Zootaxa 5757 (4): 301–323
https://www.mapress.com/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.5757.4.1
http://zoobank.org/urn:lsid:zoobank.org:pub:63195930-D16A-44BE-971F-3EE7F891BF34

A new species of *Pristimantis* (Anura: Craugastoridae) from the western slopes of the Serranía del Baudó, Chocó, Colombia

ESTEBAN GARZÓN-FRANCO[1,2,3], JUAN-P. DURANGO[1], JHON JAIRO OSPINA-SARRIA[4] & JUAN C. ARREDONDO[5,*]

[1]*Área de Sistemas Naturales y Sostenibilidad, Departamento de Ciencias Biológicas, Escuela de Ciencias Aplicadas e Ingeniería, Universidad EAFIT, Medellín, Colombia.*
esteban-garzon@hotmail.com; https://orcid.org/0000-0001-5467-7891
jdurangocardona@gmail.com; https://orcid.org/0000-0003-3705-9834
[2]*Museo de Ciencias Naturales de La Salle del Instituto Tecnológico Metropolitano, Medellín, Colombia.*
[3]*Maestría en Ciencias Biológicas, Facultad de Ciencias Agropecuarias y Naturales, Universidad CES, Medellín, Colombia.*
[4]*Calima, Fundación para la Investigación de la Biodiversidad y Conservación en el Trópico, Cali, Colombia*
jhon.sarria@fundacioncalima.org; https://orcid.org/0000-0002-9099-7793
[5]*Colecciones Biológicas, Grupo de Investigación Biología CES, programas de Ecología y Biología, Universidad CES, Medellín, Colombia.*
[*]*Corresponding author. jarredondo@ces.edu.co; http://orcid.org/0000-0003-1925-4556*

Abstract

We describe a new species of *Pristimantis* based on morphological and acoustic evidence from the western slopes of the Serranía del Baudó, tentatively assigned to the *Pristimantis ridens* species group. The new species can be distinguished from congeneric species by having coppery or reddish bronze iris, with fine black reticulations and light blue sclera, upper eyelid bearing one to three subconical tubercles, posterior surfaces of thighs generally solid brown, with small cream specks present in a few cases and groin solid brown, with some individuals showing a cream or golden blotch. Moreover, this new species distribution is notably distant from the other most similar species, inhabiting the humid lowland tropical forests of the western slopes of the Serranía del Baudó. With the description of this new species, the *Pristimantis ridens* species group reaches 31 species, that can be found in the Andean and Pacific regions from Central America to northern Peru.

Keywords: Bioacoustics, Biogeographical Chocó, *Pristimantis ridens* species group, Taxonomy

Resumen

Describimos una nueva especie de *Pristimantis* de las laderas occidentales de la Serranía del Baudó, a partir de evidencias morfológicas y acústicas, asignada tentativamente al grupo de especies *Pristimantis ridens*. La nueva especie puede distinguirse de las especies congéneres por tener el iris cobrizo o bronce rojizo, con finas reticulaciones negras y esclerótica azul claro, el párpado superior con uno a tres tubérculos subcónicos, las superficies posteriores de los muslos generalmente marrón sólido, con pequeñas motas crema presentes en unos pocos casos y la ingle marrón sólido, con algunos individuos mostrando una mancha crema o dorada. Además, la distribución de esta nueva especie es notablemente distante de la de las otras especies más similares, habitando los bosques tropicales húmedos de tierras bajas de las laderas occidentales de la Serranía del Baudó. Con la descripción de esta nueva especie, el grupo de especies de *Pristimantis ridens* alcanza las 31 especies, que pueden encontrarse en las regiones andinas y del Pacífico desde América Central hasta el norte de Perú.

Palabras clave: Bioacústica, Chocó Biogeográfico, Grupo de especies *Pristimantis ridens*, Taxonomía

Introduction

Colombia is the home of more than 860 species of amphibians, of which near 280 belong to the superfamily Brachycephaloidea (Frost 2024). Currently, this superfamily contains five families: Brachycephalidae,

Accepted by M. Rivera-Correa: 12 Dec. 2025; published: 9 Feb. 2026

Ceuthomantidae, Craugastoridae, Eleutherodactylidae and Strabomantidae, with species of the last three occurring in Colombia (Hedges *et al.* 2008; Heinicke *et al.* 2009; Barrientos *et al.* 2021; Frost 2024). Strabomantidae is the most diverse family of brachycephaloid frogs in Colombia with 267 described species, of which 227 belong to the genus *Pristimantis* Jiménez de la Espada, 1870 (Frost 2024). So far, around 36 species of *Pristimantis* are found in the Pacific mid and lowlands of the Biogeographic Chocó of Colombia (Acosta-Galvis *et al.* 2020; Reyes-Puig *et al.* 2020; Duarte-Marín *et al.* 2022).

