobatidae).

**Etymology.** Paracatu is used as a noun in apposition, meaning “good river” or “strait river” in Tupi-Guarani language, due to the remarkable fishery of the Paracatu River in the past and its feasibility for navigation. The specific name refers to the Paracatu River, the main river of the Northwest region of the state of Minas Gerais, now threatened by mining activities and excessive water pumping for agricultural, industrial, and domestic uses. The conservation of the streams and rivulets where the new species is found is essential for the maintenance and conservation of the Paracatu River and its tributaries.



**FIGURE 8.** Habitat of *Ololygon paracatu* **sp. nov.**, showing the stream with stone beds in gallery forest in the municipality of Paracatu, state of Minas Gerais, Brazil (type locality).



**FIGURE 9.** Living specimens of *Ololygon paracatu* **sp. nov.** on (A) scrub leaves around the stream, (B) ground, and (C) rocks at the stream edge. (D) A submerged spawn appearing as a cohesive clump of individually adhered egg jelly capsules.

## Discussion

*Ololygon paracatu* **sp. nov.** is the eighth described species of the *O. catharinae* species group known to occur in the Cerrado biome, added to *O. canastrensis*, *O. centralis*, *O. luizotavioi*, *O. goya*, *O. machadoi*, *O. pombali*, and *O. skaios*. The new species is morphologically similar to *O. goya* and *O. skaios*, both known to occur in the state of Goiás, Brazil. However, *O. paracatu* **sp. nov.** is recovered as the poorly supported sister taxon of *O. pombali* (< 50% jackknife; Araujo-Vieira *et al.* 2023: fig. 25; Fig. 7), a species that inhabits Serra da Canastra National Park in the state of Minas Gerais. The Cerrado species are recovered in the study of Araujo-Vieira *et al.* (2023) in three clades: (1) *O. canastrensis*, *O. centralis*, *O. goya*, *O. longilinea*, *O. paracatu* **sp. nov.** (as *Ololygon* sp. 14), *O. pombali*, *O. skaios*, and *Ololygon* sp. 17; (2) *O. machadoi*, and the four unconfirmed candidate species *Ololygon* spp. 7, 10, 12, and 13; and (3) *O. luizotavioi*. These three clades are closely related in a poorly supported clade (< 50% jackknife) that also includes two Atlantic Forest species, *O. catharinae* (as the poorly supported sister taxon of clade 2) and *O. obtriangulata* (as the well supported sister taxon of *O. luizotavioi*; Araujo-Vieira *et al.* 2023: fig. 25; Fig. 7). In this topological context, it is ambiguous to infer how many times *Ololygon* diversified in the Cerrado, and only a better knowledge of the phylogeny of *Ololygon* will allow us to approach this issue.

We also examined *Ololygon* sp. 17, a confirmed candidate species of the *O. catharinae* group that is morphologically more similar to *O. longilinea* and phylogenetically closer to the latter and *O. canastrensis* (Araujo-Vieira *et al.* 2023). It differs from the new species by having an inguinal region and hidden areas of the thighs with vermiculate spots on a yellow or pale background in life (versus irregular dark brown blotches on a pale yellow background in life in the new species; this study). In addition to the diagnostic characters mentioned in the comparison, we also noted that the loreal region in the new species is markedly concave and oblique compared with that of *O. goya* and *O. skaios* (loreal region moderately concave, neither flat nor deeply hollowed; Andrade *et al.* 2018; Pombal *et al.* 2010; this study; Fig. 4A–C: left side); however, because this characteristic is subtle, we prefer to be cautious and refrained from using it as a diagnostic character.

Species of the *Ololygon catharinae* group are commonly found in forested areas in the Atlantic Forest, and those species that inhabit Cerrado areas occupy gallery forests, mostly in relatively higher regions with fast-flowing streams or rivulets (Andrade *et al.* 2018; Lourenço *et al.* 2009a, b, 2013, 2014, 2016; Pombal *et al.* 2010; this study). Several species of the *O. catharinae* group, including *O. paracatu* **sp. nov.**, are known to breed during winter, which may allow for reduction of competition with other species, including both larval and adult forms (Canelas & Bertoluci 2007). These species also present high tolerance to low temperatures typical of montane anurans (Guix 1996).

The advertisement calls of *Ololygon* species, especially those in the *O. catharinae* group, display a complex acoustic structure characterized by various types of pulsed notes that vary in their spectral and temporal parameters. These notes may occur singly or be arranged into multi-note calls (e.g., Bastos *et al.* 2011; Pereyra *et al.* 2012; Bang & Giaretta 2017; Hepp *et al.* 2017; Köhler *et al.* 2017). The diversity and organization of these calls are further influenced by the behavioral context in which they are produced, such as advertisement, aggressive, or distress situations (e.g., Bevier *et al.* 2008; Hepp *et al.* 2017).

The advertisement call (or Type A call) of *Ololygon paracatu* **sp. nov.** can be considered within the short call acoustic pattern, composed of short squawk-like notes, as defined by Hepp *et al.* (2017). This short acoustic pattern is the most common among the species in the *O. catharinae* group, including those more closely related to the new species (*O. canastrensis*, *O. centralis*, *O. longilinea*, *O. goya*, *O. skaios*, and *O. pombali*; Cardoso & Haddad 1982; Pombal & Bastos 1996; Pombal *et al.* 2010; Andrade *et al.* 2018; Bang & Giaretta 2018; Hepp *et al.* 2017). However, although similar in general acoustic parameters to the related species mentioned above, the advertisement call of *O. paracatu* **sp. nov.** presents some differences in the dominant frequency and number of notes compared with those of *O. skaios*, and few other species in the *O. catharinae* group (see Table 2).

