

A New Species of the *Scinax eurydice* Group (Anura: Hylidae: Scinaxini) from the Amazonian Forests of Northern Peru

KATYUSCIA ARAUJO-VIEIRA^{1,2,9}, GIUSEPPE GAGLIARDI-URRUTIA³, EHIKO J. RIOS-ALVA^{3,4}, OMAR ROJAS-PADILLA^{3,5}, PEDRO MARINHO², SANTIAGO CASTROVIEJO-FISHER^{6,7}, AND JULIÁN FAIVOVICH^{1,8}

¹ División Herpetología, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”–CONICET, Av. Ángel Gallardo 470, C1405DJR, CABA, Argentina

² Laboratório de Herpetologia, Departamento de Biodiversidade e Centro de Aquicultura (CAUNESP), Universidade Estadual Paulista, Av. 24 A, 1515, Bairro Bela Vista, 13506-970, Rio Claro, SP, Brazil

³ Dirección de Investigación en Diversidad Biológica Terrestre Amazónica, Instituto de Investigaciones de la Amazonía Peruana, Av. Quiñones km 2.5, Iquitos, Loreto, Peru

⁴ Facultad de Ciencias Biológicas, Universidad Nacional Mayor de San Marcos, Lima, Peru

⁵ Laboratório de Herpetologia Tropical, Universidade Estadual de Santa Cruz, Rodovia Jorge Amado, km 16, 45662-900, Ilhéus, Bahia, Brazil

⁶ Departamento de Zoología, Universidad de Sevilla, 41012, Sevilla, Spain

⁷ Department of Herpetology, American Museum of Natural History, Central Park West & 79th St., New York, NY 10024, USA

⁸ Departamento de Biodiversidad y Biología Experimental, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, C1428EGA, CABA, Argentina

ABSTRACT: We describe a new species, the fourth of the *Scinax eurydice* species group and the first one of this group found in Peru. The other three species, *S. castroviejo*, *S. sateremawe*, and *S. eurydice*, are distributed across the Andes in Bolivia, the western Amazon basin of Brazil, and northeastern and southeastern Brazil, respectively. We describe the new species and use external morphological traits, such as the color pattern of flanks and inguinal region and vocal sac structure, to differentiate it from related species in the group. A phylogenetic analysis placed the new species as the sister taxon of *S. sateremawe* + *S. castroviejo*. Uncorrected pairwise distances in the 16S ribosomal gene fragment between the new species and the other three in the group vary from 12.6 to 15.5% and greatly exceed the thresholds commonly used to distinguish Neotropical treefrog species. Additionally, the weakly bilobate vocal sac in the new species, shared with *S. castroviejo* and *S. sateremawe*, may represent a synapomorphy of this clade of the *S. eurydice* group.

Key words: Amphibia; Morphology; Phylogeny; Species description; Synapomorphy; Taxonomy

SCINAX Wagler 1830 is a Neotropical genus of treefrogs widely distributed from southern Mexico to central-eastern Argentina (Araujo-Vieira et al. 2023; Frost 2025). It comprises 77 species divided into 13 species groups, except for *S. pachycrus* (Miranda-Ribeiro 1937), which is unassigned to any group (Araujo-Vieira et al. 2023). The *Scinax eurydice* group comprises three species: *S. castroviejo* De la Riva 1993, *S. eurydice* (Bokermann 1968), and *S. sateremawe* Sturaro and Peloso 2014. Additionally, four candidate species closely related to *S. eurydice* have been recognized for this group: *Scinax* spp. 12, 14, 23, and 24 (sensu Araujo-Vieira et al. 2023). These nominal and candidate species are distributed in the Andes of central Bolivia, the western Amazon basin of Brazil (state of Amazonas), and northeastern and southeastern Brazil from the state of Paraíba to the state of São Paulo (De la Riva 1993; De la Riva et al. 2000; Köhler 2000; Sturaro and Peloso 2014; Menezes et al. 2016). This species group is well supported by molecular data, with no known phenotypic synapomorphies. However, its species can be differentiated from other species of *Scinax* by a combination of phenotypic characters, such as the absence of pectoral glands in males and advertisement calls with two to three notes/call (e.g., De la Riva 1993; De la Riva et al. 1994; Pombal et al. 1995; Köhler 2000; Mângia et al. 2017; Araujo-Vieira et al. 2023).

In 2010 and 2015 we conducted expeditions to study the herpetofauna of the Amazonian forests of San Martín

Department, Peru. During our sampling efforts, we discovered a new species of the *S. eurydice* group with a weakly bilobate vocal sac. In this study we describe this species on the basis of the adult morphological characteristics. We also include it in a phylogenetic analysis and provide uncorrected pairwise distances (UPDs) for a fragment of the 16S ribosomal ribonucleic acid (rRNA) gene between the new species and the other species of the group. The new species represents the first species of this group of *Scinax* from Peru.

MATERIALS AND METHODS

Adult External Morphology

Individuals were euthanized with 5% lidocaine, fixed in 10% formalin or 80% ethanol, and preserved in 70% ethanol. Tissues were preserved in 96% ethanol. Type specimens were deposited at the herpetological collections of Colección Referencial de Biodiversidad del Instituto de Investigaciones de la Amazonía Peruana, Iquitos, Peru (CRBIIAP) and Museo de Biodiversidad del Peru, Cusco, Peru (MUBI). Additional examined specimens of the *S. eurydice* group are listed in Appendix I. All coordinates are informed with datum WGS84.

Ten morphological measurements (mm; Table 1) were taken following Duellman (1970): snout–vent length (SVL), head length (HL), head width (HW), internarial distance (IND), interorbital distance (IOD), eye diameter (ED), eye-to-nostril distance (EN), tympanum diameter (TD), tibia length (TL), and foot length (FL). Measurements were obtained to the nearest 0.1 mm using Mitutoyo digital calipers or from high-resolution scaled digital photographs of

⁹ CORRESPONDENCE: e-mail, katy.vieira@gmail.com

TABLE 1.—Measurements (mm) of the type series of *Scinax garciadavilae* (excluding the holotype). See Material and Methods for abbreviations. An asterisk (*) indicates specimens measured using ImageJ software.

Measurements	Males (n = 6)						Female (n = 1)
	CRBIIAP 788	CRBIIAP 785	MUBI 18467	MUBI 18468*	MUBI 14021*	MUBI 14022*	CRBIIAP 802
SVL	42.3	42.7	44.2	43.5	41.6	38.5	41.0
HL	14.7	14.7	15.3	12.8	11.1	11.4	14.5
HW	14.6	14.9	15.6	15.5	15.0	13.9	14.7
IND	2.8	2.8	3.2	2.8	2.8	3.2	3.1
IOD	5.0	4.8	4.9	6.4	7.6	6.2	4.6
ED	4.1	4.6	5.0	6.1	6.1	5.0	4.9
EN	4.5	4.8	4.8	5.2	4.3	4.4	4.5
TD	3.1	2.9	3.0	2.9	2.7	2.8	2.9
TL	23.2	24.5	26.0	25.2	24.4	22.5	25.4
FL	19.3	18.2	19.7	19.4	18.9	19.2	17.5

preserved specimens with ImageJ v1.54 software (Schneider et al. 2012). Webbing formulae followed Savage and Heyer (1967). Terminology for nuptial pad description followed Luna et al. (2018), for external morphology and outline of the snout Duellman (1970), and for iris and pupil Cervino et al. (2021). Fingers were numbered II to V following Fabrezi and Alberch (1996). Sex was determined by the presence of secondary sexual characters such as the presence of nuptial pads, vocal slits, and vocal sac expansion, or by inspection of the gonads through dissection.

One specimen (CRBIIAP 785, adult male) was dissected for examination of the anatomy of the submandibular m. interhyoideus. Lugol solution was used to enhance contrast of muscle tissue (Bock and Shear 1972). The terminology for the m. interhyoideus subgular shape follows Elias-Costa et al. (2021) as modified by Araujo-Vieira et al. (2023).

Deoxyribonucleic Acid (DNA) Sequence Data and Phylogenetic Analyses

We produced mitochondrial DNA sequences for five adult specimens (CRBIIAP 755, 788, and 802; MUBI 14020 and 14021; see Appendix II for GenBank accession numbers) of the new species. The sequences produced for specimens CRBIIAP 755, 788, and 802 include the cytochrome oxidase *c* subunit I (COI, ≈640 base pairs [bp]); a fragment including the 12S rRNA, the intervening transfer (t)RNAVal, and the 16S rRNA (12S-tRNAVal-16S; ≈2330 bp); a fragment including the 3' section of the 16S rRNA gene and the intervening tRNA^{Leu} (16S-tRNA^{Leu}; 248 bp); and reduced nicotinamide adenine dinucleotide (NADH) dehydrogenase subunit 1 and tRNA^{Ile} (ND1-tRNA^{Ile}; ≈690 bp), totaling ≈3910 bp of the mitochondrial genome. The sequences produced for the specimens MUBI 14020 and 14021 include only the fragments 16S rRNA gene (AR-BR/Wilk2; 578 bp) and COI (646 bp). The laboratory protocols—including DNA extraction methods, amplification conditions, primers, and sequencing procedures—were conducted as described in Araujo-Vieira et al. (2023, see their Appendix S3 for the list of primers).