Pristimantis is currently composed of 603 species (Frost 2024), of which many are proposed to be part of species groups that correspond to evolutionary closeness (Hedges *et al.* 2008; Padial *et al.* 2014). The *Pristimantis ridens* group, a member of the subgenus *Hypodictyon*, is one of these infrageneric units (Hedges *et al*. 2008; Pyron & Wiens 2011; Pinto-Sánchez *et al*. 2012; Padial *et al*. 2014). Nowadays, the *Pristimantis ridens* group (*sensu* Hedges *et al.* 2008 and Reyes-Puig *et al.* 2020), contains 30 recognized species: *Pristimantis adnus* Crawford *et al.* 2010; *P. almendariz* Brito & Pozo-Zamora 2013; *P. bicolor* (Rueda-Almonacid & Lynch 1983); *P. calcaratus* (Boulenger 1908); *P. caryophyllaceus* (Barbour 1928); *P. carylae* Rivera-Correa *et al.* 2021; *P. campesino* Sepúlveda-Seguro *et al.* 2022; *P. cerasinus* (Cope 1875); *P. cisnerosi* Reyes-Puig *et al.* 2020; *P. colomai* (Lynch & Duellman 1997); *P. cremnobates* (Lynch & Duellman 1980); *P. cruentus* (Peters 1873); *P. educatoris* Ryan *et al.* 2010; *P. erythropleura* (Boulenger 1896); *P. factiosus* (Lynch & Rueda-Almonacid 1998); *P. ferwerdai* Amézquita *et al.* 2019; *P. gretathunbergae* Mebert *et al.* 2022; *P. jubatus* (García & Lynch 2006); *P. kelephus* and *P. sanguineus* (Lynch 1998); *P. laticlavius* (Lynch & Burrowes 1990); *P. latidiscus* (Boulenger 1898); *P. museosus* (Ibáñez *et al.* 1994); *P. orpacobates* (Lynch, Ruiz-Carranza, & Ardila-Robayo 1994); *P. postducheminorum* Palacios-Rodríguez *et al*. 2022; *P. penelopus* and *P. viejas* (Lynch & Rueda-Almonacid 1999); *P. ridens* (Cope 1866); *P. rosadoi* (Flores 1988); *P. satagius* (Lynch 1995); *P. variabilis* (Lynch 1968).

Through an extensive sampling effort in a region of the Colombian Chocó lowlands we collected specimens that morphologically resembles the Andean species *P. campesino* and *P. viejas*. Based on morphological and acoustic evidence, we found that these specimens exhibit a unique combination of characters that leads us to describe them as a new species of *Pristimantis* from the western slopes of the Serranía del Baudó, Chocó, Colombia and, tentatively, we assigned it to the *Pristimantis ridens* species group.

Materials and Methods

Fieldwork

We conducted several field trips between 2017 and 2022 in primary and secondary humid lowland tropical forests in three different localities (Jardín Botánico del Pacífico —JBP—, Cerro Chulé, and Pakoré Wera) in the municipality of Bahía Solano in Chocó, Colombia. We found the individuals through the Visual Encounter Surveys methodology (Crump & Scott 1994), which was conducted along transects defined near the edge of streams and within forests, considering most of the microhabitats in the surveyed areas. Each survey was conducted by two to four people, with sampling generally taking place between 16:00 and 22:00 hours. Once individuals were captured by hand, we transported them to the campsite, where they were photographed in life, subsequently euthanized with 2% lidocaine, fixed in 10% formalin, and preserved in 70% ethanol following Pisani (1973) and McDiarmid (1994). We took coordinates and elevations in the field using an etrex 20x and GPSMAP 64s Garmin GPS, datum WGS84.