The long squawk-like notes, here interpreted as probable aggressive calls of *Ololygon paracatu* **sp. nov.** based on similarities with aggressive notes described for other *Ololygon* species (e.g., Bastos *et al.* 2011; Bang & Giaretta 2018; Hepp *et al.* 2017), were also recorded for *O. canastrensis*, *O. centralis*, *O. longilinea*, *O. skaios*, and *O. pombali* (unknown for *O. goya*), among other congeners (Hepp *et al.* 2017; Bang & Giaretta 2018), which can additionally emit a click-like note not recorded for *O. paracatu* **sp. nov.** in this study.

**TABLE 2.** Acoustic parameters of the calls described of the species of the *Ololygon catharinae* group. Abbreviations: CD—call duration; NN—number of notes; ND—notes duration; NP—number of pulses; PD—pulse duration; NI—notes interval; CR—call rate (number of calls per minute); DF—dominant frequency. Data presented as mean ± standard deviation (when available) and range.

Species	CD (s)	NN	ND (s)	NP	PD (s)	NI (s)	CR (calls/min)	DF (kHz)	Reference and original terms
<i>O. agilis</i>	–	1	(0.36–0.40)	–	–	–	–	(7.45–7.92)	Nunes <i>et al.</i> (2007) “Note A”
	–	(13–29)	(0.010–0.032)	–	–	(0.062–0.133)	–	(5.60–7.88)	Nunes <i>et al.</i> (2007) “Note B”
<i>O. albicans</i>	0.7	–	0.03	–	–	–	–	(3.3–4.1)	Heyer (1980)
<i>O. angrensis</i>	(0.2–0.7)	(01–07)	0.025±0.012	–	–	(0.023–0.076)	–	(2.15–3.7)	Garey <i>et al.</i> (2012)
<i>O. argyreornata</i>	0.8	5	(0.02–0.04)	–	–	(0.04–0.08)	–	(5.0–6.5)	Pombal <i>et al.</i> (1995) “Short Call”
	(10–25)	(130–280)	(0.02–0.09)	–	–	–	–	(5.0–6.5)	Pombal <i>et al.</i> (1995) “Long Call”
<i>O. aromothyella</i>	4.49±2.41	11.09±12.37	0.11±0.05	29.36±11.00	0.003±0.001	0.20±0.09	–	5.12±2.98	Pereyra <i>et al.</i> (2012) “Short Call”
	(1.04–20.76)	(2–74)	(0.04–0.22)	(18–49)	(0.001–0.005)	(0.05–0.48)	–	(4.7–5.4)	
	4.49±2.41	0.68±0.60	0.42±0.17	74.57±20.17	0.004±0.002	0.20±0.09	–	5.0±3.11	Pereyra <i>et al.</i> (2012) “Trilled Call”
	(1.04–20.76)	(0–3)	(0.30–0.61)	(33–102)	(0.002–0.006)	(0.05–0.48)	–	(4.8–5.5)	
<i>O. berthae</i>	22.21±19.23	7.87±27.5	0.39±0.06	62±3.54	0.005±0.002	0.18±0.04	–	4.9±2.75	Pereyra <i>et al.</i> (2012) “Short Note”
	(3.2–52.04)	(0–52)	(0.13–0.59)	(40–88)	(0.002–0.007)	(0.06–0.60)	–	(4.4–5.3)	
	22.21±19.23	87.67±155.60	0.07±0.02	21.62±5.58	0.003±0.001	0.18±0.04	–	4.88±2.85	Pereyra <i>et al.</i> (2012) “Trilled Note”
	(3.2–52.04)	(4–620)	(0.03–0.14)	(12–39)	(0.002–0.005)	(0.06–0.60)	–	(4.4–5.2)	
<i>O. caissara</i>	(0.01–0.02)	1	(0.01–0.02)	–	–	(0.01–32.7)	–	(3.1–4.4)	Lourenço <i>et al.</i> (2016) “Advertisement Call”
	0.8	(6–7)	–	–	–	<0.1	–	–	Cardoso & Haddad (1982) “Nuptial call”
<i>O. canastrensis</i>	0.8	–	0.4	–	–	–	–	3	Cardoso & Haddad (1982) “Encounter call”
	0.536±0.015	7±1	0.026±0.001	9±3	0.024±0.002	–	–	2.27±0.42	Bang & Giaretta (2017) “Type A”
	(0.445–0.628)	(6–8)	(0.016–0.036)	(6–13)	(0.02–0.04)	–	–	(2.25–2.34)	

.....continued on the next page

TABLE 2. (continued)

