Evolutionary Systematics. 7 2023, 183–194 | DOI 10.3897/evolsyst.7.102425

EVOLUTIONARY SYSTEMATICS

Rising from the ashes: A new treefrog (Anura, Hylidae, *Scinax*) from a wildfire-threatened area in the Amazon lowlands of central Peru

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Academic editor: Alexander Haas ♦ **Received** 21 February 2023 ♦ **Accepted** 26 April 2023 ♦ **Published** 9 May 2023

Abstract

We describe a new species of tree frog from the middle Ucayali River, Peru. *Scinax pyroinguinis* **sp. nov.** is known from two males found in a patch of Amazon rainforest at 160 masl. Externally, the new species is similar to those in the *Scinax rostratus* group but it differs from all members by having a rounded head from dorsal view without proboscis or pointed tubercle on the tip of the snout, large conical tubercles on upper eyelids and heels, and bright orange blotches and spots on groins, posterior surface of thighs, and shanks. Genetic analysis supports our morphological study and confirms *S. pyroinguinis* sp nov as a new species, being tentatively the most basal member of the *S. rostratus* group. The new species is only known from the type locality that is currently threatened by habitat loss caused by wildfires.

Key Words

Amphibia, new species, Ucayali River, *Scinax pyroinguinis*, threatened, wildfires

Introduction

Currently containing 129 recognized species (Frost 2023), *Scinax* treefrogs are among the most diverse clades of Neotropical amphibians (Ferrão et al. 2016). Over the last decade, the taxonomy of *Scinax* has been studied comprehensively, resulting in the grouping of its species into two clades: the *Scinax catharinae* clade (containing members of the *S. catharinae* and *S. perpusillus* species groups), and the *S. ruber* clade (which gathers members of the *S. rostratus* and *S. ruber* species groups) (Faivovich 2002; Faivovich et al. 2005). Regarding the current taxonomy of the *Scinax ruber* clade, those with a combination of a snout projecting beyond the margin of the jaw, a pointed tubercle on the heels, and a dark triangular cephalic marking with the base lying between eyes are placed into the *Scinax rostratus* group (Duellman 1972; Faivovich et al. 2005; Hoogmoed and Avila-Pires 2011).

Of the ten species of *Scinax* known to occur in Peru (AmphibiaWeb 2023), two of them belong to the *Scinax rostratus* group: *S. garbei* and *S. pedromedinae*. Whereas *S. garbei* has a wide distribution range in the Amazon (Lopes et al. 2020), *S. pedromedinae* is restricted to the western Amazonian region in central and southern Peru, Brazil and northern Bolivia (Moravec and Aparicio 2004; Hoogmoed and Avila-Pires 2011; Melo-Sampaio and De Souza 2015).

During October and November of 2022, GC and WA conducted a field survey in a remnant forest surrounded by burnt areas and pastures in the Ucayali River Basin, Amazon Lowlands of central Peru (Fig. 1). The expedition resulted in a small collection of amphibians and reptiles. Two specimens of *Scinax* caught our attention because of their particular external appearance similar to members of the *Scinax rostratus* group. Following morphological and genetic analyses, we concluded that these specimens of *Scinax* correspond to an unknown taxon which we described below.