Morphological analysis

We compare the new species with the species in the *Pristimantis* (*Hypodictyon*) *ridens* group defined by Hedges *et al.* (2008) and updated by Reyes-Puig *et al.* (2020), as well as with other sympatric and similar species of *Pristimantis*. We followed Lynch & Duellman (1997) for the definitions and terminology, and Duellman & Lehr (2009) for the standardized format for diagnoses. We determinate sex and age of each specimen by examination of external secondary sexual characters (vocal slits and nuptial pads) and by direct inspection of gonads. We measured each specimen of the type series with a digital caliper (~ 0.1 mm) under a dissecting stereo microscope for the following morphometric variables: Snout–vent length (SVL), head length (HL), head width (HW), eye diameter (ED), upper eyelid width (UE), interorbital distance (IOD), eye–nostril distance (END), nostril to tip of snout

distance (NSD), internarial distance (IND), distance between anterior margins of eyes (AMD), tympanum diameter (TD), forearm length (FAL), forearm breadth (FAB), hand length (HAL), thigh length (THL), tibia length (TL), tarsal length (TAL), foot length (FL), third finger disk diameter (TFD) and fourth toe disk diameter (FTD). For subarticular tubercles notation, we adopted the proposal of Lynch (1999) as modified for general use by Ospina-Sarria & Duellman (2019). For occurrence of discs on fingers, we followed Ospina-Sarria & Grant (2021). We numbered fingers pre- to postaxially from I to IV to facilitate comparison with previous anuran literature (but see Fabrezi & Alberch 1996). To compare the lengths of toes III and V, we adpressed both against Toe IV; and for the lengths of fingers I and II, we appressed one against the other. We based the description of the coloration in life on digital photographs of specimens, and the natural history data from field notes of the authors.

The type series of the new species that we described here are housed at the Amphibians collection of the Universidad EAFIT Biological Collections (EAFIT-Am) and in the Herpetology collection of the Universidad CES Biological Collections (CBUCES-D), both in Medellín, Antioquia, Colombia. Other museum acronyms follow Sabaj (2020) and Frost (2024). Examined specimens and acoustic recordings are listed in Appendix 1. Amphibian taxonomy follows Frost (2024).

Advertisement Call

We recorded three individuals under field conditions from the population of JBP, of which one was collected (EAFIT-Am 0212). We recorded in mono mode, at a 44.1 kHz of sampling frequency and 24–bit precision, employing a Zoom H5 digital recorder with a coupled Rode NTG 2 shotgun microphone, which we placed at approximately 50 – 100 cm from each of the recorded specimens. We could not take temperature and humidity data. For the analysis of the calls, we used Raven Pro software version 1.6.4 (Bioacoustics Research Program 2023), applying a Hann window with 50% overlap and a DFT size of 512 samples. We used the note–centered approach (defining uninterrupted units of sound as notes and their entirety as call) and the terms and definitions for the acoustic parameters defined by Köhler *et al.* (2017). We deposited the acoustic recordings of the new species in the OcainaCua Sound Bank (BSOC) from the Museo de Ciencias Naturales de La Salle (CSJ).

We measured the temporal features of the call (call duration, note duration, and inter–note interval) in the oscillograms, and spectral features in the power spectra diagrams (dominant frequency, low frequency, and high frequency), which we measured at 10 dB below the peak intensity of the dominant call frequency. We used the *Seewave* package version 2.1.5 (Sueur *et al.* 2021) implemented in the R software version 4.2.2 (R Core Team 2023), to obtain the oscillogram and spectrogram graphs. We imported the audio files in WAV format and generated the graphics using a Hanning window type with 90% overlap, a Fast Fourier transform (FFT) window length of 512 samples. We described the advertisement call with sounds of the three specimens, but we made the graphics with the call of the voucher individual. Acoustic parameters are given as range (mean ± SD; sample size employed for each parameter). We employed bioacoustics information from *P. campesino*, *P. colomai, P. cruentus, P. erythropleura, P. taeniatus* and *P. viejas* from Bernal *et al.* (2004), Salvador & Cossel (2016), Valencia-Zuleta *et al.* (2016), Duarte-Marín & Arango-Ospina (2019), Sepúlveda-Seguro *et al.* (2022), Arias *et al*. (2023), Falcón-Espitia *et al.* (2023), and Londoño-Quiceno & Gutiérrez-Cárdenas (2023).