Species	CD (s)	NN	ND (s)	NP	PD (s)	NI (s)	CR (calls/ min)	DF (kHz)	Reference and original terms
<i>O. catharinae</i>	2.5	–	0.04	–	–	–	–	(2.2–3.1)	Heyer (1980) “Advertisement call”
<i>O. centralis</i>	(0.39–0.91)	(1–10)	(0.02–0.03)	–	–	–	–	(3.49–4.89)	Bastos <i>et al.</i> (2011) “Advertisement call”
<i>O. goya</i>	0.58±0.17 (0.29–0.9)	6.9±1.76 (4–11)	0.031±0.008 (0.012–0.055)	(1–14)	–	0.056±0.012 (0.026–0.11)	–	2718±246 (2.07–3.10)	Andrade <i>et al.</i> (2018) “Advertisement call”
<i>O. heyeri</i>	(0.34–0.56)	(6–9)	(0.002–0.01)	–	–	(0.55–0.66)	–	(2.84–3.87)	Hepp <i>et al.</i> (2017) “Call A”
<i>O. hiemalis</i>	0.191±0.413 (0.563– 2.434)	9±2 (6–17)	0.052±0.015 (0.021–0.096)	8±2 (4–13)	0.002±0.005 (0.001– 0.004)	–	–	2.81±0.44 (2.25–3.53)	Bang & Giaretta (2017) “Type A”
<i>O. humilis</i>	(0.109– 0.345)	(3–5)	(0.002–0.006)	–	–	(0.003–0.055)	–	(3.0–3.9)	Hepp <i>et al.</i> (2017) “Call A”
<i>O. littoralis</i>	(0.21–0.79)	(3–4)	0.050±0.013	–	–	(0.024–0.066)	–	(1.89–3.53)	Garey <i>et al.</i> (2012) “Advertisement call”
<i>O. longilinea</i>	(0.613– 1.418)	(8–19)	(0.016–0.067)	–	–	(0.024–0.141)	–	(2.0–2.7)	Hepp <i>et al.</i> (2017) “Call A”
<i>O. luizotavioi</i>	(0.12–0.49) (0.08–0.54)	(2–6) (2–4)	(0.005–0.018) 0.003–0.008	–	–	(0.078–0.435) (0.063–0.075)	–	(2.7–4.1) (3.0–4.0)	Lourenço <i>et al.</i> (2009) “Advertisement call”
<i>O. machadoi</i>	–	(6–7)	0.05	–	–	–	–	3.5	Bokermann & Sazima (1973) “Nuptial call”
<i>O. paracatu</i> <b>sp. nov.</b>	0.26±0.06 (0.17–0.41)	3.49±0.63 (3–5)	0.032±0.01 (0.016–0.065)	7.15±1.73 (4–10)	0.002±0.000 (0.002– 0.005)	0.05±0.01 (0.022–0.086)	4.42±2.43 (1–8)	3.12±0.210 (2.5–3.5)	This study “Advertisement call”
<i>O. pixinguinha</i>	0.31±0.075 (0.185– 0.447)	1	0.31±0.075 (0.185–0.447)	38.12±7.80 (22–48)	0.003±0.000 (0.003– 0.004)	–	2.4±1.94 (1–5)	3.231±0.140 (3.0–3.4)	This study “Aggressive call”
<i>O. pixinguinha</i>	0.56±0.18 (0.3–0.9)	20.9±5.6 (12–30)	0.010±0.0023 (0.002–0.015)	5.7±1.9 (1–8)	–	0.0168±0.0031 (0.012–0.037)	–	2.61±0.33 (2.24–3.44)	Lacerda <i>et al.</i> (2021) “Type A”
	0.33±0.13 (0.12–0.72)	1	–	149.5±41.9 (74–249)	–	–	–	2.84±0.37 (2.07–4.13)	Lacerda <i>et al.</i> (2021) “Type B”

.....continued on the next page

TABLE 2. (continued)

Species	CD (s)	NN	ND (s)	NP	PD (s)	NI (s)	CR (calls/ min)	DF (kHz)	Reference and original terms
	0.918 ± 0.276 (0.534– 1.619)	9.9 ± 2.4 (6–16)	0.035 ± 0.007 (0.018–0.048)	10 ± 2.4 (5–15)	–	–	–	3.474 ± 0.305 (2.906– 4.078)	Bang & Giaretta (2018) “Type A”
<i>O. pombali</i>	0.361 ± 0.137 (0.153– 0.708)	1	0.361 ± 0.137 (0.153–0.708)	38.6 ± 16.5 (18–71)	–	–	–	3.693 ± 0.258 (3.000– 4.125)	Bang & Giaretta (2018) “Long squawk-like note – Aggressive call”
	0.035 ± 0.008 (0.026– 0.074)	1 (1–3)	0.035 ± 0.008 (0.026–0.074)	6.3 ± 2.3 (3–12)	–	–	–	3.548 ± 0.447 (2.765– 4.125)	Bang & Giaretta (2018) “Click-like note – Aggressive call”
<i>O. ranki</i>	0.73 ± 0.32 (0.049– 0.161)	8 ± 2 (6–15)	0.03 ± 0.010 (0.015–0.051)	8 ± 2 (4–13)	0.023 ± 0.005 (0.002– 0.003)	–	–	2.89 ± 0.32 (2.34–3.42)	Bang & Giaretta (2017) “Type A”
<i>O. rizibilis</i>	(0.74–2.95)	(7–23)	(1.00–4.70)	(15–72)	–	–	–	(2.8–4.0)	Pombal <i>et al.</i> (1995) “Advertisement call”
<i>O. strigilata</i>	(0.01–0.02)	1	(0.01–0.02)	–	–	–	–	(2.6–3.4)	Mendes <i>et al.</i> (2013) “Advertisement call”
<i>O. skaios</i>	(4.4–7.9)	(42–73)	(0.01–0.05)	–	–	(0.04–0.2)	–	2.2	Pombal <i>et al.</i> (2010) “Long call”
	(0.02–0.05)	1	(0.01–0.05)	–	–	–	–	2.3	Pombal <i>et al.</i> (2010) “Short call”
<i>O. trapicheiroi</i>	(0.006– 2.218)	(1–8)	(0.006–0.337)	–	–	(0.002–0.645)	–	(2.7–3.3)	Hepp <i>et al.</i> (2017) “Call A”