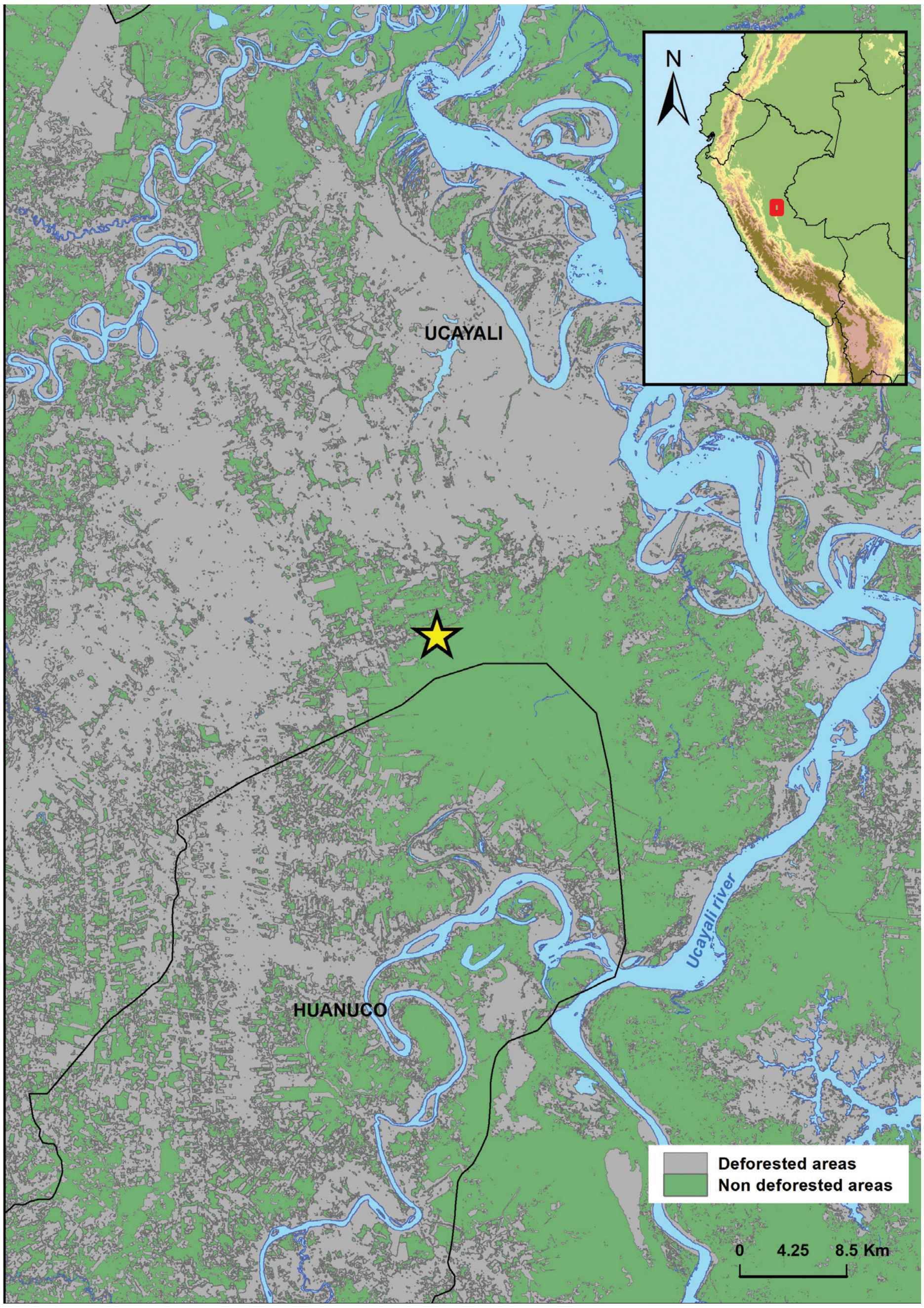

Figure 1. Map showing type locality of *Scinax pyroinguinis* sp. nov. (yellow star), Ucayali department, central Peru.

Materials and methods

We collected specimens at night while conducting visual transect surveys. We euthanized specimens with benzocaine 20%, preserved them in 10% formalin, and stored them in 70% alcohol. We extracted tissue samples from the tongue of the specimens and stored them in 96% alcohol. We have deposited all specimens in the herpetological collection of the Centro de Ornitologia y Biodiversidad (CORBIDI), Lima, Peru. This research was performed under the permit RDG N° D000010-2021-MIDAGRI-SERFOR-DGGSPFFS issued by Ministerio de Agricultura de Peru.

We follow Duellman (2001) for morphological characters terminology, Lima et al. (2004) for format description, Faivovich et al. (2005) and Duellman et al. (2016) for systematics of *Scinax*. We used the standard webbing formulae of Savage and Heyer (1967), and Myers and Duellman (1982). For comparisons we consider morphological data for *Scinax acuminatus* from Cope (1862), for *S. boulengeri* from Cope (1887) and Duellman (1972); for *S. constrictus* from Lima et al. (2004); *S. garbei* from Miranda-Ribeiro (1926), Duellman (1972), Duellman and Wiens (1973), and Duellman (2005); *S. jolyi* from Lescure and Marty (2000); for *S. kennedyi* from Pyburn (1973); for *S. nebulosus* from Spix (1824), Hoogmoed and Gruber (1983), Duellman

(1972) and Lescure and Marty (2000); for *S. pedromedinai* from Henle (1991), Duellman and Wiens (1973), and Duellman (2005); for *S. proboscideus* from Brongersma (1933), Duellman (1972), and Lescure and Marty (2000); and for *S. sugillatus* from Duellman and Wiens (1973). Also, the examined specimens are listed in Appendix 1.

For morphological measurements, we follow Duellman (2001) measuring the following variables to the nearest 0.1 mm with digital callipers under a stereomicroscope: snout–vent length (SVL), head length (HL), head width (HW), eye diameter (ED), eye–nostril distance (END), interorbital distance (IOD), internarial distance (IND), nostril snout distance (NSD), tympanum diameter (TD), thigh length (THL), tibia length (TL), and foot length (FL). We numbered fingers and toes preaxially to postaxially from I–IV and I–V respectively. We determined comparative lengths of toes III and V by adpressing both toes against Toe IV; length of fingers I and II were determined by adpressing the fingers against each other. We observed external sexual characteristics (e.g., the presence of vocal sacs in males) to sex specimens. We used photographs of live animals taken by GC in the field for a description of coloration in life.

We confirmed the taxonomic position of the new species within *Scinax* based on the sequence fragment of the non-coding 16S rRNA mitochondrial gene. To compare our newly generated sequence with congeners, we considered sequences of the 16 species of *Scinax* most similar to the new species (on the basis of BLAST results across Genbank sequences), as well as the outgroup species *Scarthyla ostinodactyla* and *Sphaenorhynchus lacteus*, and the new sequences of *S. pyroinguinis* sp. nov. from central Peru (sequences for CORBIDI 24669 and 24670 were identical, so only CORBIDI 24669 was used for analyses), and of *S. garbei* (CORBIDI 17064) from Amazonian Peru, for a total of 20 terminals (Appendix 2). Extraction, amplification, and sequencing of DNA followed standard protocols (Hedges et al. 2008; Catenazzi and Ttito 2016). We used the 16Sar (forward) primer (5'-3' sequence: CGCCTGTTTATCAAAAACAT) and the 16Sbr (reverse) primer (5'-3' sequence: CCGGTCTGAACTCAGATCACGT) (Palumbi and Benzie 1991) with the following thermocycling conditions (PCR) on a Proflex PCR system (Applied Biosystems): one cycle of 96 °C/3 min; 35 cycles of 95 °C/30 s, 55 °C/45 s, 72 °C/1.5 min; one cycle 72 °C/7 min. We purified PCR products with Exosap-IT (Affymetrix, Santa Clara, CA) and obtained sequences from MCLAB (San Francisco, CA). We used Geneious, version 11.1.5 (Biomatters, http://www.geneious.com/) to align sequences with the MAFFT v7.017 alignment program (Katoh and Standley 2013), and trimmed sequences to a length of 590 bp without removing any variable fragment. We calculated p-distances using MEGA v. 7 (Kumar et al. 2016). We inferred phylogenetic relationships with a Maximum Likelihood (ML) inference approach on IQ-TREE (Nguyen et al. 2015) using the online server (http://iqtree.cibiv.univie.ac.at/), default options (ultrafast bootstrap method, 1000 bootstrap alignments), and the GTR+G+I model of evolution.

Nomenclatural act

The electronic version of this article in Portable Document Format (PDF) will represent a published work according to the International Commission on Zoological Nomenclature (ICZ), and hence the new name contained in the electronic version is effectively published under that Code from the electronic edition alone. This published work and its nomenclatural acts have been registered in ZooBank, the online registration system for the ICZN. The ZooBank LSIDs (Life Science Identifiers) can be resolved and the associated information viewed through any standard web browser by appending the LSID to the prefix http://zoobank.org/. The LSID for this publication is urn:lsid:zoobank.org:pub: D1FA19AE-F5F0-4059-A30D-094B37D1D885.