All the sequences of the new species were included in the molecular data set of Araujo-Vieira et al. (2023; their Appendix S1). We performed multiple sequence alignments for each DNA fragment using MAFFT v7 (Katoh and Standley

2013) with G-INS-i (global homology considered), with default parameters for gap opening and extension. The alignments were visualized in BioEdit v5.0.9 (Hall 1999) and concatenated using SequenceMatrix v1.7.8 (Vaidya et al. 2011). For the maximum parsimony phylogenetic analyses, we used TNT v1.6 (Goloboff and Morales 2023). Searches used the command “New Technology Search” under search level 50, which combines Ratchet, Tree Drifting, Sectorial Searches, and Tree Fusing (Goloboff 1999; Nixon 1999). For this driven search, we used the default options for these algorithms, hitting the most parsimonious length 500 times. The resulting trees were submitted to a round of tree bisection–reconnection branch swapping. Searches used the collapsing option “minimum length,” which collapses every node with a minimum length of 0. Parsimony jackknife absolute frequencies (Farris et al. 1996) were calculated in TNT v1.6 (Goloboff and Morales 2023) using new technology requesting 10 hits with driven searches under search level 15, for a total of 1000 replicates. The preferred relation used to treat indels (insertions and deletions) and all substitutions was 1:1:1 (transition:transversion:unit indels) under equal weights. Gaps were treated as fifth state. The resulting tree was edited with FigTree v1.4.3 (Rambaut 2014).

The fragments of the 16S rRNA gene (479 bp) for the new species and those in the *S. eurydice* group were aligned in MAFFT under the strategy Q-INS-i, and UPDs were calculated in PAUP* (Swofford 2002).

SPECIES ACCOUNT

Scinax garciadavilae sp. nov.

(Table 1; Figs. 1–2)

Holotype.—MUBI 14020, adult male, Shuchshuyacu (06°37'20.7"S, 76°36'53.9"W; 537 m above sea level [a.s.l.]), district of Zapatero, province of Lamas, department of San Martín, Peru, collected on 25 March 2010 by SC-F.

Paratypes.—Six adult males and one female. MUBI 18467, male, collected with the holotype. MUBI 14021 and 18468, males, Nuevo Jaén (07°41'26.5"S, 76°39'53.9"W; 650 m a.s.l.), municipality of Campanilla, province of Mariscal Cáceres, department of San Martín, Peru, collected on 25 March 2010 by SC-F and M. Guerra Panijo. MUBI 14022, male, road Tarapoto to Tocache, Pólvora (07°52'09.2"S, 76°40'42.2"W; 780 m a.s.l.), municipality of Pólvora, province of Tocache, department of San Martín, Peru, collected on 26 March 2010 by SC-F and M. Guerra Panijo. CRBIIAP 785 and 788, males, CRBIIAP 802, female, El Quinillal Environmental Protection Association of the El Quinillal Forest (APABOQUI; 07°30'43.0"S, 76°22'50.4"W; 486 m a.s.l.), municipality of Bajo Biavo, province of Bellavista, department of San Martín, Peru, collected on different dates in August and September 2015 by GG-U, EJR-A, and OR-P.

Referred specimens.—CRBIIAP 755 and 800, male juveniles, Valle del Biavo (7°11'42.11"S, 76°33'31.84"W) and APABOQUI, respectively, municipality of Bajo Biavo, province of Bellavista, department of San Martín, Peru, collected on different dates in August and September 2015 by GG-U, EJR-A, and OR-P.

Diagnosis.—(1) Dorsum light gray to brown with large, irregular darker blotches, without light blotches; (2) flanks and inguinal region yellow, with small to medium-sized round and irregular dark-brown to black blotches in life; (3)

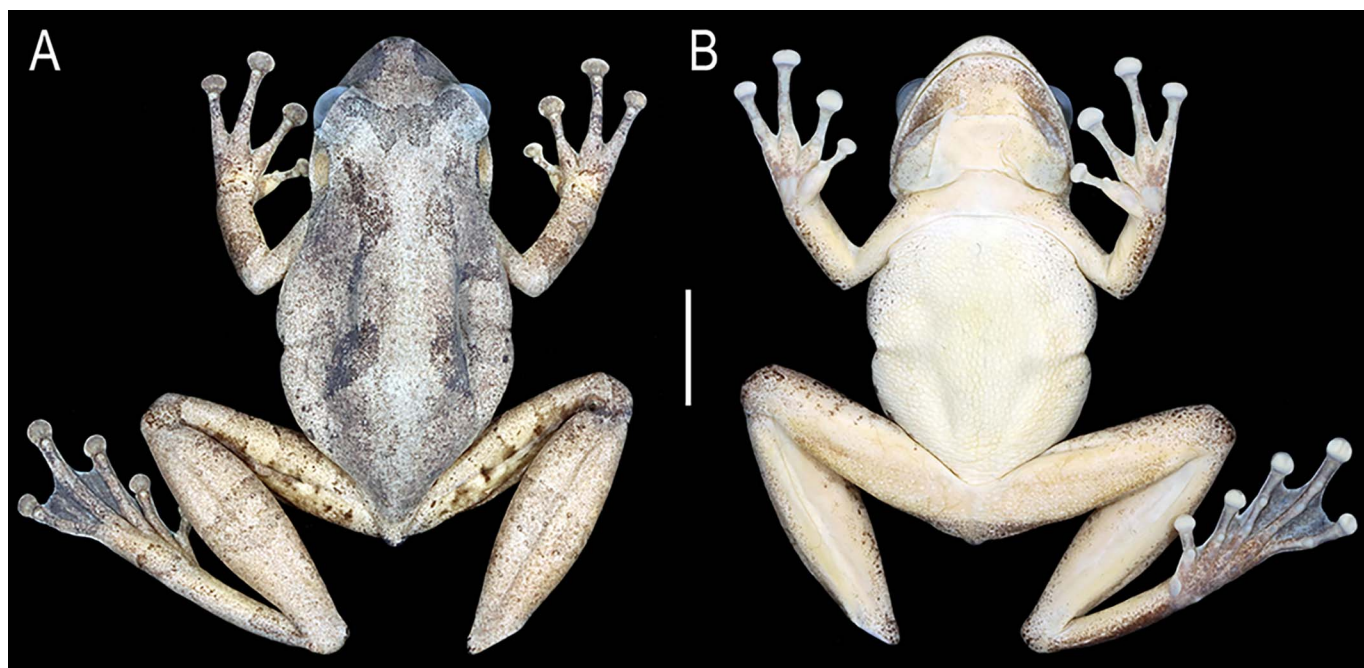


FIG. 1.—*Scinax garciadavilae*, holotype (MUBI 14020, male, SVL 45.0 mm). (A) Dorsal and (B) ventral views of the body. Scale bar = 10 mm.

hidden surfaces of thighs yellow, finely or densely spotted with black, sometimes forming small and irregular black blotches in life; (4) iris silver in life; (5) nuptial pad on finger III absent; (6) vocal sac weakly bilobate; (7) small, round, scattered tubercles present on heel.

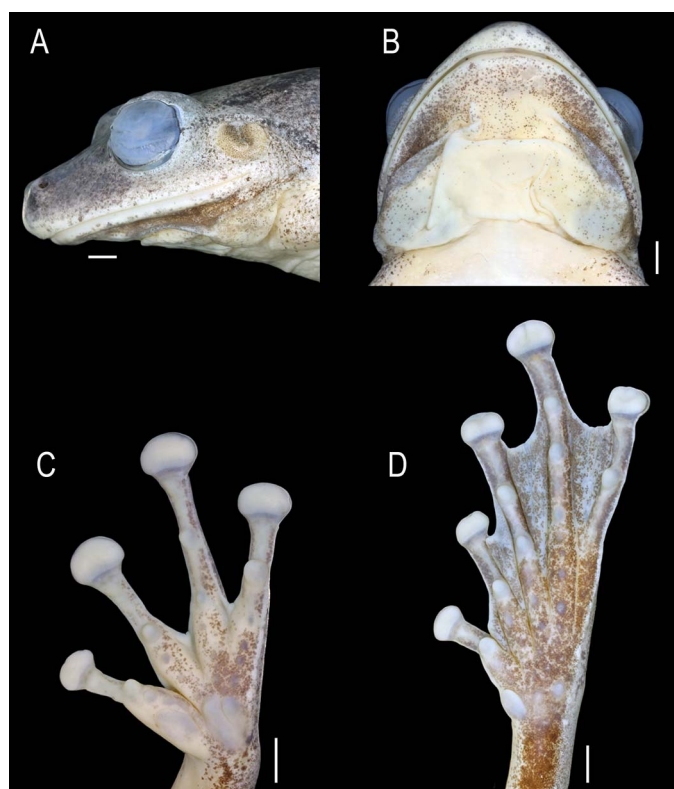


FIG. 2.—*Scinax garciadavilae*, holotype (MUBI 14020, male). (A) Lateral and (B) ventral views of the head. (C) Left hand and (D) foot in ventral view. Scale bars = 2 mm.

Comparisons.—Phylogenetic analyses support the placement of the new species within the *S. eurydice* group (see Araujo-Vieira et al. 2023 for the group's diagnosis and characterization). The diagnostic characters distinguishing the new species from other species of this group are detailed below.

The dorsum light gray to brown with large, irregular darker blotches, without light blotches differentiates *S. garciadavilae* from *S. sateremawe* (dorsum dark gray or brown, with large and irregular darker blotches and small light-gray or light-cream blotches; Sturaro and Peloso 2014). The flanks and inguinal region yellow, with small to medium-sized round and irregular dark-brown to black blotches in life differentiates the new species from *S. castroviejoi* (yellow with large, irregular dark blotches forming a mottled pattern; De la Riva 1993; this study), *S. eurydice* (yellow with small dark flecks; Bokermann 1968; this study), and *S. sateremawe* (large, orange black-bordered blotches; Sturaro and Peloso 2014). The hidden surfaces of thighs yellow,

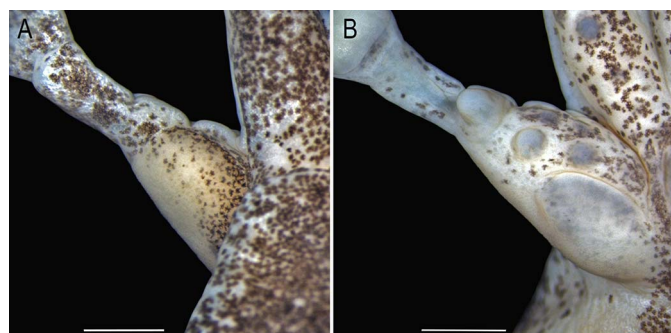


FIG. 3.—Nuptial pad on finger II of the right hand of *Scinax garciadavilae* (MUBI 18467, male). (A) Dorsal and (B) ventral (digitally reversed) views. Scale bars = 2 mm.