The description of a new species of the *Ololygon catharinae* group in the Brazilian Cerrado highlights the importance of this highly threatened Biome for anuran biodiversity. However, despite knowledge gaps regarding the Cerrado's role in the evolution and conservation of the Brazilian biota, the rate of habitat loss in the Cerrado is twice that observed in the Amazon. This suggests that the Biome will be restricted to its scarcely protected system in a few years (Françoso *et al.* 2015). We are unaware of the presence of *O. paracatu* **sp. nov.** in protected areas. Nevertheless, very few and small-sized protected areas are close to its known distribution (e.g., Paracatu State Park – PE de Paracatu). Since the species is restricted to streams and rivulets with fast flow associated with gallery forests, conservation actions aimed at the species' conservation can be beneficial to the maintenance of the mistreated Paracatu River and for water provision in the region.

## Acknowledgements

We thank N. Q. Costa and W. P. Ramalho for providing the geographic coordinates and A. L. Natalina for helping with the map of distribution. We thank the curators of the collections, J. P. Pombal Jr. (MNRJ), G. R. Colli (CHUNB), C. F. B. Haddad (CFBH), R. P. Bastos (ZUFG), L. F. Toledo (ZUEC), and W. Vaz-Silva (CEPB) for allowing access to specimens deposited in the collections under their care. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - BRAZIL (CAPES), Finance Code #001/530010100, research fellowship to D. Carvalho. A. Valencia-Zuleta thanks the “Programa de Apoio à Fixação de Jovens Doutores no Brasil” – FAPEG/CNPq 09/2022 (process #150812/2023-0). N. M. Maciel, and R. A. Brandão thank CNPq for the productivity fellowship [process #311363/2021-0 (NMM); and processes #306644/2020-7, and #306994/2023-2 (RAB)]. R. A. Brandão also thanks Fundação de Apoio à Pesquisa do Distrito Federal (FAPDF) and Universidade de Brasília (UnB) for a sabbatical grant (Edital DPG/UnB N° 0009/2023). K. Araujo-Vieira and J. Faivovich thank Fundação de Amparo à Pesquisa do Estado de São Paulo, Brazil (FAPESP procs. # 2019/24979-2 and CEPID 2021/10639-5), Agencia Nacional de Promoción Científica y Tecnológica, Argentina (ANPCyT, PICT 346/2019 and 059/2021), and CONICET (PIP 2800). We thank the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) for providing the collecting license (number 21643).

## References

- Altig, R. & McDiarmid, R.W. (2007) Morphological diversity and evolution of egg and clutch structure in amphibians. *Herpetological Monographs*, 21, 1–32.  
<https://doi.org/10.1655/06-005.1>
- Andrade, G.V. & Cardoso, A.J. (1987) Reconhecimento do grupo *rizibilis*; descrição de uma nova espécie de *Hyla* (Amphibia, Anura). *Revista Brasileira de Zoologia*, 3, 433–440.  
<https://doi.org/10.1590/s0101-81751986000300003>
- Andrade, S.P., Santos, D.L., Rocha, C.F., Pombal Jr., J.P. & Vaz-Silva, W. (2018) A new species of the *Ololygon catharinae* species group (Anura: Hylidae) from the Cerrado biome, state of Goiás, Central Brazil. *Zootaxa*, 4425 (2), 283.  
<https://doi.org/10.11646/zootaxa.4425.2.5>
- Araujo-Vieira, K., Lourenço, A.C.C., Lacerda, J.V.A., Lyra, M.L., Blotto, B.L., Ron, S.R., Baldo, D., Pereyra, M.O., Suárez-Mayorga, Á.M., Baêta, D., Ferreira, R.B., Barrio-Amorós, C.L., Borteiro, C., Brandão, R.A., Brasileiro, C.A., Donnelly, M.A., Dubeux, M.J.M., Köhler, J., Kolenc, F., Leite, F.S.F., Maciel, N.M., Nunes, I., Orrico, V.G.D., Peloso, P., Pezzuti, T.L., Reichle, S., Rojas-Runjaic, F.J.M., Da Silva, H.R., Sturaro, M.J., Langone, J.A., Garcia, P.C.A., Rodrigues, M.T., Frost, D.R., Wheeler, W.C., Grant, T., Pombal Jr., J.P., Haddad, C.F.B. & Faivovich, J. (2023) Treefrog diversity in the Neotropics: Phylogenetic relationships of Scinaxini (Anura: Hylidae: Hyliinae). *South American Journal of Herpetology*, 27, 1–143.  
<https://doi.org/10.2994/SAJH-D-22-00038.1>
- Bang, D.L. & Giaretta, A.A. (2018) Vocal repertoire of *Ololygon pombali* (Lourenço, Carvalho, Baêta, Pezzuti & Leite, 2013) (Anura: Hylidae) from its type locality, with notes on phenotype variation. *Zootaxa*, 4413 (2), 392–396.  
<https://doi.org/10.11646/zootaxa.4413.2.12>
- Bang, D.L. & Giaretta, A.A. (2017) A reassessment of the vocalizations of three species of *Ololygon* (Anura: Hylidae) from southeastern Brazil. *Phyllomedusa*, 16, 23–45.  
<https://doi.org/10.11606/issn.2316-9079.v16i1p23-45>
- Bastos, R.P., Alcantara, M.B., Morais, A.R., Lingnau, R. & Signorell, L. (2011) Vocal behaviour and conspecific call response in *Scinax centralis*. *Herpetological Journal*, 21, 43–50.