Results

Generic placement and relationships

We assign the new species to *Scinax* on the basis of our molecular phylogeny, which places with reasonable support (91% bootstrap value) the new species as a sister lineage to two clades containing *S. garbei*, and *S. rostratus* plus related species (Fig. 2). Our uncorrected p-distances (https://figshare.com/articles/figure/p-distances_Scinax/22009445) support the hypothesis that the new species is genetically different from all other species of *Scinax* for which 16S sequences are available. The sequenced species with the smallest distances are three Ecuadorian specimens of *S. garbei*; however, all three specimens have distances ~5%, which are typically associated with divergent species.

Also, externally the new species agrees with the phenotypic characteristics assigned to the members of the *Scinax rostratus* group: snout projecting beyond the mouth, a row of tubercles on the lower lip, and a conical (pointed) tubercle on the heels (Duellman 1972; Faivovich 2002).

Thus, based on genetic and morphological evidence, we assign the new species to the *S. rostratus* group sensu Faivovich (2002).

Taxonomy

Scinax pyroinguinis **sp. nov.**
https://zoobank.org/7A8F56AA-E0E8-4C7E-96BA-FFC2223F3717
Figs 3–5A, B

Type material. ***Holotype.*** Peru • Adult male; Ucayali region, Coronel Portillo province, Quebrada Agua Blanca; 8°31'38.49"S, 74°39'36.63"W; 160 m; 29 Sep. 2022; G. Chávez, W. Aznaran leg.; CORBIDI 24669 (Figs 3, 4A–D). ***Paratopotype.*** Adult male (CORBIDI 24670, Fig. 4E–H).

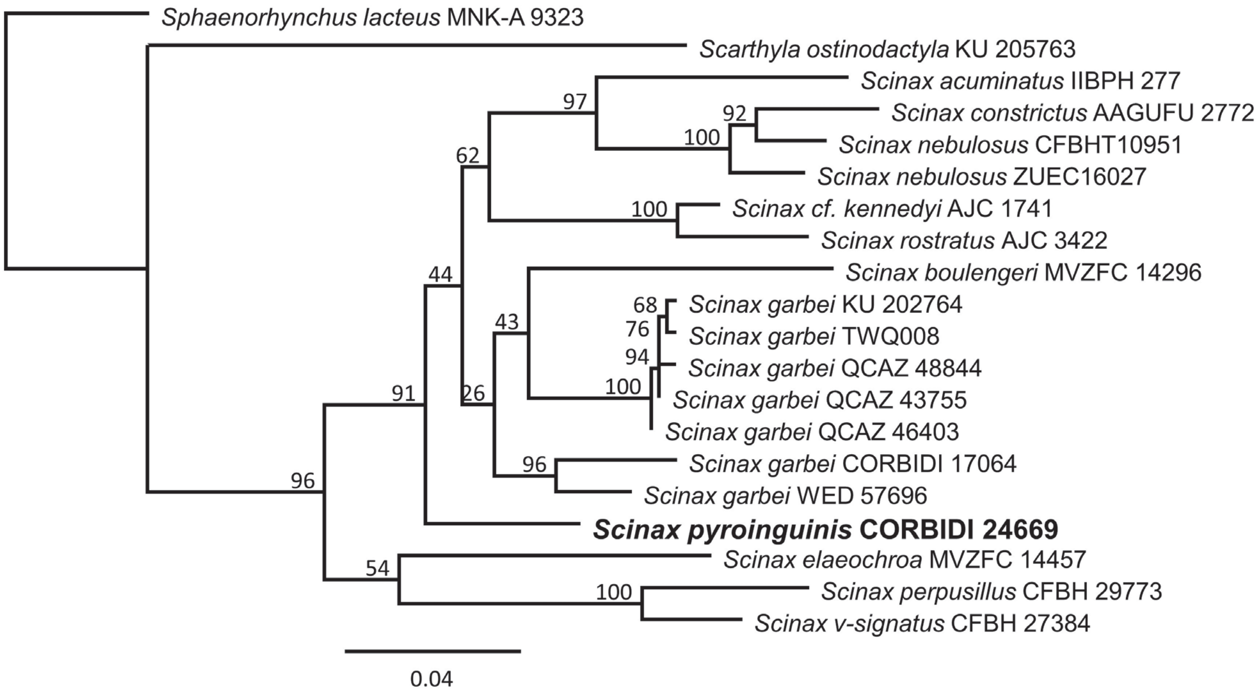

Figure 2. Maximum Likelihood consensus tree for *Scinax* (new species in bold) and related species *Scarthyla ostinodactyla* and *Sphaenorhynchus lacteus* (as outgroup terminals) included in this study based on a 590-bp fragment of the 16S rRNA gene in IQ-TREE (posterior probabilities are indicated at each node). Consensus tree was constructed from 1000 bootstrap trees (log-likelihood of consensus tree: -3243.3050, SE 139.8126). Branch lengths are optimized by maximum likelihood on original alignment.

Diagnosis. A medium-sized species of *Scinax*; SVL of males 39.4–42.0 mm (n=2), females unknown; skin on dorsum tuberculate, tubercles large, spiculated; head rounded from dorsal and lateral view; nostrils protuberant, not projected from head contour in dorsal view; upper eyelid tubercles present, large, conical; tubercles on the lower jaw present, conical; vocal sac unpigmented; row of tarsal tubercles present; heel tubercle present, large, conical; row of ulnar tubercle present; a discrete anal flap present in males; a barely visible interorbital triangular mark pointed posteriorly; a large bright orange blotch on a dark background covering groin and anterior surface of thighs, bright orange spots on dark background covering posterior surface of thighs and shanks.