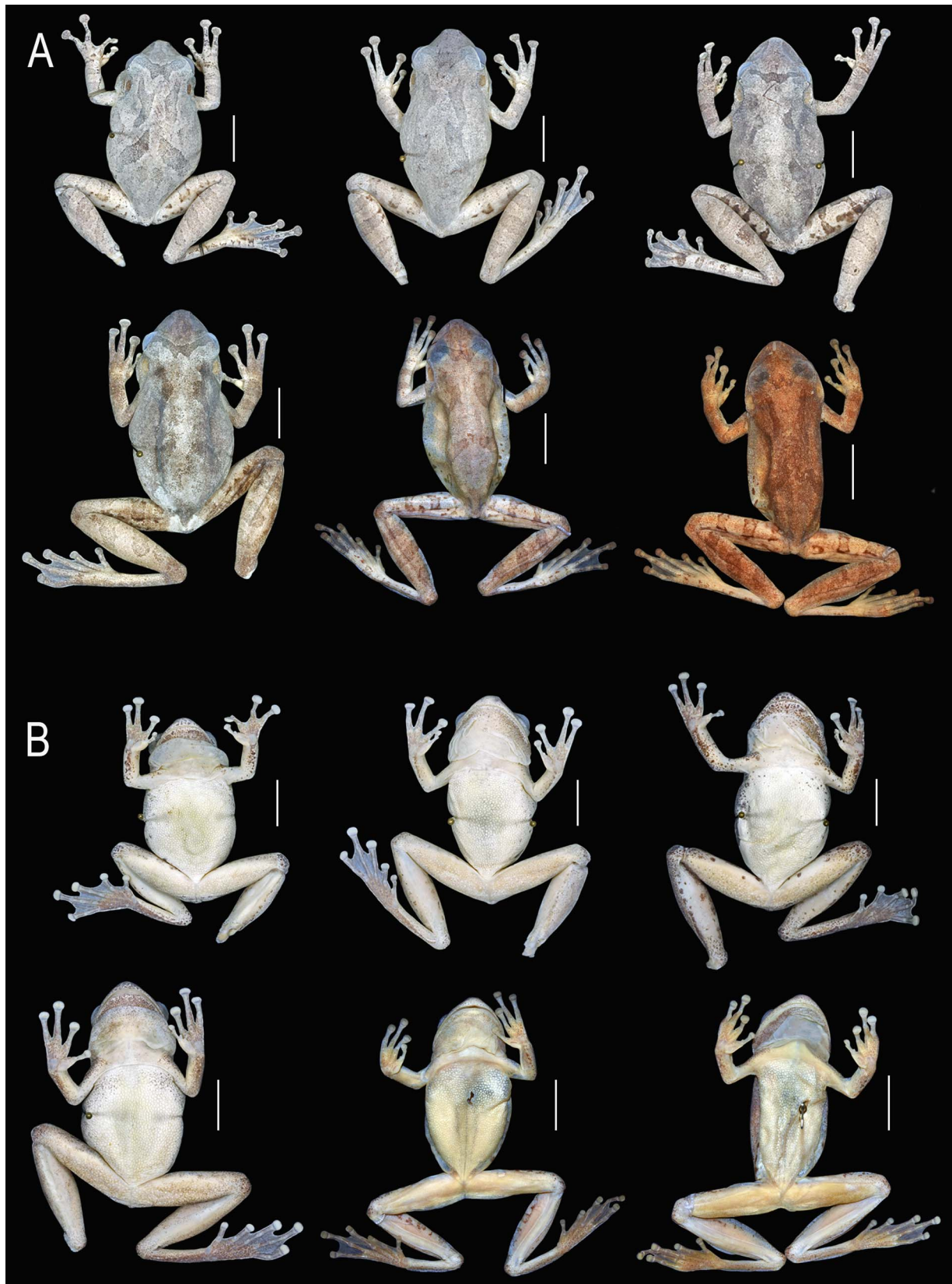


FIG. 4.—Male paratypes of *Scinax garciadavilae* in preservative. Color pattern variation of the body in (A) dorsal and (B) ventral views. From left to right and top to bottom: MUBI 14021, MUBI 14022, MUBI 18468, MUBI 18467, CRBIIAP 788, and CRBIIAP 785. Scale bars = 10 mm.

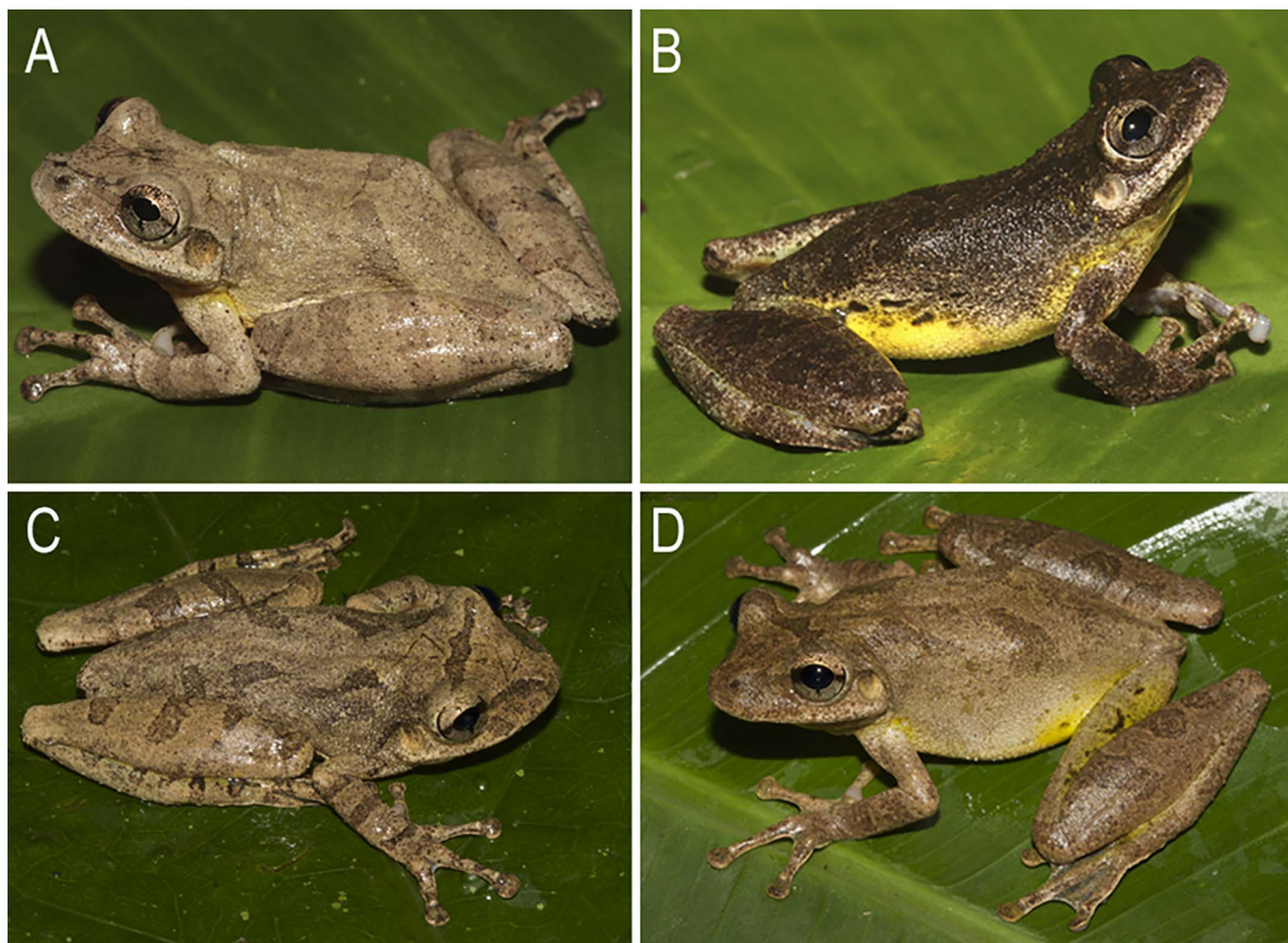


FIG. 5.—Male paratypes of *Scinax garciadavilae* in life. Body in dorsolateral view of (A) CRBIIAP 788, (B) CRBIIAP 785, (C) MUBI 18468, and (D) MUBI 18467.

finely or densely spotted with black, sometimes forming small and irregular black blotches in life differentiates *S. garciadavilae* from *S. eurydice* (brown with tiny yellowish flecks; Bokermann 1968; this study) and *S. sateremawe* (large, orange, black-bordered blotches; Sturaro and Peloso 2014). The iris silver in life differentiates *S. garciadavilae* from *S. castroviejoi* (iris bronze brown; De la Riva 1993), *S. eurydice* (iris bronze yellow; Bokermann 1968; this study), and *S. sateremawe* (upper part of iris golden, lower part silver; Sturaro and Peloso 2014). Additionally, *S. garciadavilae* differs from *S. eurydice* by lacking nuptial pad on finger III and having the vocal sac weakly bilobate (nuptial pad on finger III present and vocal sac single subgular; Araujo-Vieira et al. 2023), and from *S. eurydice* and *S. sateremawe* by having small, scattered tubercles on heel (absent in these species; Sturaro and Peloso 2014; this study).