- Bioacoustics Research Program (2014) *Raven Pro: interactive sound analysis software*. Cornell Laboratory of Ornithology. Version 1.5. The Cornell Lab of Ornithology, Ithaca, New York. Available from: <http://www.birds.cornell.edu/raven> (accessed 23 December 2025)
- Bokermann, W.C.A. (1967) Dos nuevas especies de *Hyla* del grupo *catharinae* (Amphibia, Hylidae). *Neotropica*, 13, 61–66.
- Bokermann, W.C.A. & Sazima, I. (1973) Anfíbios da Serra do Cipó, Minas Gerais, Brasil. II. Duas espécies novas de *Hyla* (Anura, Hylidae). *Revista Brasileira de Biologia*, 33, 521–528.
- Canelas, M.A.S. & Bertoluci, J. (2007) Anurans of the Serra do Caraça, southeastern Brazil: species composition and phenological patterns of calling activity. *Iheringia, Série Zoológica*, 97, 21–26.  
<https://doi.org/10.1590/S0073-47212007000100004>
- Caramaschi, U. & Kisteumacher, G. (1989) Duas novas espécies de *Oloolygon* Fitzinger, 1843, do Sudeste do Brasil (Amphibia, Anura, Hylidae). *Boletim do Museu Nacional, Nova Série, Zoologia*, 327, 1–15.
- Cardoso, A.J. & Haddad, C.F.B. (1982) Nova espécie de *Hyla* da Serra da Canastra (Amphibia, Anura, Hylidae). *Revista Brasileira de Biologia*, 42, 499–503.
- Carvalho-e-Silva, S.P. de & Peixoto, O.L. (1991) Duas novas espécies de *Oloolygon* para os estados do Rio de Janeiro e Espírito Santo (Amphibia, Anura, Hylidae). *Revista Brasileira de Biologia*, 51, 263–270.
- Cervino, N.G., Elias-Costa, A.J., Pereyra, M.O. & Faivovich, J. (2021) A closer look at pupil diversity and evolution in frogs and toads. *Proceedings of the Royal Society B: Biological Sciences*, 288, 20211402.  
<https://doi.org/10.1098/rspb.2021.1402>
- Cruz, C.A.G., Nunes, I. & De Lima, M.G. (2011) A new *Scinax* Wagler belonging to the *S. catharinae* clade (Anura: Hylidae) from the state of Alagoas, northeastern Brazil. *Zootaxa*, 3096 (1), 18–26.  
<https://doi.org/10.11646/zootaxa.3096.1.2>
- Duellman, W.E. (1970) The hylid frogs of middle America. *Monographs of the Museum of Natural History, The University of Kansas*, 1, 1–753.  
<https://doi.org/10.5962/bhl.title.2835>
- Fabrezi, M. & Alberch, P. (1996) The carpal elements of anurans. *Herpetologica*, 55, 188–204.
- Faivovich, J. (2002) A cladistic analysis of *Scinax* (Anura: Hylidae). *Cladistics*, 18, 367–393.  
<https://doi.org/10.1111/j.1096-0031.2002.tb00157.x>
- Faivovich, J. (2005) A new species of *Scinax* (Anura: Hylidae) from Misiones, Argentina. *Herpetologica*, 61, 69–77.  
<https://doi.org/10.1655/04-32.1>
- Françoso, R.D., Brandão, R., Nogueira, C.C., Salmons, Y.B., Machado, R.B. & Colli, G.R. (2015) Habitat loss and the effectiveness of protected areas in the Cerrado Biodiversity Hotspot. *Natureza e Conservação*, 13, 35–40.  
<https://doi.org/10.1016/j.ncon.2015.04.001>
- Garey, M.V., Costa, T.R.N., Lima, A.M.X., Toledo, L.F. & Hartmann, M.T. (2012) Advertisement call of *Scinax littoralis* and *S. angrensis* (Amphibia: Anura: Hylidae), with notes on the reproductive activity of *S. littoralis*. *Acta Herpetologica*, 7, 297–308.
- Guix, J.C. (1996) Actividad invernal de anuros en tres sierras del sudeste de Brasil. *Boletín de la Asociación Herpetológica Española*, 7, 31–34.
- Haddad, C.F.B. & Pombal Jr., J.P. (1987) *Hyla hiemalis*, a new species of the *rizibilis* group from the state of São Paulo (Amphibia, Anura, Hylidae). *Revista Brasileira de Biologia*, 47, 127–132.
- Hepp, F., Lourenço, A.C.C. & Pombal Jr., J.P. (2017) Bioacoustics of four *Scinax* species and a review of acoustic traits in the *Scinax catharinae* species group (Amphibia: Anura: Hylidae). *Salamandra*, 53, 212–230.
- Heyer, W.R. (1980) The calls and taxonomic positions of *Hyla giesleri* and *Oloolygon opalina* (Amphibia: Anura: Hylidae). *Proceedings of the Biological Society of Washington*, 93, 655–661.
- Heyer, W.R., Rand, A.S., Cruz, C.A.G., Peixoto, O.L. & Nelson, C.E. (1990) Frogs of Boracéia. *Arquivos de Zoologia*, 31, 231–410.
- Köhler, J., Jansen, M., Rodríguez, A., Kok, P.J.R., Toledo, L.F., Emmrich, M., Glaw, F., Haddad, C.F.B., Rödel, M.O. & Vences, M. (2017) The use of bioacoustics in anuran taxonomy: Theory, terminology, methods and recommendations for best practice. *Zootaxa*, 4251 (1), 1–124.  
<https://doi.org/10.11646/zootaxa.4251.1.1>
- Lacerda, J.V.A., Ferreira, R.B., Araujo-Vieira, K., Zocca, C. & Lourenço, A.C.C. (2021) A new species of *Scinax* Wagler (Amphibia, Anura, Hylidae) from the Atlantic Forest, Southeastern Brazil. *Ichthyology and Herpetology*, 109, 522–536.  
<https://doi.org/10.1643/h2020091>
- Lourenço, A.C.C., Nascimento, L.B. & Pires, M.R.S. (2009a) A new species of the *Scinax catharinae* species group (Anura: Hylidae) from Minas Gerais, Southeastern Brazil. *Herpetologica*, 65, 468–479.  
<https://doi.org/10.1655/07-088.1>
- Lourenço, A.C.C., Baêta, D., Monteiro, V.S. & Pires, M.R.S. (2009b) O canto de anúncio de *Scinax luizotavioi* (Caramaschi & Kisteumacher, 1989) (Anura, Hylidae). *Arquivos do Museu Nacional*, 67, 73–79.
- Lourenço, A.C.C., Carvalho, A.L.G., Baêta, D., Pezzuti, T.L. & Leite, F.S.F. (2013) A new species of the *Scinax catharinae* group (Anura, Hylidae) from Serra da Canastra, southwestern state of Minas Gerais, Brazil. *Zootaxa*, 3613 (6), 415–435.  
<https://doi.org/10.11646/zootaxa.3613.6.4>
- Lourenço, A.C.C., Luna, M.C. & Pombal Jr., J.P. (2014) A new species of the *Scinax catharinae* group (Anura: Hylidae) from Northeastern Brazil. *Zootaxa*, 3889 (2), 415–435.