Comparisons. Externally, the new species is easily differentiable from members of the *Scinax catharinae* clade and the *S. ruber* clade (except those included in the *S. rostratus* group) by having a row of tubercles on the lower jaw (see Fig. 4A, E) and a snout projecting beyond the edge of the jaws (Fig. 5). Furthermore, it can be distinguished from the species in the *S. rostratus* group by the unique combination of lacking a tubercle or fleshy flap on the tip of the snout, having a snout rounded from dorsal view, conical tubercles on the upper eyelids and heels, dorsum skin strongly tuberculate, and having large bright orange blotches covering the groin, posterior surface of thighs and shanks (Figs 4, 5A, B). Specifically, *Scinax pyroinguinis* can be differentiated from *S. boulengeri* by having a head rounded from dorsal view (vs acuminate), nostrils not projected over the snout border on dorsal view (vs projected), and large conical tubercles on the heels (vs small); from *S. constrictus* by having a longer size with a maximum SVL in males (n = 2) of 42.2 mm (vs 28.4 mm), a head acutely rounded in dorsal view (vs pointed), and nostrils not projected over the snout border in dorsal view (vs projected); from *S. garbei* by having skin on dorsum tuberculate (vs smooth with scattered tubercles), a rounded head from dorsal view (vs acuminate), and nostrils not projected over the snout border in dorsal view (vs projected); from *S. jolyi* by having a rounded head from dorsal view (vs acuminate), nostrils not projected over the snout border in dorsal view (vs projected), a row of large conical tubercles on the lower jaw (vs absent), and large conical tubercles on the heels (vs small, low tubercles); from *S. kennedyi* by having skin on dorsum tuberculate (vs smooth), a row of large conical tubercles on the lower jaw (vs absent), large conical tubercles on the heels (vs small low tubercles); from *S. nebulosus* by having a longer size with a maximum SVL in males (n = 2) of 42.2 mm (vs 30 mm), a rounded head from dorsal view (vs acuminate), nostrils not projected over the snout border in dorsal view (vs projected), and lacking of tubercles on the tip of the snout (vs tubercle present); from *S. pedromedinae* by having a longer size with a maximum SVL in males (n = 2) of 42.2 mm (vs 29 mm), a rounded head from dorsal view (vs acuminate), nostrils not projected over the snout border in dorsal view (vs projected), and large conical tubercles on the upper eyelid (vs absent); from *S. proboscideus* by having a rounded head from dorsal view (vs pointed), a row of large conical tubercles on the lower jaw (vs small law tubercles), lacking a fleshy proboscis on the tip of the snout (vs present); from

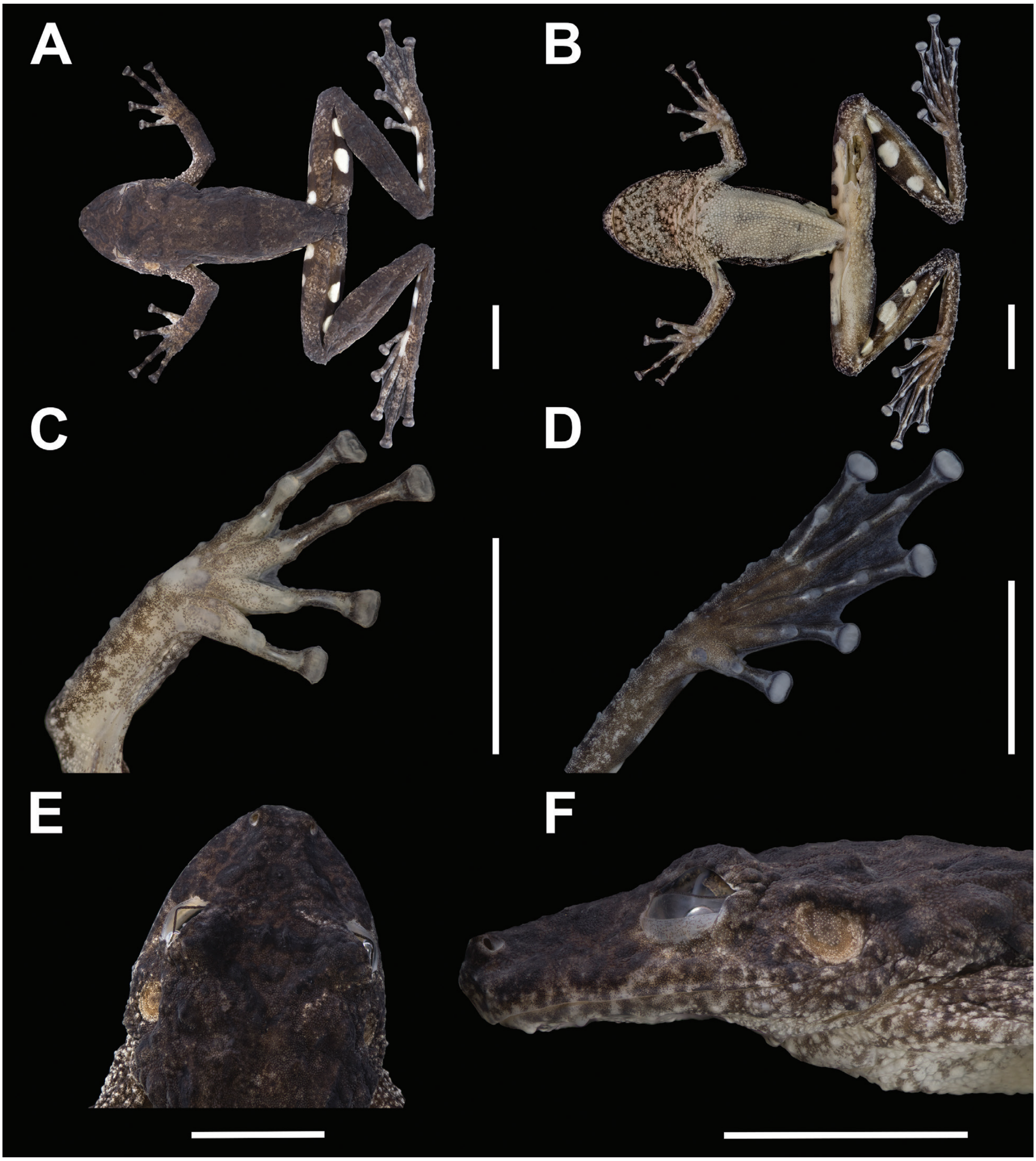

Figure 3. Preserved male Holotype (CORBIDI 24669, SVL = 42.0 mm) of *Scinax pyroinguinis* sp. nov. **A.** Dorsal view of the body; **B.** Ventral view of the body; **C.** Ventral view of the right hand; **D.** Ventral view of the right foot; **E.** Dorsal view of the head; **F.** Lateral view of the head. Scale bar: 10 mm.