Results

The individuals of the new species agree with the morphological definition of the genus *Pristimantis* provided by Hedges *et al.* (2008). Given its alignment with all morphological criteria outlined by Hedges *et al.* (2008) and Reyes-Puig *et al.* (2020), we tentatively propose assigning the new species to the *Pristimantis* (*Hypodictyon*) *ridens* group. Based in the following shared characteristics: a small to moderate size (males SVL 16 – 32.5 mm), with proportionally short limbs; cranial crests usually absent; tympanic membrane and annulus usually differentiated; texture on dorsum variable and venter coarsely areolate; expanded digital disks; Toe V longer than Toe III, toe webbing absent; supernumerary tubercles on fingers and toes absent; fold or elongated tubercle usually present on the inner surface of tarsus, lateral fringes usually present. Vocal slits and nuptial pads present or absent (Hedges *et al.* 2008; Crawford *et al.* 2010; Reyes-Puig *et al.* 2020). We describe this new species below.

Species description

Pristimantis mecada sp. nov.
(Table 1, Figs 1–7)

Holotype: EAFIT-Am 0050 (field number JCA-926), an adult female from Colombia, department of Chocó, municipality of Bahía Solano, corregimiento of Mecana, Jardín Botánico del Pacífico Nature Reserve (6.263438, -77.3753888; 115 m asl; Fig. 1), collected by EGF, X. Rueda and JCA on April 3, 2017 (Figs. 2–4).

TABLE 1. Morphometric measurements (in mm) from the holotype (EAFIT-Am 0050, adult female), and ranges and body ratios (in percentage) from the paratypes of *Pristimantis mecada*. Values are given as range (mean ± SD).

Trait	Holotype	Males ♂ (n = 21)	Females ♀ (n = 11)
SVL	26.2	15.5–21.3 (18.8±1.4)	18.4–31.0 (26.0±3.9)
HL	11.9	6.4–8.9 (7.8±0.6)	7.8–12.8 (10.8±1.4)
HW	11.2	6.0–8.4 (7.1±0.6)	6.9–12.0 (10.1±1.5)
ED	4.3	2.1–3.4 (2.8±0.4)	2.7–3.8 (3.5±0.3)
END	3.2	1.8–2.7 (2.4±0.2)	2.5–4.1 (3.5±0.4)
NSD	1.2	0.6–1.1 (0.8±0.1)	0.9–1.6 (1.2±0.2)
IOD	3.1	1.6–2.6 (2.2±0.3)	2.3–3.5 (2.9±0.3)
UE	2.9	1.7–2.5 (2.0±0.2)	2.0–3.1 (2.6±0.4)
IND	2.4	1.5–2.1 (1.8±0.2)	1.7–2.6 (2.3±0.2)
AMD	5.8	3.0–4.6 (4.0±0.4)	4.1–6.2 (5.3±0.7)
TD	1.5	0.7–1.1 (0.9±0.1)	0.8–1.6 (1.2±0.2)
FAL	6.4	3.5–4.8 (4.4±0.4)	4.6–7.0 (5.8±0.7)
FAB	1.9	0.9–1.5 (1.2±0.2)	1.1–2.4 (1.8±0.4)
HAL	7.5	4.1–6.0 (5.3±0.5)	4.8–8.5 (7.4±1.1)
THL	14.0	7.6–11.1 (9.6±0.9)	10.0–15.2 (13.1±1.5)
TL	15.9	9.3–12.8 (11.3±0.9)	11.2–17.1 (15.1±1.5)
TAL	8.0	4.5–6.9 (5.7±0.6)	5.0–8.7 (7.5±1.0)
FL	13.1	6.3–9.9 (8.8±0.9)	8.3–13.6 (12.1±1.5)
TFD	1.7	0.5–0.9 (0.8±0.1)	0.5–1.5 (1.1±0.3)
FTD	1.3	0.4–0.9 (0.7±0.2)	0.7–1.5 (1.1±0.3)
HL/SVL	45.4	38.4–44.5	39.7–45.1
HW/SVL	42.9	34.6–40.5	36.7–41.5
ED/HL	35.7	30.9–44.0	29.0–37.5
END/ED	74.4	74.1–103.0	81.2–109.7
UE/IOD	95.1	71.7–115.0	76.2–107.9
IOD/HW	27.2	26.2–37.4	24.4–33.5
IND/IOD	78.4	69.1–95.5	70.0–91.7
TD/ED	35.1	25.7–40.9	28.5–41.4
TL/SVL	60.5	56.4–63.4	53.2–67.4
FL/SVL	50.1	40.7–51.8	43.5–51.8