- <https://doi.org/10.11646/zootaxa.3889.2.5>
- Lourenço, A.C.C., Zina, J., Catroli, G.F., Kasahara, S., Faivovich, J. & Haddad, C.F.B. (2016) A new species of the *Scinax catharinae* group (Anura: Hylidae) from southeastern Brazil. *Zootaxa*, 4154 (4), 468–479.  
<https://doi.org/10.11646/zootaxa.4154.4.3>
- Lourenço, A.C.C., Lingnau, R., Haddad, C.F.B. & Faivovich, J. (2019) A new species of the *Scinax catharinae* group (Anura: Hylidae) from the highlands of Santa Catarina, Brazil. *South American Journal of Herpetology*, 14, 163–176.  
<https://doi.org/10.2994/SAJH-D-18-00001.1>
- Lourenço, A.C.C., Lacerda, J.V.A., Cruz, C.A.G., Nascimento, L.B. & Pombal Jr., J.P. (2020) A new species of the *Scinax catharinae* species group (Anura: Hylidae) from the Atlantic rainforest of northeastern Minas Gerais, southeastern Brazil. *Zootaxa*, 4878 (2), 415–435.  
<https://doi.org/10.11646/zootaxa.4878.2.5>
- Luna, M.C., McDiarmid, R.W. & Faivovich, J. (2018) From erotic excrescences to pheromone shots: structure and diversity of nuptial pads in anurans. *Biological Journal of the Linnean Society*, 124, 403–446.  
<https://doi.org/10.1093/biolinnean/bly048>
- Lutz, B. (1973a) *Brazilian species of Hyla*. University of Texas Press, Austin, Texas, and London, 275 pp.
- Lutz, B. (1973b) New Brazilian forms of *Hyla*. I. Two new races of *H. catharinae*. *Boletim do Museu Nacional. Nova Série, Zoologia. Rio de Janeiro*, 288, 1–7.
- Myers, C.W. & Duellman, W.E. (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. (2005) A new species allied to *Hyla circumdata* (Anura: Hylidae) from Serra da Mantiqueira, Southeastern Brazil. *Herpetologica*, 61, 63–69.  
<https://doi.org/10.1655/03-41>
- Nunes, I., Santiago, R.S. & Juncá, F.A. (2007) Advertisement calls of four hylid frogs from the state of Bahia, Northeastern Brazil (Amphibia, Anura, Hylidae). *South American Journal of Herpetology*, 2, 89–96.  
[https://doi.org/10.2994/1808-9798\(2007\)2\[89:acofhf\]2.0.co;2](https://doi.org/10.2994/1808-9798(2007)2[89:acofhf]2.0.co;2)
- Pereyra, M.O., Borteiro, C., Baldo, D., Kolenc, F. & Conte, C.E. (2012) Advertisement call of the closely related species *Scinax aromothyella* Faivovich 2005 and *S. berthae* (Barrio 1962), with comments on the complex calls in the *S. catharinae* group. *Herpetological Journal*, 22, 133–137.
- Pezzuti, T.L., Fernandes, I.R., Leite, F.S.F., De Sousa, C.E., Garcia, P.C.A. & Rossa-Feres, D. (2016) The tadpoles of the neotropical *Scinax catharinae* group (Anura, Hylidae): Ecomorphology and descriptions of two new forms. *Zoologischer Anzeiger*, 261, 22–32.  
<https://doi.org/10.1016/j.jcz.2016.02.002>
- Pezzuti, T.L., Leite, F.S.F., Rossa-Feres, D.D.C. & Garcia, P.C.A. (2021) The tadpoles of the Iron Quadrangle, southeastern Brazil: A baseline for larval knowledge and anuran conservation in a diverse and threatened region. *South American Journal of Herpetology*, 22, 1–109.  
<https://doi.org/10.2994/SAJH-D-20-00042.1>
- Pimenta, B.V.S., Faivovich, J. & Pombal Jr., J.P. (2007) On the identity of *Hyla strigilata* Spix, 1824 (Anura: Hylidae): redescription and neotype designation for a “ghost” taxon. *Zootaxa*, 1441 (1), 35–49.  
<https://doi.org/10.11646/zootaxa.1441.1.3>
- Pombal Jr., J.P. & Bastos, R.P. (1996) Nova espécie de *Scinax* Wagler, 1830 do Brasil Central (Amphibia, Anura, Hylidae). *Boletim do Museu Nacional. Nova série, Zoologia. Rio de Janeiro*, 371, 11.
- Pombal Jr., J.P., Carvalho, R.R., Canelas, M.A.S. & Bastos, R.P. (2010) A new *Scinax* of the *S. catharinae* species group from Central Brazil (Amphibia: Anura: Hylidae). *Zoologia*, 27, 795–802.  
<https://doi.org/10.1590/S1984-46702010000500016>
- Pombal Jr., J.P., Bastos, R.P. & Haddad, C.F.B. (1995) Vocalizações de algumas espécies do gênero *Scinax* (Anura, Hylidae) do sudeste do Brasil e comentários taxonômicos. *Naturalia*, 20, 213–225.
- Pombal Jr., J.P. & Gordo, M. (1991) Duas novas espécies de *Hyla* da Floresta Atlântica no estado de São Paulo (Amphibia, Anura). *Memórias do Instituto Butantan*, 53, 135–144.
- R Development Core Team (2019) R: A language and environment for statistical computing. Available from: <http://www.r-project.org> (accessed 23 December 2025)
- Roberto, I.J., Ávila, R.W., Lima, M.G. & dos Santos, E.M. (2025) Taxonomic assessment of *Ololygon* gr. *argyreornata* (Anura, Hylidae) from northern Atlantic Forest reveals a new species from the Pernambuco Endemism Centre, northeastern Brazil. *Amphibia-Reptilia*. [published online ahead of print 2025]  
<https://doi.org/10.1163/15685381-bja10241>
- Savage, J.M. & Heyer, W.R. (1967) Variation and distribution in the tree-frog genus *Phyllomedusa* in Costa Rica, Central America. *Studies on Neotropical Fauna and Environment*, 5, 111–131.  
<https://doi.org/10.1080/01650526709360400>
- Sueur, J., Aubin, T. & Simonis, C. (2008) Seewave, a free modular tool for sound analysis and synthesis. *Bioacoustics*, 18, 213–226.  
<https://doi.org/10.1080/09524622.2008.9753600>
- Toledo, L.F., Martins, I.A., Bruschi, D.P., Passos, M.A., Alexandre, C. & Haddad, C.F.B. (2015) The anuran calling repertoire