S. rostratus by having the skin on dorsum tuberculate (vs smooth with a few tubercles), a rounded head from dorsal view (vs acutely rounded), a row of large conical tubercles on the lower jaw (vs absent), and large conical tubercles on the heels (vs absent); finally from *S. sugillatus* by having a rounded head from dorsal view (vs acuminate), nostrils not projected over the snout border in dorsal view (vs projected), and lacking of tubercles on the tip of the snout (vs tubercle present). Moreover, *Scinax pyroinguinis* resembles *S. acuminatus* externally, but it can be distinguished by having a snout extending beyond the edge of the jaw (vs snout not projected beyond the jaws), a rounded head from dorsal view (vs acuminate), a row of large conical tubercles on the lower jaw (vs absent), conical tubercles on the heels (vs absent), and groin and posterior surface of thighs bright orange on a dark background (vs bluish-gray groins with black bands on the posterior surface of thighs).

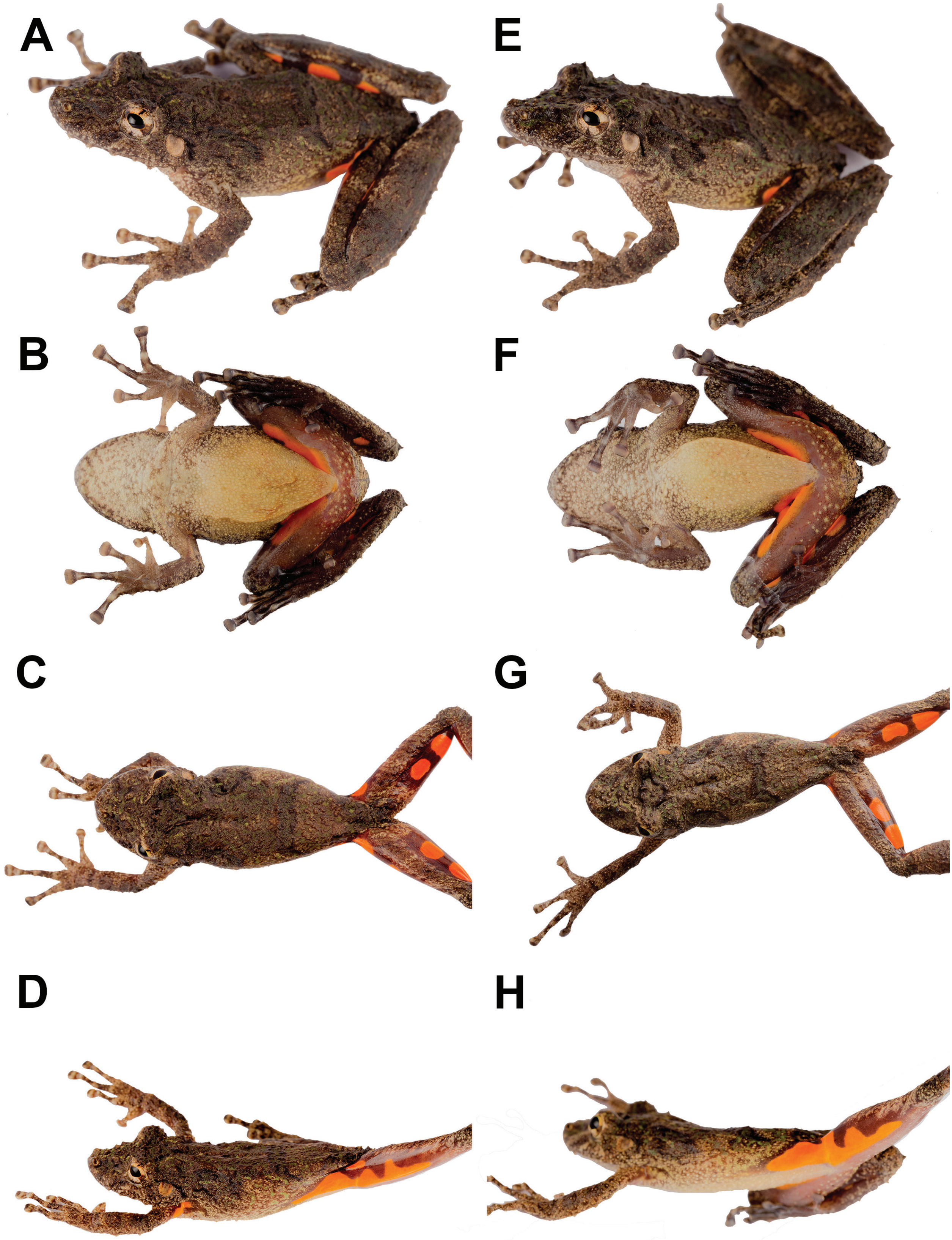

Figure 4. Color pattern of the type series of *Scinax pyroinguinis* sp. nov. in life. **A–D.** Holotype (CORBIDI 24669, SVL = 42 mm); **E–H.** Paratopotype (CORBIDI 24700, SVL = 39.4 mm).