Paratypes (n = 32: 11 females and 21 males)**:** a subadult female (CBUCES-D 846) and two adult females (EAFIT-Am 0083, 86) collected by JCA, EGF, and O. S. Alzate-Zapata on March 18, 2019. One juvenile female (CBUCES-D 847) and three adult males (EAFIT Am 0109, 117; CBUCES-D 848), collected by EGF and JCA on November 4, 2020. One subadult female (CBUCES-D 849), one adult female (EAFIT-Am 0198) and two adult males (EAFIT-Am 0206, 212), collected by EGF, V. Sierra-Arias, and JCA on March 21, 2021. One adult female

(CBUCES-D 857) collected by EGF, J. M. Lozano-Arias, V. Sierra-Arias, and JCA on March 7, 2022. The paratype specimens mentioned above were collected in the same locality as the holotype. Fourteen adult males (EAFIT-Am 0247, 250, 264–266, 271–272, 294, 302, 304; CBUCES-D 851–852, 854, 856), one subadult male (CBUCES-D 853), two adult females (EAFIT-Am 0303, CBUCES-D 850) and two subadult females (EAFIT-Am 0263; CBUCES-D 855) collected from Cerro Chulé locality (6.2805556, -77.36455556; 378 m asl) between February 24 and March 02, 2020, by JPD and JCA. A single adult male (EAFIT-Am 0621), from Pakoré Wera Nature Reserve, corregimiento de Mutis (6.2024, -77.3857; 100 m asl), was collected by EGF, D. Abreu-Acosta, and V. Sierra-Arias on September 26, 2021.