in the light of social context. *Acta Ethologica*, 18, 87–99.

<https://doi.org/10.1007/s10211-014-0194-4>

Wells, K.D. (2007) *The ecology and behavior of Amphibians*. The University of Chicago Press, Chicago, Illinois, and London, 1162 pp.

#### APPENDIX 1. Additional specimens examined.

*Ololygon albicans* (n = 12): BRAZIL: Rio de Janeiro: Teresópolis, MNRJ 4037, 4038 (syntypes); Mangaratiba, MNRJ 35863–35866; Nova Friburgo MNRJ 39887–39891. *Ololygon ariadne* (n = 11): BRAZIL: São Paulo: São José do Barreiro, Serra da Bocaina National Park, MNRJ 76658, 76660–76667; ZUEC-AMP 2023, 2024. *Ololygon canastrensis* (n = 13): BRAZIL: Minas Gerais: Capitólio, MNRJ 49484; São Roque de Minas, Parque Nacional da Serra da Canastra, CFBH 62254 (paratype), MNRJ 4117 (holotype), 4148 (paratype), ZUEC 4188, 4189, 4191, 4193 (paratypes); Perdizes, ZUEC-AMP 8201–8204; Ribeirão das Moendas, MNRJ 49473. *Ololygon carnevallii* (n = 9): BRAZIL: Minas Gerais: Botumirim, MNRJ 82433, 82434; Caratinga, ZUEC-AMP 6633, 6635; Grão Mogol, MNRJ 88767; Marliéria, Parque Estadual do Rio Doce, MNRJ 4182 (holotype), 4183, 4184 (paratypes). *Ololygon catharinae* (n = 12): BRAZIL: Santa Catarina: Rancho Queimado, MNRJ 72424–72429, 72431, 72434, 72435; São Paulo: Ubatuba, Praia do Itaguá, CEPB 6504, 6506, 6516. *Ololygon centralis* (n = 12): BRAZIL: Goiás: Caldas Novas, ZUFG 10369, 10371, 10374, 10382, 10937, 10940, 10941, 10943; Goiânia, Parque Estadual Altamiro de Moura Pacheco, CEPB 26, 27; Silvânia, MNRJ 17465 (holotype), ZUFG 11059. *Ololygon flavoguttata* (n = 10): BRAZIL: Rio de Janeiro: Cachoeiras de Macacu, MNRJ 68785–68794. *Ololygon heyeri* (n = 6): BRAZIL: Espírito Santo: Santa Teresa, MNRJ 38367–38372. *Ololygon humilis* (n = 8): BRAZIL: Rio de Janeiro: Duque de Caxias, MNRJ 1478 (paralectotype); Nova Iguaçu, MNRJ 2248 (lectotype); Pacarambi, MNRJ 76526–76531. *Ololygon jureia* (n = 9): BRAZIL: São Paulo: Iguapé, Estação Ecológica da Jureia-Itatins, MNRJ 14202, 14203 (paratype); ZUEC-AMP 8875 (holotype), 8885, 8889, 8870, 8872, 8885, 8896 (paratypes). *Ololygon kautskyi* (n = 6): BRAZIL: São Paulo: Aracruz, MNRJ 39785–39788, 39792, 39794. *Ololygon littoralis* (n = 10): BRAZIL: São Paulo: Iguapé, ZUEC-AMP 8892 (holotype), 8876, 8880, 8882, 8885–8886, 8888, 8890, 8893–8894 (paratypes). *Ololygon longilinea* (n = 3): BRAZIL: Minas Gerais: Poços de Caldas, CHUNB 57632–57634. *Ololygon luizotavioi* (n = 17): BRAZIL: Minas Gerais: Santa Bárbara, MNRJ 4210 (holotype), 4211–4215 (paratypes); São Gonçalo do Rio Abaixo, MNRJ 4509–4516 (paratypes); Viçosa, ZUEC-AMP 16149; Espírito Santo: Vargem Alta, ZUEC-AMP 20841, 20853. *Ololygon machadoi* (n = 10): BRAZIL: Minas Gerais: Botumirim, MNRJ 82435, 82436; Cristália, MNRJ 32888; Jaboticatubas, CFBH 6244 (paratype), MNRJ 57810–87811, ZUEC-AMP 1926, 15904, 15912 (paratypes). *Ololygon obtriangulata* (n = 10): BRAZIL: Minas Gerais: Cidade Azul, MNRJ 55844–55847; Rio de Janeiro: Alto Itatiaia, MNRJ 4036, 87592 (paratypes); Petrópolis, ZUEC-AMP 14742; Resende, ZUEC-AMP 4082; São Paulo: Campos do Jordão, ZUEC 3819; São José do Barreiro, ZUEC-AMP 6476. *Ololygon pombali* (n = 5): BRAZIL: Minas Gerais: Capitólio, MNRJ 49479 (holotype), 49476–49478, 54986 (paratypes). *Ololygon ranki* (n = 10): BRAZIL: Minas Gerais: Poços de Caldas, CFBH 6256, 6259 (paratypes), MNRJ 91198–91200; Rio de Janeiro: Angra dos Reis, CHUNB 57649–57653. *Ololygon skaios* (n = 92): BRAZIL: Goiás: Alto Paraíso de Goiás, CHUNB 16907–16913, 17546, 47575; Barro Alto, ZUFG 3662; Caiapônia, ZUFG 5867–5869, 5971, 5972, 5874, 5875, 5877–5880, 5882–5884, 6226–6239, 9088–9090; Formoso, CHUNB 73198, 73200; Luziânia, CHUNB 40889, 40894–40896, 40899, 43437, 43462–43463; Niquelândia, ZUFG 8471–8472; Pirenópolis, ZUFG 15183–15195; Santa Rita do Novo Destino, MNRJ 54471 (holotype), 54472–54474 (paratopotypes), ZUFG 15203; Distrito Federal: Brasília, CHUNB 33786, 37348, 40939, 47607–47608, 47615, 47621, 47622, 47632, ZUFG 9093, 9097–9098, 14459, 15205–15209. *Ololygon strigilata* (n = 8): BRAZIL: Bahia: Ibirapitanga, MNRJ 38098 (neotype), 38093, 38094, 38096. *Ololygon trapicheiroi* (n = 6): BRAZIL: Rio de Janeiro: Maricá, MNRJ 75041, 75043, 75045–75046; Saquarema, MNRJ 79576, 79578. *Ololygon goya* (n = 18): BRAZIL: Bahia: Sítio d'Abadia, CEPB 10015–10020, 10022–10033. *Ololygon* sp. 17 (*sensu* Araujo-Vieira *et al.*, 2023; n = 5). BRAZIL: Minas Gerais: Cristina, Mata da Prefeitura, CFBH 16515; Carrancas, Alto da Serra das Perdizes, UFMG-AMP 6905; Nova Lima, MCNAM 7860; Aiuruoca, Rio Preto, CFBH 36914, 36916.

**APPENDIX 2.** Accession numbers for advertisement and aggressive calls corresponding to each recorded specimen.

Call recordings are deposited in the Audiovisual Collection of the Museum of Biological Diversity (MDBio), Fonoteca Neotropical Jacques Villiard (FNJV), UNICAMP (<https://www2.ib.unicamp.br/fnjv/>). Metadata and associated information for each recording are available in the respective audiovisual collection entry.

FNJV 0136269 – CHUNB 82768 (advertisement and aggressive calls)  
FNJV 0136270 – not collected (advertisement and aggressive calls)  
FNJV 0136271 – CHUNB 82775 (advertisement and aggressive calls)  
FNJV 0136272 – ZUFG 15214 (advertisement and aggressive calls)  
FNJV 0136273 – CHUNB 82780 (advertisement and aggressive calls)  
FNJV 0136274 – CHUNB 82767 (advertisement and aggressive calls)  
FNJV 0136275 – CFBH 44962 (advertisement and aggressive calls)  
FNJV 0136276 – CHUNB 82775 (advertisement calls)  
FNJV 0136277 – CHUNB 82780 (aggressive calls)