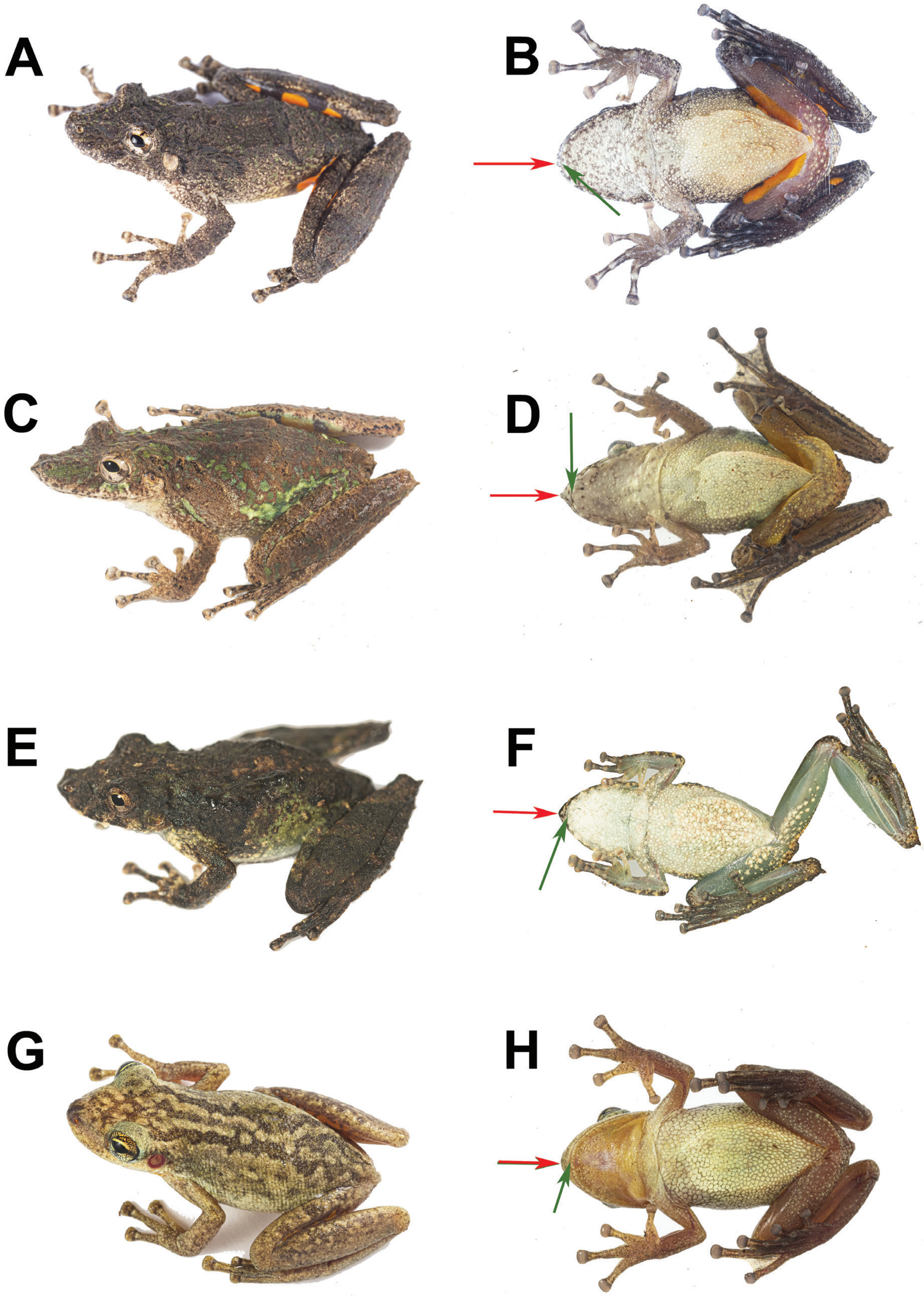

Figure 5. Dorsal (left column) and ventral (right column) coloration in life of some species of the *Scinax rostratus* group (**A–F**) vs a representative of the *Scinax ruber* clade not included in the *S. rostratus* group (**G–H**). **A, B.** *Scinax pyroinguinis* sp. nov.; **C, D.** *Scinax garbei* (SINCHI 00712), E–F) *Scinax pedromedinae* (CORBIDI 18210); **G, H.** *Scinax ruber* (SINCHI 00416). Arrows show the differences between the edge of the maxilla and the tip of the snout. Green arrows pointed on the maxillary edge; Red arrows pointed on the tip of the snout.

Description of the holotype. Head slightly longer than wide (HW/HL = 0.95, HL = 36% of SVL, HW = 35% of SVL); snout elongate, rounded in dorsal view (Fig. 3E) and acutely rounded in lateral view (Fig. 3F); nostrils not projected from head contour in dorsal view, projected in lateral view; canthus rostralis concave from dorsal view; ED 52% of END, 22% of HL, 23% of HW; internarial region depressed; upper eyelid conical tubercle present, higher than rest of tubercles on the same region; tympanum evident, circular, 87% of ED; supratympanic fold evident; tongue slightly cordiform, free behind; vomerine teeth in two small groups between choanae; single subgular vocal sac; five tubercles along the edge of the lower jaw at each side. Upper arm robust, with 3 tubercles on outer side; fingers size I<II~IV<III (Fig. 3C); fingers I to IV basally webbed; nuptial pads absent; outer metacarpal tubercle cordiform, inner metacarpal tubercle oval; subarticular tubercles rounded; finger discs wider than long; toes size I<II<V~III<IV (Fig. 3D). Hind limb long; tibia longer than femur, TL 61% of SVL, THL 50% of SVL; FL 45% of SVL; foot webbing formula I 2-2+ II 1-1+ III 0-2- IV 2–0 V; inner metatarsal tubercle rounded, the outer with ⅔ the size of the inner; subarticular tubercles rounded; supernumerary tubercles discrete on hands and feet; outer margin of tarsus with a ridge of tubercles; calcar tubercle conical; a discrete anal flap formed by two enlarged tubercles; a dermal groove from the cloaca to the center of ventral surface of thighs. Skin of dorsum and head tuberculate with many small ridges, conical and rounded tubercles; flanks and shoulders shagreened with numerous smaller tubercles; body not bearing any constriction; dorsal surfaces of arms and legs with scattered tubercles; venter areolate; throat granular; ventral surfaces of legs and arms smooth.

Coloration of the holotype in life (Fig. 4A–D). Background coloration of dorsal surfaces of head, body, and limbs dark brown with olive-green fine blotches. Dorsal pattern consisting of a greenish-brown triangle-like interorbital mark pointed distally, loreal region darker, numerous greenish brown blotches distributed randomly on dorsal surfaces of limbs. Fingers and toes brown, distal surfaces of disc brown with cream bars or blotches; toe webbing creamy yellow with brown reticulations. Axillary region dark brown with a bright orange blotch; flanks creamy yellow with brown reticulations; groins dark brown with a large irregular bright orange blotch that reaches the medial part of the anterior surface of thighs, the right with a small orange spot above the blotch; posterior surfaces of thighs dark brown with two large bright orange spots; posterior surface of shanks and tarsus dark brown with bright orange blotches. Throat and chest creamy yellow with brown reticulations; belly creamy yellow. Ventral surfaces of hands brown; supernumerary tubercles cream; ventral surface of feet dark brown. Iris creamy yellow with a brown transversal stripe crossing the iris horizontally, uncomplete vertical black stripes above and below the pupil, and some fine black reticulations above and below the pupil.