Description of the holotype.—Adult male, 45.0 mm SVL, in good state of preservation after 15 yr in ethanol 70% and with the right foot cut and preserved as a tissue sample (Fig. 1A,B). Head slightly wider than long, HL 97.5% HW; HL 34.7% SVL; HW 35.5% SVL. Snout rounded in dorsal and lateral views (Figs. 1A, 2A); EN 90.4% ED; nostrils oval, protruding dorsolaterally; region between nostrils

slightly concave; canthus rostralis poorly defined and slightly convex; loreal region slightly concave. ED 32.5% HW and 33.3% HL. Pupil horizontal. Palpebral membrane translucent, not reticulated. Tympanum distinct, round, medium sized, TD 65% ED; tympanic annulus rounded, with upper portion hidden by the supratympanic fold. Supratympanic fold evident from the upper part of the tympanum to the insertion of arm (Fig. 2A). Tongue ovoid, free laterally and posteriorly, shallowly notched posteriorly. Vomerine teeth in two separated transverse series, each bearing 8 (right) and 11 (left) teeth; right dentigerous process 3/4 the size of the left process length. Choanae oval. Vocal slits present, extending diagonally from the lateral base of tongue to the corner of the mouth. Vocal sac subgular, weakly bilobate, externally expanded, ventrally not reaching the pectoral fold or region and not occupying space between head and body, with a shallow medial concavity in the posterior portion, which gives it a bilobate shape when inflated and deflated (Fig. 2B). Pectoral fold present, with only preaxillary element. Axillary membrane absent.

Forelimbs not hypertrophied; upper arm thinner than forearm. Ulnar tubercles small, rounded, and flattened; four tubercles in row on the left forearm and five on the right

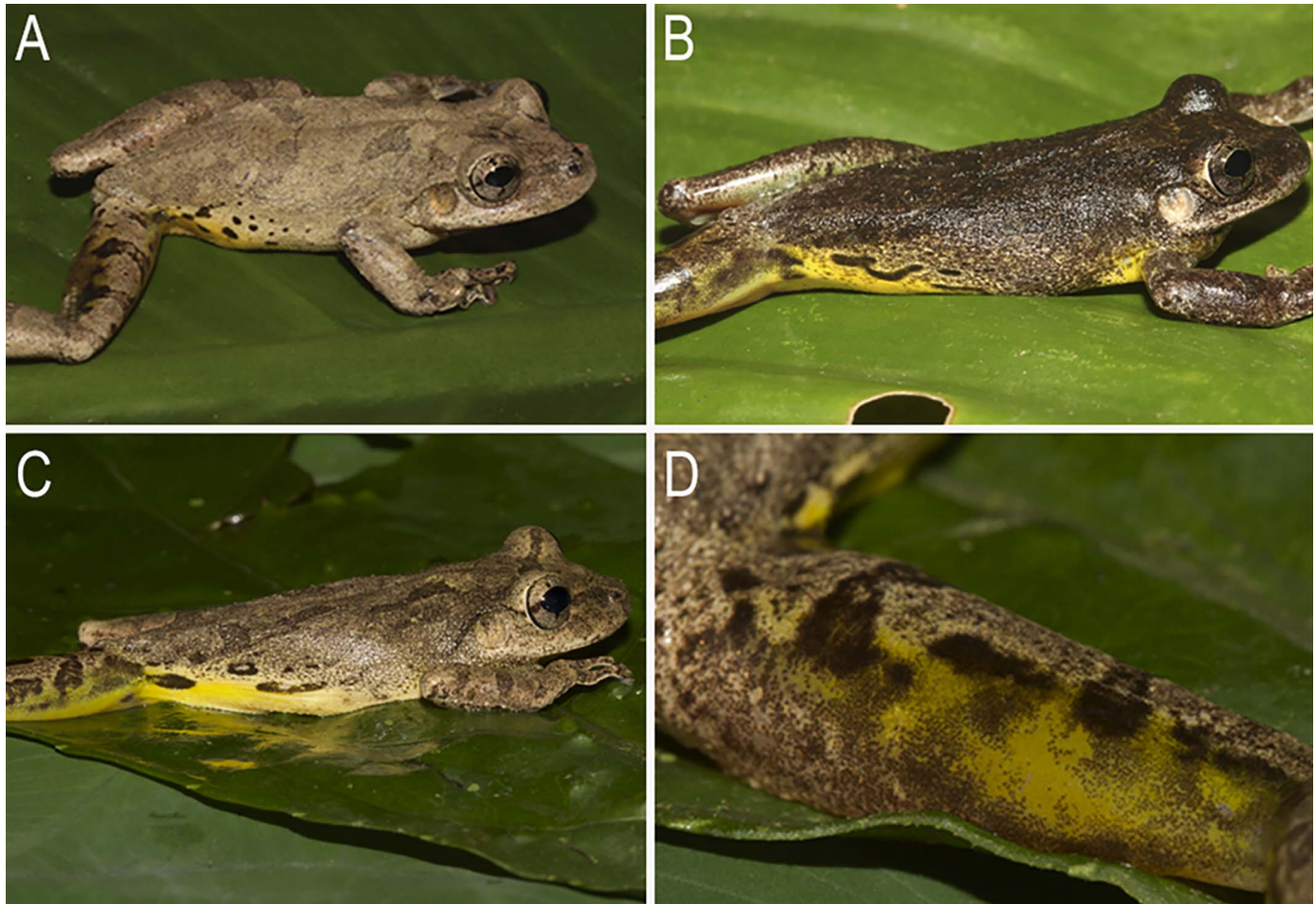


FIG. 6.—Male paratypes of *Scinax garciadavilae* in life. Flanks and inguinal region of (A) CRBIIAP 788, (B) CRBIIAP 785 (digitally reversed), and (C) MUBI 18468. Posterior view of the shank of (D) MUBI 18468.

one. Fingers fringed; relative finger length $II < III < V < IV$ (Fig. 2C). Discs elliptical, wider than long; disc of finger II smaller than others. Subarticular tubercles single, conical on fingers II and III, rounded and quadrangular on fingers IV and V, respectively. Subarticular tubercle on finger V larger than others. Supernumerary tubercles single, small, and rounded. Inner metacarpal tubercle single, flattened, and elliptical; outer metacarpal tubercle bifid and flattened. Webbing absent between fingers II and III, basal between fingers III and V. Nuptial pad on finger II, thickened, light-colored, covering the metacarpal II dorsomedially, extending from the base of the inner metacarpal tubercle, obscuring its base and outer margin, to distal margin of the subarticular tubercle ventrally, with distinct epidermal projections. Nuptial pad on finger III absent.

Hind limbs proportionally long, TL 60.7% SVL, FL 45.6% SVL. Tarsal tubercles diminutive, round, and scattered; tubercles on heel small, round, and scattered. Tubercles elliptical, flattened, along the internal margin of tarsi in row, near the tibiotarsal articulation to approximately half length of tarsus. Toes fringed; relative toe length $I < II < III \approx V < IV$ (Fig. 2D). Discs elliptical, wider than long. Subarticular tubercles single, conical on toes II and III, and rounded on toes I, IV, and V. Supernumerary tubercles single, small, and rounded. Inner metatarsal tubercle single

and elliptical; outer metatarsal tubercle single and round, approximately three times smaller than the inner metatarsal tubercle. Webbing formula $I 2^- - 2 II 1 - 2^+ III 1^+ - 2 IV 2 - 1^- V$ (Fig. 2D). Cloacal opening directed posteriorly at upper level of thighs.

Skin texture smooth on dorsum, loreal region, dorsal and ventral surfaces of limbs, hidden surfaces of thighs, tibiae, and tarsi, flanks, and gular and inguinal regions; tympanum region and sides of mandible shagreen; small, round, and scattered tubercles present on loreal region and dorsal surfaces of head, trunk, tibiae, and supracloacal region. Low granules on abdomen, ventral surface of thighs, and subcloacal region. Glandular concentrations and spicule-shaped papillary epidermal projections absent on inner margin of forelimbs and pectoral and inguinal regions.

Measurements of the holotype (mm).—SVL 45.0, HL 15.6, HW 16.0, ED 5.2, IOD 5.7, IND 3.0, EN 4.7, TD 3.4, TL 27.3, FL 20.5.

Color in preservative.—Dorsum of body light gray with a black X-shaped mark composed of an anterior pair of inverted parentheses-like blotches on the scapular region and a posterior pair of large and elliptical blotches on the sacral region, with small, irregular dark blotches on the posterior half-body. Head with a black W-shaped interocular

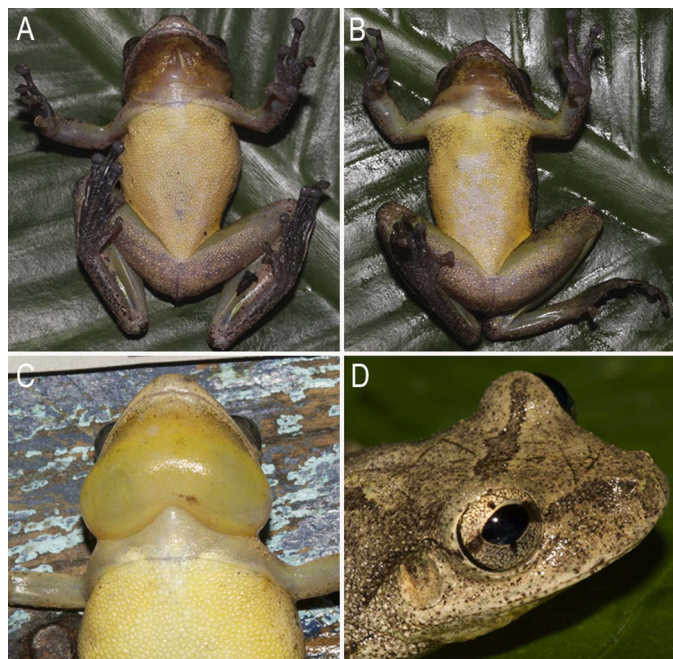


FIG. 7.—Male paratypes of *Scinax garciadavilae* in life. Ventral view of the body of (A) CRBIIAP 788 and (B) CRBIIAP 785. Gular and pectoral regions of (C) MUBI 14022, showing the vocal sac partially inflated. Head in dorsolateral of (D) MUBI 18468.

blotch. Canthus rostralis with a black line; loreal region black. Upper lip and the region below the eyes with the same background coloration as dorsum. A black line runs from the eye to the insertion of the arm, passing above tympanum. Dorsal surfaces of fore- and hind limbs light brown with irregular transverse dark-brown blotches; discs and toe webbings black. Flanks and inguinal region white with small, round, and irregular dark-brown blotches, becoming spotted with dark toward the axilla; axilla white. Hidden surfaces of shanks cream yellow, finely spotted with dark brown, with small and irregular dark-brown blotches; hidden surfaces of thighs densely spotted with black. Ventrally, gular region cream with black spots, less abundant medially. Pectoral region and abdomen white to cream yellow, with black scattered spots on the lateral margins of abdomen; around arm insertion, subcloacal region, and lateral edges of arms, thighs, and shanks finely spotted with brown, with some small, irregular, scattered dark blotches. Plantar surface and medial surface of tarsi densely spotted with brown; palmar surface cream yellow, conspicuously spotted with black on fingers III to V. Iridophores are distributed in the skin, giving an iridescent appearance. There are no notes of coloration in life of the holotype.