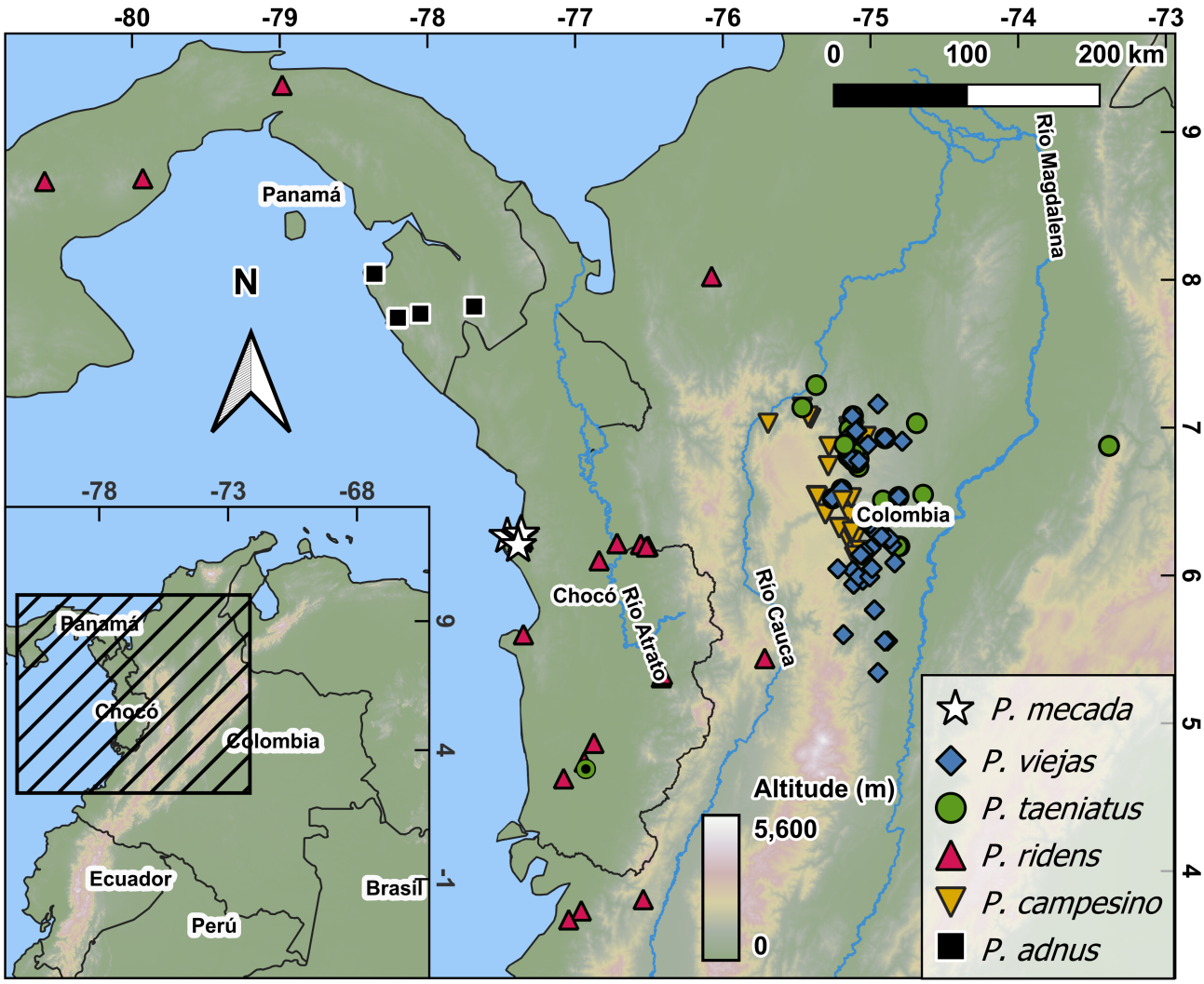

FIGURE 1. Map of the type locality of *Pristimantis mecada*, and the most similar species of the *Pristimantis ridens* group and *P. taeniatus* (type locality: green circle with black dot).

Referred specimens: An adult male (EAFIT-Am 0644, SVL = 19.22 mm) from corregimiento of Huina, municipality of Bahía Solano, Chocó, Colombia (6.26489, -77.45901; 78 m asl), collected by JPD on July 6, 2022. Two adult females (MHUA-A 363, SVL = 27.41 mm; MHUA-A 364, SVL = 27.94 mm) from Estación Biológica El Amargal, corregimiento of Arusí, municipality of Nuquí, Chocó, Colombia (5.58055, -77.49777; 65 m asl), collected in 1998. One subadult female (MHUA-A 4893, SVL = 20.88 mm), from corregimiento of Coquí, municipality of Nuquí, Chocó, Colombia, collected by JCA in 2005. An adult male (ANDES-A 635, SVL = 20.1 mm) from Estación Biológica El Amargal, corregimiento of Arusí, municipality of Nuquí, Chocó, Colombia (5.5680556, -77.5013889; 30 m asl), collected by Andrew J. Crawford on May 31, 2006.