Coloration of the holotype in alcohol (Fig. 3). Dorsal surfaces of head, body, and limbs dark brown; throat and chest creamy white with brown reticulations; belly and ventral surface of limbs creamy white. Groins, axilla, posterior surface of thighs and shanks dark brown with white blotches or large spots.

Variation. Paratype CORBIDI 24670 shows a greener canthus rostralis and paler dorsum. Also, it has a more reticulated iris. Variation in body measurements and proportions are given in Table 1.

Table 1. Measurements (in mm) and proportions of the type series of *Scynax pyroinguinis* sp. nov.

	CORBIDI 24669	CORBIDI 24670
Sex	Male	Male
SVL	42	39.4
HW	14.77	13.51
HL	15.5	15.41
ED	3.44	3.32
TD	3	2.88
IOD	4.32	4.06
END	6.61	5.78
NSD	1.22	1.12
IND	3.12	3.05
THL	20.97	20.62
TBL	25.45	24.35
FL	19.15	17.9
HL/SVL	0.37	0.39
HW/SVL	0.35	0.34
HW/HL	0.95	0.88
END/HL	0.43	0.38
NSD/HL	0.08	0.07
THL/SVL	0.50	0.52
TBL/SVL	0.61	0.62
FL/SVL	0.46	0.45

Etymology. The specific epithet *pyroinguinis* is an adjective that means "groins of fire", and is formed from the combination of the Greek prefix "pyro" (=fire) and the Latin name "inguen" (=groin). The name refers to the striking orange blotched groins of the new species which remind us the flames of the wildfires threatening its habitat.

Distribution and natural history. *Scinax pyroinguinis* sp. nov. is only known from the type locality, in the Ucayali River basin (Fig. 2). The type locality is a remnant patch of forest surrounded by farms where vegetation has been burnt or converted to pastures (Fig. 6A, B). Vegetation in the area is represented primarily by cecropia trees (*Cecropia* spp.) up to 15 m tall, scattered bushes, and ferns. The ground is well covered by leaf litter and some fallen trunks, also some epiphytes and lichens are present on trunks. A 3 m width stream bordering the edge of the forest has banks covered by clay or sand (Fig. 6A). We observed individuals of *S. pyroinguinis* perched on leaves of bushes along the stream and at the edge of the forest, about 1 m above the ground, at night. During our fieldwork, we did not notice any calls and our search for tadpoles was unsuccessful. Additionally, we observed the following sympatric species: *Boana lanciformis*, *B. cinerascens* and *S. ruber*.

Figure 6. Habitat of *Scinax pyroinguinis* sp. nov. **A.** Wildfire in the vicinity of the type locality during our fieldwork; **B.** Stream and surrounding vegetation in Quebrada Blanca, where specimens of the new species were caught; Ucayali, central Peru. Photos by: **A** Luis A. García-Ayachi; **B** Pavel Cartagena.

Discussion

In spite of having only two specimens, genetic and morphological evidence support our description and confirm *Scinax pyroinguinis* sp. nov. as a new taxon. Our phylogenetic tree (Fig. 2) shows that *S. pyroinguinis* forms a well-supported (91%) single lineage, sister to a greater clade that contains members of the *S. rostratus* group plus *S. acuminatus*. Our analysis of the external morphology of the new species also supports its inclusion in the *S. rostratus* group. Additionally, the phylogenetic tree (Fig. 2) suggests that *S. pyroinguinis* might be the most basal member of the group, but further studies increasing the terminals are needed to confirm its position in the *S. rostratus* group.

In the past, *S. acuminatus* has been suggested as closely related to the *Scinax rostratus* group (Faivovich 2002). Here we can confirm with high genetic support that the population of *S. acuminatus* we used in our analysis (GenBank accession number KJ004189 from Ñeembucu, southwestern Paraguay) does belong to the *S. rostratus* group. However, since its type locality was not mentioned in the original description and its geographic range includes eastern Bolivia, southern Brazil, northern Argentina and Paraguay (Boulenger 1889; Köhler and Böhme 1996; Magrini et al. 2011; Weiler et al. 2013), we are not able to assign *S. acuminatus sensu lato* to the *S. rostratus* group. Thus, increasing the genetic samples for *S. acuminatus* covering its entire distribution range is necessary to complete this picture.

A potential hidden diversity within *Scinax garbei* has been previously noticed (Lopes et al. 2020). Our genetic analysis found that samples of *S. garbei* from lower Madre de Dios river (WED 57696) and lower Kosñipata Valley (CORBIDI 17064), both localities in the Amazon rainforest at southern Peru, form a different lineage, sister to the samples of *S. garbei* from Ecuadorian Amazon (QCAZ 43755, 46403, 48844; TWQ 008, KU 202764), far northern than the aforementioned Peruvian samples. This finding does confirm what was suggested by Gomes-Lopes et al. (2020) that the populations from Ecuador might be considered taxonomically different from those of southern Peru. Also, Lopes et al. (2020) noticed that one of the available names for populations of *S. garbei* in southern Peru is *S. epacrorhyna*, a species described by Duellman (1972) and later synonymized with *S.garbei* by Duellman and Wiens (1973). Duellman and Wiens (1973) considered the morphological characters of *S. epacrorhyna* as a geographic variation of *S. garbei*. Although our results support the hypothesis that populations from southern Peru might be considered a different taxon, an integrative approach (acoustic data, updated morphological revisions and genetic samples from type specimens) is needed to assign a name and clarify the taxonomic status, Ecuadorian and Peruvian populations.

The type locality of *S. pyroinguinis* is on the western side of the middle basin of the Ucayali river, one of the largest tributaries of the Amazon river (Fig. 1). The middle Ucayali river has been mentioned as a geographic barrier for birds (Harvey et al. 2014), yet the dispersal of amphibians across river sides (Marin da Fonte et al. 2019) could play a role in the distribution of the new species. Even though the presence of *S. pyroinguinis* on the eastern side of the Ucayali river has not been confirmed, more fieldwork is needed to confirm its occurrence on both sides of the Ucayali river.