Variation.—Measurements are presented in Table 1. Dentigerous processes barely separated (MUBI 14021, 14022, 18467, and CRBIIAP 788) or separated by a space equivalent to 1/4 size of the dentigerous process length (MUBI 18468 and CRBIIAP 785). Vomerine teeth contact each other medially in MUBI 14021, 14022, and CRBIIAP 802. Number of vomerine teeth 6–11 on the right side and 6–9 on the left side. Nuptial pad on finger II like that of the holotype in three specimens (MUBI 14021, 18468, and CRBIIAP 785: only the left nuptial pad), thinner in three others (MUBI 14022, CRBIIAP 788, and 785: only the right

nuptial pad), and thicker in one specimen (MUBI 18467; Fig. 3A,B); it does not cover the proximal quarter of the dorso-medial surface of metacarpal II in MUBI 14022. Toe webbing formula varies as follows: I 2^- –($2-2^-$) II ($1-1^-$)–(2^+-2) III (1^+-1)–($2-2^+$) IV ($2-2^+$)–($1-1$) V.

Skin texture smooth or areolate on ventral surface of forearms, shoulders, and pectoral region. Small, round, and scattered tubercles less visible than those of the holotype on dorsal surface of body and forearms. Ulnar and tarsal tubercles barely visible in CRBIIAP 785. Tubercles on the internal margin of tarsi barely visible, loreal region more concave, and canthus rostralis more defined in CRBIIAP 785, 788, and 802. The only available mature female (CRBIIAP 802) is smaller than males (41.0 mm versus 42.3–45.0 mm in males) and has the toe webbing formula I 2^- – 2^- II $1-2$ III $1-2$ IV 2^- – 1 V.

In preservative, the general dorsal coloration pattern of paratypes is similar to the holotype. Still, blotches vary in size, shape, and number on a light-gray to brown background (Fig. 4). Dorsal blotches of the X-shaped mark reduced in size in MUBI 18468, thinner and more elongated in CRBIIAP 785, and partially confluent in MUBI 14022; left and right blotches of the anterior pair discontinuous in MUBI 18468 and CRBIIAP 788, respectively; small to medium-sized, round, irregular dark blotches distributed on the dorsum of body in MUBI 14021 (posterior and lateral portions), MUBI 18468, CRBIIAP 788 (posterior portion), and MUBI 18467 (medial and posterior portions), less evident in MUBI 14022 and CRBIIAP 785. The W-shaped interocular blotch with the posterior vertices less marked in CRBIIAP 785 and 788 and thinner in MUBI 18467, 18468, CRBIIAP 785, and 802. Canthal line less evident in MUBI 18467 and indistinct in MUBI 14022; loreal region with the same coloration of dorsum in MUBI 14021 and 14022; region below the eyes with a dark blotch in MUBI 14021.

Flanks and inguinal region white with small, round, irregular dark blotches similar to those of the holotype in MUBI 14021, 14022, 18467, CRBIIAP 785, and 788, or with medium-sized blotches in MUBI 18468; axilla white with few dark spots in all individuals. Hidden surfaces of thighs finely (MUBI 14021, 14022, CRBIIAP 788) or densely dark spotted (MUBI 18467, CRBIIAP 788), with small, irregular darker blotches similar to those of the holotype, or with medium-sized blotches in MUBI 18468; hidden surfaces of shanks finely (MUBI 14021, 18468, 14022, CRBIIAP 785, and 788) or densely (MUBI 18467) dark brown or black spotted, with small, irregular darker blotches or medium-sized blotches in MUBI 18468. Irregular transverse dark blotches on tarsi less evident in CRBIIAP 785 and absent in MUBI 14022 and 18467.

Ventrally, gular region white to cream, finely (e.g., CRBIIAP 788) to densely spotted (e.g., MUBI 18467), with dark brown to black, always less abundant medially. Pectoral region and abdomen white to cream, with black scattered spots on the pectoral region in MUBI 18467 and 18468; black spots on the lateral margins of abdomen and subcloacal region absent in CRBIIAP 785 and 788; the individual MUBI 18468 is more densely dark colored than the others. The general color patterns of the female are similar to those of males; dark spots finely and regularly distributed on gular region; the posterior pair of blotches on the sacral region and the transversal marks on shanks and tarsi almost indistinguishable.

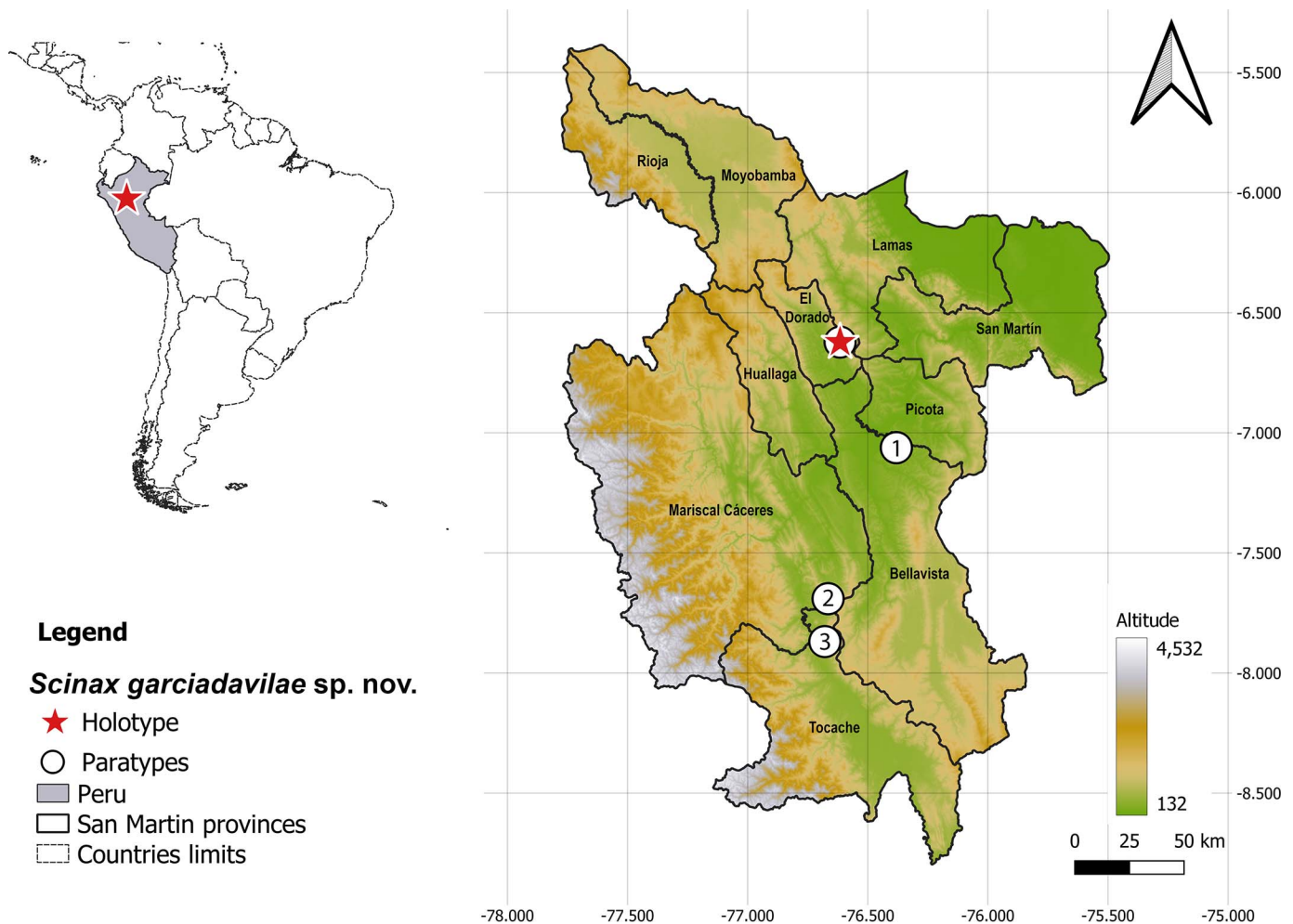


FIG. 8.—Geographic distribution of *Scinax garciadavilae* in the department of San Martín, Peru. Red star (type locality): Shucshuyacu, district of Zapatero, province of Lamas ($6^{\circ}37'20.7''\text{S}$, $76^{\circ}36'53.9''\text{W}$). (1) El Quinillal, municipality of Bajo Biavo, province of Bellavista ($7^{\circ}30'43.0''\text{S}$, $76^{\circ}22'50.4''\text{W}$). (2) Road Tarapoto to Tocache, Nuevo Jaén, municipality of Campanilla, province of Mariscal Cáceres ($7^{\circ}41'26.5''\text{S}$, $76^{\circ}39'53.9''\text{W}$). (3) Road Tarapoto to Tocache, Pólvara, municipality of Pólvara, province of Tocache ($7^{\circ}52'09.2''\text{S}$, $76^{\circ}40'42.2''\text{W}$).