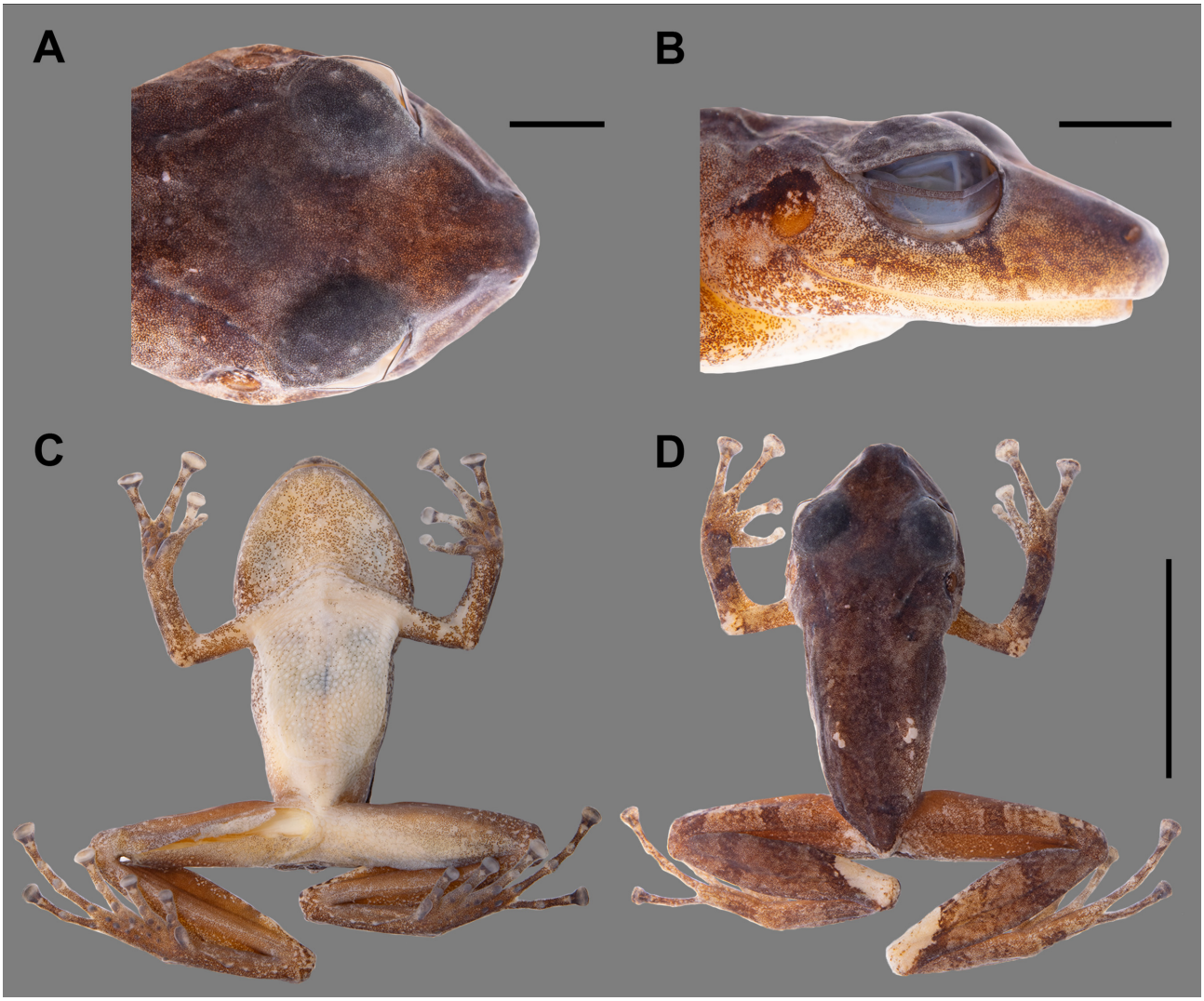

FIGURE 2. Holotype of *Pristimantis mecada* in preservative (EAFIT-Am 0050). (A) Dorsal view of the head; (B) lateral view of the head; (C) ventral view; (D) dorsal view. Scale bars: 3 mm (A, B); 15 mm (C, D). Photos by EGF.

Diagnosis

Pristimantis mecada sp. nov. is diagnosed by the following combination of characters: (1) skin on dorsum shagreen with some scattered tubercles that become more evident in the sacral region and flanks; skin on venter coarsely areolate and skin on throat smooth; short dorsolateral folds present, extending to almost reach the sacral region; discoidal fold present, well anterior to groin; dermal ridges on scapular region present, forming a "\ /" shape; (2) tympanic membrane differentiated, oval in shape and being 25.67 – 40.87% of the eye diameter in males and 28.45 – 41.38% in females; tympanic annulus present, visible through skin and dorsally covered in part by the supratympanic fold, which extends posteriorly; (3) snout moderately long; rounded in dorsal and lateral views, lacking rostral papilla; canthus rostralis slightly concave in dorsal view, and rounded in lateral view; (4) upper eyelid bearing one to three subconical tubercles, upper eyelid width 71.65 – 115% of the IOD in males and 76.21–107.91% in females; cranial crests absent; (5) choanae small, ovoid, not concealed by palatal shelf of maxillary arch; dentigerous process of vomer small and subtriangular in shape, positioned posterior to level of choanae and moderately separated from each other, each process bearing 3 – 7 teeth; (6) males with vocal slits and subgular vocal sac evident externally; white nuptial pads present in the thumb and along the edge of thenar tubercle; (7) Finger I shorter than Finger II (finger length formulae I<II<IV<III); fingers with expanded and truncated discs, except on Finger I, which is nearly round and smaller than the others; disc on Finger II smaller than discs on fingers III and