Despite having collected only two individuals, our field sampling and comparisons with populations of sympatric species suggest that *Scinax pyroinguinis* is an uncommon species in the area. Indeed, we have obtained these two individuals after having completed 108 person-days of herpetological survey between 2021–2022. Also, the patch of forest where *S. pyroinguinis* lives is under pressure from wildfires (Fig. 6) caused by farmers who try to expand their pastures or clean the ground for agriculture. These fires occur mostly in the dry season and are illegal in Peruvian territory. However, environmental policies from the government have been largely ineffective and have not prevented the loss of forest territories in the Amazon (Eufemia et al. 2022). For instance, an update of the levels of deforestation caused by wildfires around the type locality gives a critical scenario where 273 fire alerts have been displayed over the last year (2022–2023, Watch GF 2015) and where the deforested area between 2011–2021 is 3130 km^2 (Watch GF 2015). Furthermore, as Fig. 1 shows, the new species inhabits a very fragmented landscape where the forest covers about 655 km^2 of the land. Finally, since cases of microendemism in *Scinax* frogs are not known, we believe that the presence of *S. pyroinguinis* on the eastern side of the Ucayali River is probable. Thus, following the IUCN criteria, based on the presence of the new species in a very fragmented habitat that faces increasing deforestation every year, and the absence of data on its distribution, ecology and population status, we suggest the new species be placed into the Near Threatened (NT) category of the IUCN red list.

Acknowledgements

We thank the two reviewers who helped us improve this manuscript. Our genetic analyses were performed thanks to the support of the Global Genome Initiative Awards Program of the Global Genome Biodiversity Network (GGBN). Our fieldwork would not have been possible without the support of Bosques Amazonicos del Peru (BAM). GC, WA, and LAGA thank CORBIDI and PASKAY S.A.C. for the logistic help in the field. Finally, we want to thank Oscar Castillo who helped us greatly during our fieldwork.

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Appendix 1

Specimens examined

Scinax garbei. ECUADOR: SUCUMBIOS: Provincia Sucumbios, Cuyabeno, CORBIDI 0008. PERU: CUSCO: Provincia La Convención, Comunidad Nativa Chokoriari, CORBIDI 8040-43, Comunidad Nativa Camisea CORBIDI 11181, 11224; Provincia Paucartambo, Kosñipata, Pillcopata, AMNH 85382, CORBIDI 17064, KU 139242–43, 139245; Rio Entoro, CN Qeros, MHNG 2607.28. HUÁNUCO: Provincia Puerto Inca, Serranía del Sira, CORBIDI 14421. LORETO: Provincia Datem del Marañon, Comunidad Nativa Nuevo Andoas, CORBIDI 1037, 6453, 6455, 6483, 6487; Provincia Maynas, Redondococha, CORBIDI 0056, 0059; Provincia Requena, Parque Nacional Sierra del Divisor, CORBIDI 2135, 2144. MADRE DE DIOS: Provincia Manu, Los Amigos Conservation Concession, MUSM 24281–82, Concesion Forestal Inambari, CORBIDI 13430; Provincia Tambopata, Alrededores de Puerto Maldonado CORBIDI 5169.

Scinax pedromedinae. PERU: LORETO: Provincia Requena, Parque Nacional Sierra del Divisor, CORBIDI 2142. MADRE DE DIOS: Provincia Manu, Los Amigos Conservation Concession, MUSM 24322, 24325; Concesion Forestal Inambari, CORBIDI 13435; Provincia Tambopata, Lago Tres Chimbadas, CORBIDI 5211.

Scinax ruber. ECUDADOR: Sucumbios: Provincia Sucumbios, Cuyabeno CORBIDI 0136. PERU: CUSCO: Provincia La Convención, Comunidad Nativa Kotsiri, CORBIDI 335-36, Comunidad Nativa Alto Shima CORBIDI 9701, 9707, Comunidad Nativa Puyantimari, CORBIDI 9761, Comunidad Nativa Camisea, CORBIDI 10007-09, 11221; Provincia Paucartambo, Kosñipata, Atalaya, KU 154729, 154731–32; Pillcopata, KU 139241; Radiochaylloc, MUSM 21080, MHNG 2607.14. HUÁNUCO: Provincia Leoncio Prado, Parque Nacional Tingo Maria, CORBIDI 15589. JUNÍN: Provincia Chanchamayo, Fundo La Génova, CORBIDI 9877. LORETO: Provincia Datem del Marañon, Comunidad Nativa Nuevo Andoas, CORBIDI 1052, 5041; Provincia Maynas, Aguas Negras CORBIDI 244; Provincia Requena, Parque Nacional Sierra del Divisor, CORBIDI 2125, 2130. MADRE DE DIOS: Provincia Manu, Los Amigos Conservation Concession, MUSM 24298–99, 24330; Concesion Forestal Inambari, CORBIDI 13449, 13468.

Appendix 2

Table A1. Genbank accession numbers.

Species	Specimen	Accession code
Scarthyla ostinodactyla	KU 205763	AY326035
Scinax acuminatus	IIBPH 277	KJ004189
Scinax boulengeri	MVZFC 14296	AY843755
Scinax constrictus	AAGUFU 2772	MK503374
Scinax elaeochroa	MVZFC 14457	AY843757
Scinax garbei	CORBIDI 17064	OQ888803
Scinax garbei	KU 202764	AY326033
Scinax garbei	QCAZ 46403	MH662482
Scinax garbei	QCAZ 48844	MH662483
Scinax garbei	QCAZ 43755	MH662501
Scinax garbei	TWQ 008	ON907637
Scinax garbei	WED 57696	DQ283030
Scinax cf. *kennedyi*	AJC 1741	KP149408
Scinax nebulosus	CFBHT 10951	KJ004190
Scinax nebulosus	ZUEC 16027	MK503370
Scinax perpusillus	CFBH 29773	JN099996
Scinax pyroinguinis	CORBIDI 24669	OQ883950
Scinax pyroinguinis	CORBIDI 24670	OQ883951
Scinax rostratus	AJC 3422	KP149284
Scinax v-signatus	CFBH 27384	MK266761
Sphaenorhynchus lacteus	MNK-A 9323	JF790143