In life, dorsal color light to dark brown, with brown to black blotches, including those of the X-shaped mark and the interocular one (Fig. 5A–D). Canthal and postocular black lines present, less evident in CRBIIAP 785. Upper lip and the region below eyes white to cream, with a dark-brown blotch in MUBI 14021. Dorsal surfaces of fore- and hind limbs light to dark brown with irregular transverse brown to black blotches, which are darker and more pronounced on shanks, tarsi, fingers, and toes in MUBI 18467, 18468, and CRBIIAP 788.

Flanks and inguinal region yellow, with small to medium-sized, round, irregular dark-brown to black blotches, becoming spotted with light to dark brown toward the axilla; axilla yellow with few black spots (Fig. 6A–C). Hidden surfaces of thighs yellow, finely or densely spotted with dark brown to black, with small to medium-sized, irregular dark-brown to black blotches (Fig. 6D); hidden surfaces of shanks finely or densely spotted with dark brown to black.

Ventrally, gular region yellowish orange (e.g., CRBIIAP 785, 788) or yellow (e.g., MUBI 14022), with black spots, less

abundant medially (Fig. 7A–C). Pectoral region and abdomen yellow cream, creamier in the medial portion of the abdomen in CRBIIAP 785; black scattered spots on the pectoral region and lateral margins of abdomen in CRBIIAP 785 (absent in preservative), and on the subcloacal region in CRBIIAP 785 and 788 (absent in preservative). There are no notes of coloration in life for specimens CRBIIAP 802 (female) and MUBI 14021 (male).

Skin texture shagreen on dorsum of body and flanks in life (smooth in preservative). Tubercles on forearms, tarsi, and heels white enameled. Small, round, and scattered tubercles evident on dorsum of body and forearms (barely visible in preservative). Iris silver, with black reticulations, two irregular dark blotches on the sides of the lateral inflection points, a smaller, irregular blotch below the lower inflection point, and a similar blotch above the upper inflection point, slightly separated from the pupular margin (Fig. 7D). Physiological chlorosis absent (white bones, transparent lymph).

Etymology.—The specific name honors Carmen Rosa García Dávila, a geneticist and researcher of the Peruvian



FIG. 9.—Landscape along the Tarapoto–Tocache Road between Quebradas 11 and 9, district of Zapatero, province of Lamas, department of San Martín, Peru. The type locality is in a stream that crosses the road in the forested hills visible in the background.

Amazon. For decades, she has dedicated her life with enthusiasm and passion to the research and conservation of Amazonian biodiversity. She has also been promoting women's empowerment in science in the country, primarily by fostering the development of Amazonian women scientists.

Geographic distribution and natural history.—The new species was collected during fieldwork carried out in 2010 and 2015 in five different sites along approximately 140 km of the Huallaga River (Figs. 8 and 9). Most of this area belongs to the seasonally dry forests of Huallaga. However, five individuals of *S. garciadavilae* (MUBI 18467, 18468, 14020, 14021, 14022) were found in evergreen rainforest along the road in pools of water formed in the gutters.

The individuals collected in El Quinillal (CRBIIAP 785, 788, and 802) were found near humid areas that become flooded during the rainy season (November to March). These sites were quite altered and degraded, situated in areas affected by anthropogenic activities, mainly from agriculture. The CRBIIAP 785 (male) and 802 (female) specimens were found in an axial amplexus. Calling activity has been observed in the field; however, we did not have the

opportunity to record it at the time. The larvae of the new species also remain unknown.

Phylogenetic analysis and UPDs.—Considering the goals of this study and the large size of the original data set of Araujo-Vieira et al. (2023), in Fig. 10 we only show the section of the parsimony results corresponding to the *S. eurydice* group. The parsimony analyses resulted in 2503 most parsimonious trees of 88,293 steps. The analysis recovered the *S. eurydice* group monophyletic (100% jackknife), with the new species as the sister taxon (98% jackknife) of *S. castroviejoi* + *S. sateremawe*. *Scinax garciadavilae* + (*S. castroviejoi* + *S. sateremawe*) is the sister clade of *S. eurydice* and its related candidate species, *Scinax* spp. 12, 14, 23, and 24 (100% jackknife). The new species has UPDs of 12.6–15.5% (16S rRNA; 419 bp) from all nominal species and related candidate species of the *S. eurydice* group (Table 2).

Remarks.—Dissection of the m. interhyoideus in specimen CRBIIAP 785 (adult male) showed that the muscle has a shallow medial constriction in its posterior margin and forms small but continuous contralateral subgular lobes, which we refer to as a weakly bilobate m. interhyoideus Araujo-Vieira et al. (2023). The m. interhyoideus is not posterolaterally expanded, and extends ventrally beyond the mandible, reaching the anterior half of the m. deltoideus. This combination—a weakly bilobate m. interhyoideus that extends ventrally beyond the mandible to reach the anterior portion of the m. deltoideus—corresponds to a weakly bilobate vocal sac that does not reach the pectoral fold or region, as defined by Araujo-Vieira et al. (2023). We caution, however, that these definitions strictly based on vocal sac anatomy require further refinement through observations of fully inflated vocal sacs (Elias-Costa and Faivovich 2025), which remain unavailable for many species of *Scinaxini*.

DISCUSSION

Scinax garciadavilae is the fourth described species in the *S. eurydice* group and the first species of this group known to occur in Peru. The other three species are distributed across the Andes, with occurrences in central Bolivia in La Paz, Santa Cruz, and Cochabamba departments (*S. castroviejoi*; De la Riva 1993; De la Riva et al. 2000; Köhler 2000; Araujo-Vieira et al. 2023), the western Amazon basin in the state of Amazonas, Brazil (*S. sateremawe*; Sturaro and Peloso 2014), and northeastern and southeastern Brazil, ranging from the state of Paraíba to São Paulo (*S. eurydice*; Bokermann 1968; Menezes et al. 2016).

Within this species group, four candidate species closely related to *S. eurydice* have been identified by Araujo-Vieira et al. (2023): *Scinax* spp. 12, 14, 23, and 24. Additionally, a fifth lineage consisting of populations from the Brazilian states of Alagoas, Pernambuco, and Paraíba was suggested by Menezes et al. (2016). These lineages share similar adult external morphology and advertisement calls with *S. eurydice* (Pombal et al. 1995; Magrini et al. 2011; Novaes and Zina 2016; Menezes et al. 2016; Mângia et al. 2017; this study). Menezes et al. (2016) referred to unpublished phenotypic evidence, including body size and shape, color patterns, and calls, suggesting characteristics for differentiating lineages associated with *S. eurydice* (*Scinax* spp. 14 and 23 sensu

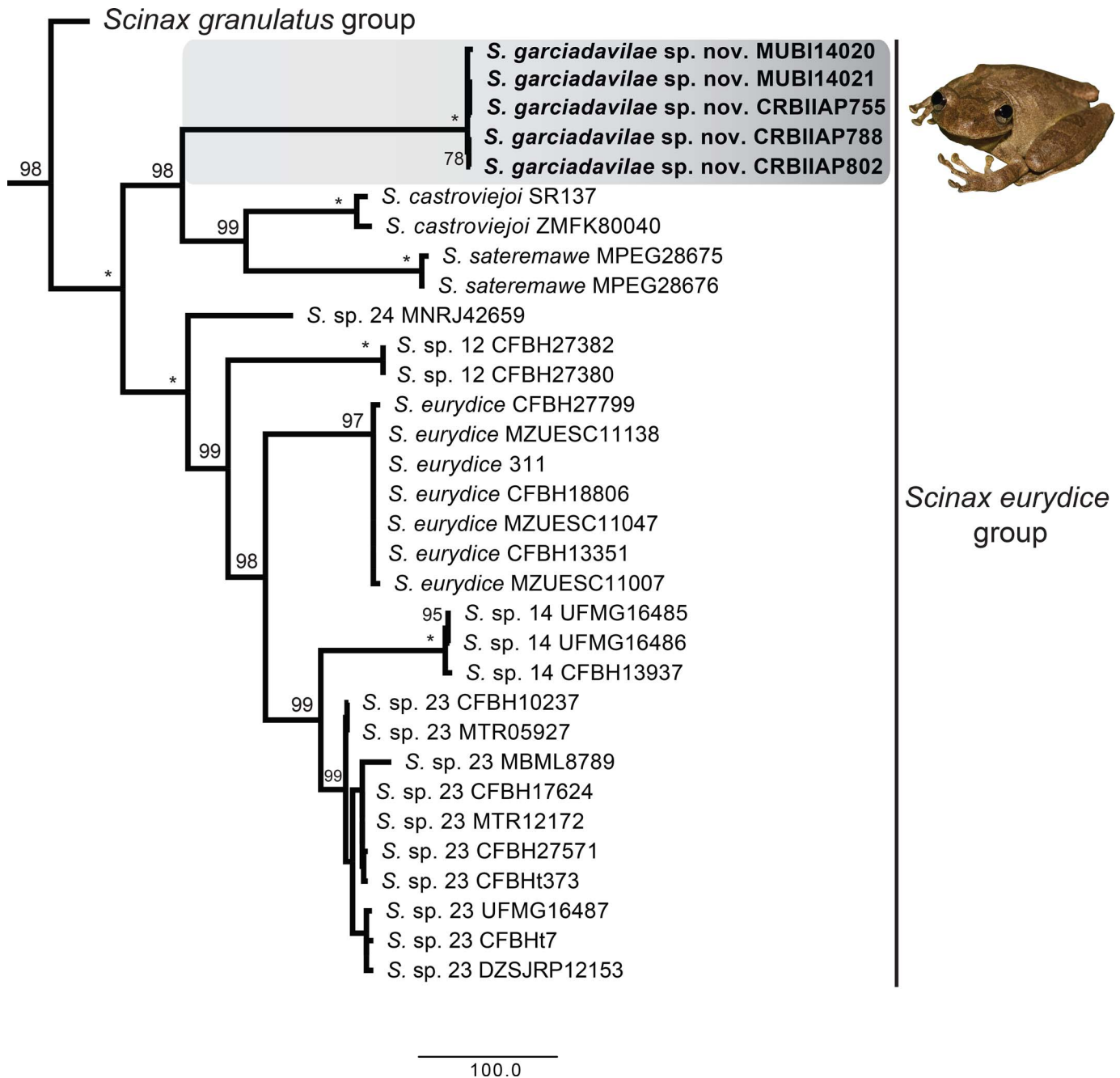


FIG. 10.—Phylogenetic relationships of the *Scinax eurydice* group as recovered in one of 2503 most parsimonious trees obtained from the analysis of molecular data set with gaps as a fifth state. Values around nodes are parsimony jackknife supports; all nodes are retained in the strict consensus. An asterisk (*) indicates groups with 100% jackknife support. Nodes lacking values have <50% jackknife support. See Appendix II for the list of GenBank accession numbers and localities.

Araujo-Vieira et al. 2023, and the other one from northeastern Brazil). So far, the only published differences among them appear to be in the advertisement calls and cytogenetics (see Pombal et al. 1995; Cardozo et al. 2011; Magrini et al. 2011; Nogueira et al. 2015; Novaes and Zina 2016; Araujo-Vieira et al. 2023).

Nevertheless, our observations revealed *S. garciadavilae* being distinguished from *Scinax* spp. 12, 14, 23, and 24 by the same characters used to differentiate it from *S. eurydice*: the flanks and inguinal region yellow, with small to medium-sized, round and irregular dark-brown to black blotches in

life; hidden surfaces of the thighs yellow, finely or densely spotted with black, sometimes forming small and irregular black blotches in life; iris silver with black reticulations in life; vocal sac weakly bilobate, and nuptial pad absent on finger III.

Scinax castrovieji is known from a few localities in the eastern Andes in central Bolivia (De la Riva et al. 2000; Araujo-Vieira et al. 2023), and material from this species is scarce in scientific collections. We studied the holotype and four paratypes (formerly CET A600 – 605, currently EBD 37255 – 37260) and other specimens from Bolivian

TABLE 2.—Percentage (%) of uncorrected p -distances between the 16S rDNA (AR-BR/Wilk2, 419 bp) gene fragment sequences for described and candidate species of the *Scinax eurydice* group; new species in bold. Number of specimens is indicated in parentheses. See Appendix II for the list of GenBank accession numbers and localities.

	<i>S. castroviejoi</i>	<i>S. eurydice</i>	<i>S. garciadavilae</i>	<i>S. sateremawe</i>	<i>Scinax</i> sp. 12	<i>Scinax</i> sp. 14	<i>Scinax</i> sp. 23	<i>Scinax</i> sp. 24
<i>S. castroviejoi</i> (2)	1.7	—	—	—	—	—	—	—
<i>S. eurydice</i> (7)	9.7–10.2	0.2–0.5	—	—	—	—	—	—
<i>S. garciadavilae</i> (5)	12.6–12.8	13.8–14.1	0.0	—	—	—	—	—
<i>S. sateremawe</i> (2)	11.2	12.4–12.6	15.1	0.0	—	—	—	—
<i>Scinax</i> sp. 12 (2)	9.9–10.6	3.6–3.9	15.0	13.8	0.0	—	—	—
<i>Scinax</i> sp. 14 (3)	9.7–10.2	2.4–2.7	14.6	12.6	4.1	0.0	—	—
<i>Scinax</i> sp. 23 (9)	9.9–11.6	3.9–4.8	14.6–15.5	14.1–14.8	3.9–4.3	4.1–4.6	0.0–1.7	—
<i>Scinax</i> sp. 24 (1)	10.4–10.7	5.1–5.6	15.3	13.8	5.8	4.8	6.5–7.0	—

localities in the departments of Cochabamba and Santa Cruz (see Appendix I). It was evident that all these individuals had flanks and inguinal region mottled, with large, irregular dark blotches on a cream or white background, which was yellow in life according to De la Riva (1993). This is one of the relatively few phenotypic diagnostic characters that differentiates this species from *S. garciadavilae*

(Fig. 11A–C). Our phylogenetic results and estimated UPDs constitute additional evidence supporting the description of the new species. According to our results, *S. garciadavilae* is not the sister species of *S. castroviejoi*, its most similar species, and the relationship *S. garciadavilae* + (*S. sateremawe* + *S. castroviejoi*) is highly supported ($\geq 98\%$ jackknife). Furthermore, *S. garciadavilae* has UPDs of 12.6–15.5% (16S rDNA; 419 bp) from all remaining species and related candidate species of the *S. eurydice* group. These values are much larger than the threshold value for interspecific UPDs of 3% for the 16S rRNA gene suggested by Fouquet et al. (2007) for identifying candidate species of Neotropical anurans.

The vocal sac of *S. sateremawe* was considered somewhat similar to the bilobate vocal sac of *Julianus camposseabrai* (Bokermann 1968) by Araujo-Vieira et al. (2023). However, this species and *S. castroviejoi* seem to share the weakly bilobate vocal sac condition with *S. garciadavilae*, which shows one discrete lobe on each side. Unfortunately, no specimens of *S. castroviejoi* and *S. sateremawe* were available for dissection and study of the submandibular musculature. The weakly bilobate vocal sac could be a synapomorphy of *S. garciadavilae* + (*S. castroviejoi* + *S. sateremawe*); however, numerous instances of homoplasy in Scinaxini preclude confirmation with the available evidence (see Araujo-Vieira et al. 2023).

Three of the four described species of the *S. eurydice* group are known from geographically distant and remote areas in central (Brazil) and western (Peru) Amazonia, as well as the central Andes in Bolivia. Among these, *S. garciadavilae* and *S. sateremawe* are currently only known from their type material, whereas relatively few specimens from additional localities have been documented for *S. castroviejoi*. Our knowledge of the morphological variation, advertisement calls, and natural history of these species remains limited. To some extent, this lack of information limits the amount of informative variation that can be incorporated into the diagnoses of these species, which nevertheless exhibit high levels of sequence divergence. As the taxonomy of the *S. eurydice* group and its closely related candidate species continues to be explored, we anticipate that new sources of informative variation will emerge, further enriching the taxonomic studies of this group of *Scinax*.

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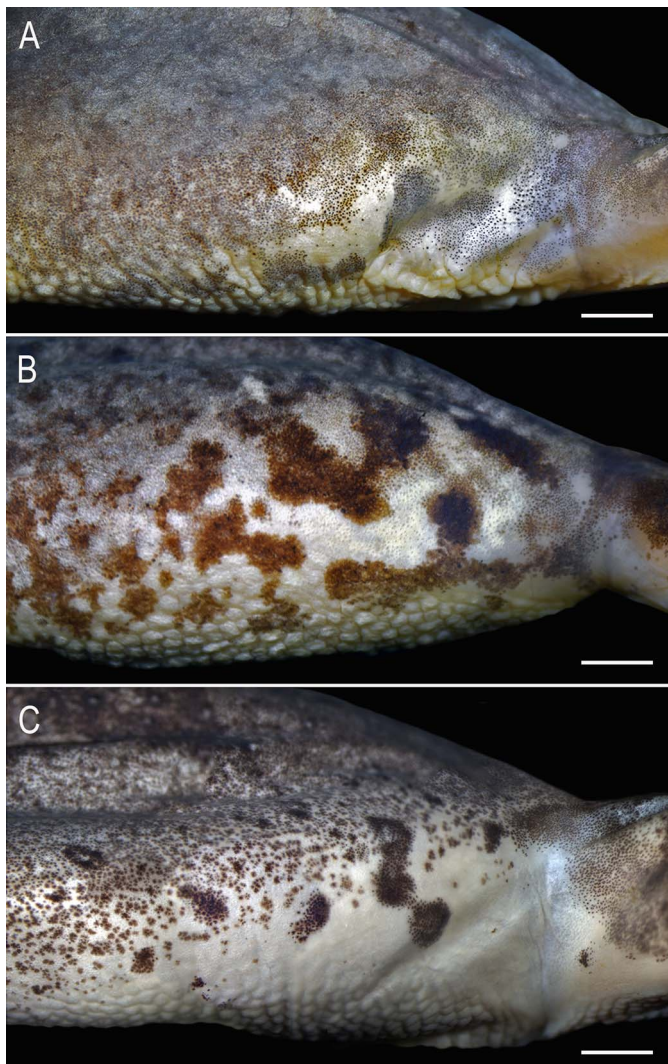


FIG. 11.—Flanks and inguinal region (left side) of *Scinax castroviejoi* (A) ZFMK 80040, (B) ZFMK 67093, and (C) *S. garciadavilae* (MUBI 14020, holotype). Scale bars = 1 mm.

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APPENDIX I

Specimens Examined

Institutional abbreviations follow Sabaj (2022).

Scinax castroviejoi.—BOLIVIA: Santa Cruz: Florida, Laguna Bermejo, CET A600 (holotype), A601–605 (paratypes), MNK 509–510 (paratypes, photographs); La Hoyada, ZFMK 72632–72633. Cochabamba, Chapare, road to San Onofre, ZFMK 67093–67095, 80040.

Scinax eurydice.—BRAZIL: Bahia: Fazenda Santo Onofre 10 km E Maracás, MZUSP 74213 (holotype), MZUSP 74214–74215, 104048–104052, MNRJ 4050, USNM 164046 (paratypes), MZUSP 59912–59914, 73732–73733; Fazenda Santo Onofre e Canabrava, CFBH 18806, 23660, Ilhéus, MZUSP 117827, 117835; Mata de São João, CFBH, 27799; Uruçuca, MZUSP 33890; Salvador, MZUSP 8338; Porto Seguro, Fazenda Lafranchini, CFBH 36878.

Scinax sateremawe.—BRAZIL: Amazonas: Maués, Floresta Nacional de Pau-Rosa (FPR), Rio Paraconi, Comunidade São Tomé, MPEG 28677 (holotype), 28678–28680 (paratypes); Comunidade Bragança, MPEG 28675–28676 (paratypes); Careiro da Várzea, MPEG 13932–13936 (paratypes).

Scinax sp. 12 (sensu Araujo-Vieira et al. 2023).—BRAZIL: Rio de Janeiro: Santa Maria Madalena, CFBH 27380, 27382.

Scinax sp. 14 (sensu Araujo-Vieira et al. 2023).—BRAZIL: Minas Gerais: Juiz de Fora, Mata do Krambeck—Jardim Botânico da Universidade Federal de Juiz de Fora, UFMG 16485–16486.

Scinax sp. 23 (sensu Araujo-Vieira et al. 2023).—BRAZIL: Minas Gerais: Juiz de Fora, Mata do Krambeck – Jardim Botânico da Universidade Federal de Juiz de Fora, UFMG 16487; Grão Mogol, CFBH 10236; Viçosa, CFBH 27571. Espírito Santo: São Mateus, CFBH 35116; Conceição da Barra, Vila de Itaúnas, CFBH 35372; Santa Tereza, MBML 8789.

Scinax sp. 24 (sensu Araujo-Vieira et al. 2023).—BRAZIL: Bahia: Santa Cruz Cabralia, RPPN Estação Veracel, MNRJ 42659.

APPENDIX II.—Voucher specimens, collection numbers (tissue identification number or, if unavailable, collector), localities, and GenBank accession numbers of mitochondrial sequences for *Scinax garciadavilae* and mitochondrial and nuclear sequences for the remaining species and related candidate species of the *S. eurydice* group taken from Araújo-Vieira et al. (2023). 12S-tRNA^{Val}-16S (the ribosomal 12S rRNA, the intervening tRNA^{Val}, and the 16S rRNA), 16S-tRNA^{Leu} (3' section of 16S rRNA gene and the intervening tRNA^{Leu}), ND1 (NADH dehydrogenase subunit 1 and tRNA^{Leu}), COI (cytochrome c oxidase subunit I), Cytb (cytochrome b), CXCR4 (chemokine receptor type 4), POMC (proopiomelanocortin), RAG1 (recombination activating gene 1), RHO (rhodopsin exon 1), SIAH (seventh in absentia homolog 1), and Tyr (tyrosinase). Countries: BR = Brazil; BO = Bolivia; PE = Peru. Brazilian states: AM = Amazonas; BA = Bahia; ES = Espírito Santo; MG = Minas Gerais; RJ = Rio de Janeiro; and SP = São Paulo. Topotypical or holotype specimens are underlined; those species names with an asterisk are <20 km from the type locality. Institutional abbreviations follow Sabaj (2022), except for the field series of SR (Steffen Reiche) and Miguel Trefaut Rodrigues (MTR), to be catalogued in MZUSP).

ID	Locality	12S-tRNA valine-16S	16S-tRNA Leu	ND1	COI	Cytb	CXCR4	POMC	RAG1	RHO	SIAH	Tyr
CRBILAP 755	<i>Scinax garciadavilae</i> PE: San Martín: Valle del Biavo	PV648336	PV648330	PV648333	PV644235	—	—	—	—	—	—	—
CRBILAP 788	<i>S. garciadavilae</i> PE: San Martín: El Quimillal	PV648337	PV648331	PV648334	PV644236	—	—	—	—	—	—	—
CRBILAP 802	<i>S. garciadavilae</i> PE: San Martín: El Quimillal	PV648338	PV648332	PV648335	PV644237	—	—	—	—	—	—	—
MUBI 14020	<i>S. garciadavilae</i> PE: San Martín: Shuchuyacu	PV642618	—	—	PV644233	—	—	—	—	—	—	—
MUBI 14021	<i>S. garciadavilae</i> PE: San Martín: road Tarapoto-Tocache	PV642619	—	—	PV644234	—	—	—	—	—	—	—
SR137	<i>S. castroviejoi</i> BO: La Paz: Camino Charazani –Apolo	OQ934440	—	—	—	—	—	OQ936142	OQ936403	OQ936744	OQ937031	OQ937307
ZFMK80040	<i>S. castroviejoi</i> BO: Cochabamba: Chapare: 1900 m a. s.l.: road to Santo Onofre	OQ934441	—	—	OQ941141	—	—	—	OQ936404	OQ936745	OQ937032	—
311	<i>S. eurydice</i> BR: BA: Ilhéus	OK161155	—	—	—	—	—	—	—	—	—	—
CFBH13351	<i>S. eurydice</i> BR: BA: Feira de Santana	OQ934499	—	—	OQ941186	OQ937639	OQ935909	—	OQ936432	OQ936767	OQ937053	OQ937333
CFBH18806	<i>S. eurydice</i> BR: BA: Maracás: Fazenda Santo Onofre	OQ934500	OQ935144	OQ938048	OQ941187	—	—	—	—	—	—	—
CFBH27799	<i>S. eurydice</i> BR: BA: Mata de São João	OQ934501	OQ935145	OQ938049	OQ941188	—	—	—	—	—	—	—
MZUESC11007	<i>S. eurydice</i> BR: BA: Jequié	OK161150	—	—	OK157339	—	—	—	—	—	—	—
MZUESC11047	<i>S. eurydice</i> BR: BA: Ilhéus	OK161148	—	—	—	—	—	—	—	—	—	—
MZUESC11138	<i>S. eurydice</i> BR: BA: Jequié	OK161153	—	—	OK157340	—	—	—	—	—	—	—
MPEG28675	<i>S. sateremauve*</i> BR: AM: Matés: Floresta Nacional de Pau-Rosa: Comunidade Bragança: Rio Paraconí	OQ934683	OQ935230	OQ938143	OQ941317	OQ937718	—	OQ936222	OQ936515	—	OQ937114	OQ937404
MPEG28676	<i>S. sateremauve*</i> BR: AM: Matés: Floresta Nacional de Pau-Rosa: Comunidade Bragança: Rio Paraconí	OQ934684	OQ935231	OQ938144	OQ941318	OQ937719	—	—	OQ936516	—	—	OQ937405
CFBH27380	<i>Scinax</i> sp. 12 BR: RJ: Santa Maria Madalena	OQ934765	OQ935285	OQ938205	OQ941395	—	—	OQ936254	OQ936561	OQ936875	OQ937153	—
CFBH27382	<i>Scinax</i> sp. 12 BR: RJ: Santa Maria Madalena	OQ934766	OQ935286	OQ938206	OQ941396	—	—	—	—	—	—	—
CFBH13937	<i>Scinax</i> sp. 14 BR: RJ: Petrópolis	OQ934761	OQ935291	OQ938211	OQ941404	—	—	—	—	—	—	—

APPENDIX II
Continued.

	ID	Locality	12S-rRNA valine-16S	16S-rRNA Leu	ND1	COI	Cytb	CXCR4	POMC	RAG1	RHO	SIAH	Tyr
UFMC16485	<i>Scinax</i> sp. 14	BR: MG: Juiz de Fora: Mata do Krambeck, Jardim Botânico da Universidade Federal de Juiz de Fora	OQ934779	OQ935289	OQ938209	OQ941402	—	—	—	—	—	—	—
UFMC16486	<i>Scinax</i> sp. 14	BR: MG: Juiz de Fora: Mata do Krambeck, Jardim Botânico da Universidade Federal de Juiz de Fora	OQ934780	OQ935290	OQ938210	OQ941403	—	—	—	—	—	—	—
CFBH10237	<i>Scinax</i> sp. 23	BR: MG: Grão Mogol	KU495544	—	—	KU494751	—	—	—	—	—	—	—
CFBH27571	<i>Scinax</i> sp. 23	BR: MG: Viçosa	OQ934791	OQ935297	OQ938217	OQ941409	—	—	—	—	—	—	—
CFBH4373	<i>Scinax</i> sp. 23	BR: ES: Santa Teresa: São Lourenço	OQ934792	—	—	OQ941410	—	OQ935962	OQ936259	OQ936567	OQ936881	OQ937157	OQ937456
CFBH7	<i>Scinax</i> sp. 23	BR: SP: Ubatuba	OQ934790	OQ935296	OQ938216	—	OQ937763	OQ935961	—	OQ936566	OQ936880	OQ937156	OQ937455
DZSJRP12153	<i>Scinax</i> sp. 23	BR: SP: São Jose do Barreiro	OQ934793	OQ935298	OQ938218	OQ941411	—	—	—	—	—	—	—
MBML8789	<i>Scinax</i> sp. 23	BR: ES: Santa Teresa	OQ934789	OQ935295	OQ938215	OQ941408	—	—	—	—	—	—	—
MTR05927	<i>Scinax</i> sp. 23	BR: BA: Jussari: Serra do Teimoso	KDQF01003135	—	—	—	—	—	—	—	—	—	—
MTR12172	<i>Scinax</i> sp. 23	BR: ES: Linhares: Goytacazes, FLONA	KDQF01003197	—	—	—	—	—	—	—	—	—	—
UFMC16487	<i>Scinax</i> sp. 23	BR: MG: Juiz de Fora: Mata do Krambeck, Jardim Botânico da Universidade Federal de Juiz de Fora	OQ934794	—	—	OQ941412	—	—	—	—	—	—	—
MNRJ42659	<i>Scinax</i> sp. 24	BR: BA: Santa Cruz Cabralia: RPPN Estação Veracel	OQ934795	—	—	OQ941413	—	OQ935963	OQ936260	OQ936568	OQ936882	—	OQ937457

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