IV, with the last two noticeably expanded; circumferential grooves present on all fingers; (8) fingers bearing lateral fringes; palmar tubercle deeply bifid; thenar tubercle oval, slightly smaller than palmar tubercle; supernumerary tubercles low, distributed along the palmar surfaces; subarticular tubercles on fingers present, including hyperdistals; two subarticular tubercles on fingers I and II, and three on fingers III and IV (Fig. 4A); subarticular tubercles prominent, with rounded to oval bases and larger than supernumerary tubercles; (9) three to five low ulnar tubercles (generally three), not coalesced; antebrachial tubercle present; (10) heel bearing one small tubercle; one to three low tubercles on the outer edge of tarsus; inner surface of tarsus bearing a well–developed tubercle–like fold, which extends to one third of the tarsal distance; (11) inner metatarsal tubercle oval, twice as long as wide; outer metatarsal tubercle conical, three to four times smaller than the inner metatarsal tubercle; subarticular tubercles on toes present, including hyperdistals; subarticular tubercles prominent, with a rounded to oval base and larger than supernumerary tubercles; two subarticular tubercles on toes I and II, three on toes III and V, and four on Toe IV; supernumerary tubercles low, rounded or slightly oval and distributed along the plantar surfaces; (12) toes with lateral fringes, without webbing; Toe III shorter than Toe V; Toe III extending to distal edge of the antepenultimate subarticular tubercle of Toe IV; Toe V extending to proximal edge of penultimate subarticular tubercle of Toe IV (Fig. 4B); discs and circumferential grooves present on all toes; discs of toes smaller than discs on fingers III and IV; discs of toes III–V similar in size, and larger than discs on toes I and II; (13) coloration in life: the dorsum ranges from tan or light brown to dark brown, presenting in some cases shades of gray and reddish brown; some individuals exhibit a pale middorsal stripe or a light and broad middorsal band that can be bordered laterally or not by black stripes, similarly in some cases individuals may present longitudinal stripes; dark vertical labial bars present, generally with the anterior one more demarcated; dark brown stripe in the supratympanic region, and a dark canthal stripe present in few individuals; hindlimbs with dark transverse bars, and sometimes with a cream or pale brown band across the heel; posterior surfaces of thighs generally solid brown, with small cream specks present in a few cases; groin solid brown, with some individuals showing a cream or golden blotch; belly of males and females translucent white with some scattered dark brown flecks and iridophores; throat white densely scattered with dark brown flecks and iridophores; iris coppery or reddish bronze, with fine black reticulations and light blue sclera (Figs. 3; 5); (14) SVL in males 15.5 – 21.3 mm (mean ± 1 SD = 18.8 ± 1.4; *n* = 21) and SVL in females 18.42 – 31mm (mean ± 1 SD = 26.0 ± 3.7; *n* = 12); (15) call with 4 to 14 notes (Fig. 6A–B); 3 to 8 pulses per note (Fig. 6D); call duration from 0.103 to 0.599 s (Fig. 6B); note duration from 0.011 to 0.051 s (Fig. 6D); an interval between notes of 0.0008–0.0214 s; dominant frequency from 2437.5 to 3187.5 Hz; frequency band from 2374.9 to 3542.0 Hz (Fig. 6C).

Comparisons

In this section we compare the new species with the recognized species of the *Pristimantis ridens* group, and with the sympatric and morphologically similar species of *Pristimantis*. A table with the summary of the diagnostic characters is given in the online resource of Appendix 2.

Within the *Pristimantis ridens* species group, *Pristimantis mecada* is morphologically similar to the Andean species *P. viejas* and *P. campesino* due to the presence of a shagreen with scattered tubercles dorsal skin texture, venter areolate, short dorsolateral folds, discoidal fold, inner tarsal fold, small tubercles on upper eyelid and heel, white nuptial pads and by having a similar dorsal color variation. Nevertheless, the new species can be differentiated by the following combination of features (character states for *P. mecada* in parentheses): *P. campesino* and *P. viejas* have conspicuous orange and/or red spots in the concealed surfaces of thighs, shanks, and groin (a single golden or cream spot in the groin and small light speckles in the posterior surfaces of thighs, Fig. 7 A–I; Lynch and Rueda-Almonacid 1999; Sepúlveda-Seguro *et al.* 2022). *Pristimantis viejas* has a bicolored iris, being golden with a reddish horizontal band and thick black reticulations (iris uniform reddish or copperish coloration with fine black reticulations; Sepúlveda-Seguro *et al.* 2022).

Pristimantis mecada is also similar to *P. adnus,* a species found in the montane forests of Panamá and tentatively distributed along the Pacific coast of Colombia (Crawford *et al.* 2010), by having an overall brownish coloration and a shagreen with scattered tubercles dorsal skin texture. However, *P. adnus* lacks vocal slits, dentigerous process of vomers, ulnar tubercles and lateral fringes on fingers and toes (all present; Crawford *et al.* 2010). In Addition, *P. adnus* has red or orange spots in the concealed surfaces of hindlimbs and groin (absent). *Pristimantis mecada* can also be confused with the sympatric *P. ridens*, however, this species has the smooth dorsal skin texture, tympanum

slightly visible and concealed surfaces of hind limbs with a bright red coloration (skin on dorsum finely shagreen with some scattered tubercles, tympanum readily distinguishable and concealed surfaces of hind limbs without conspicuous bright red coloration, Fig. 7 J–L; Savage 2002).

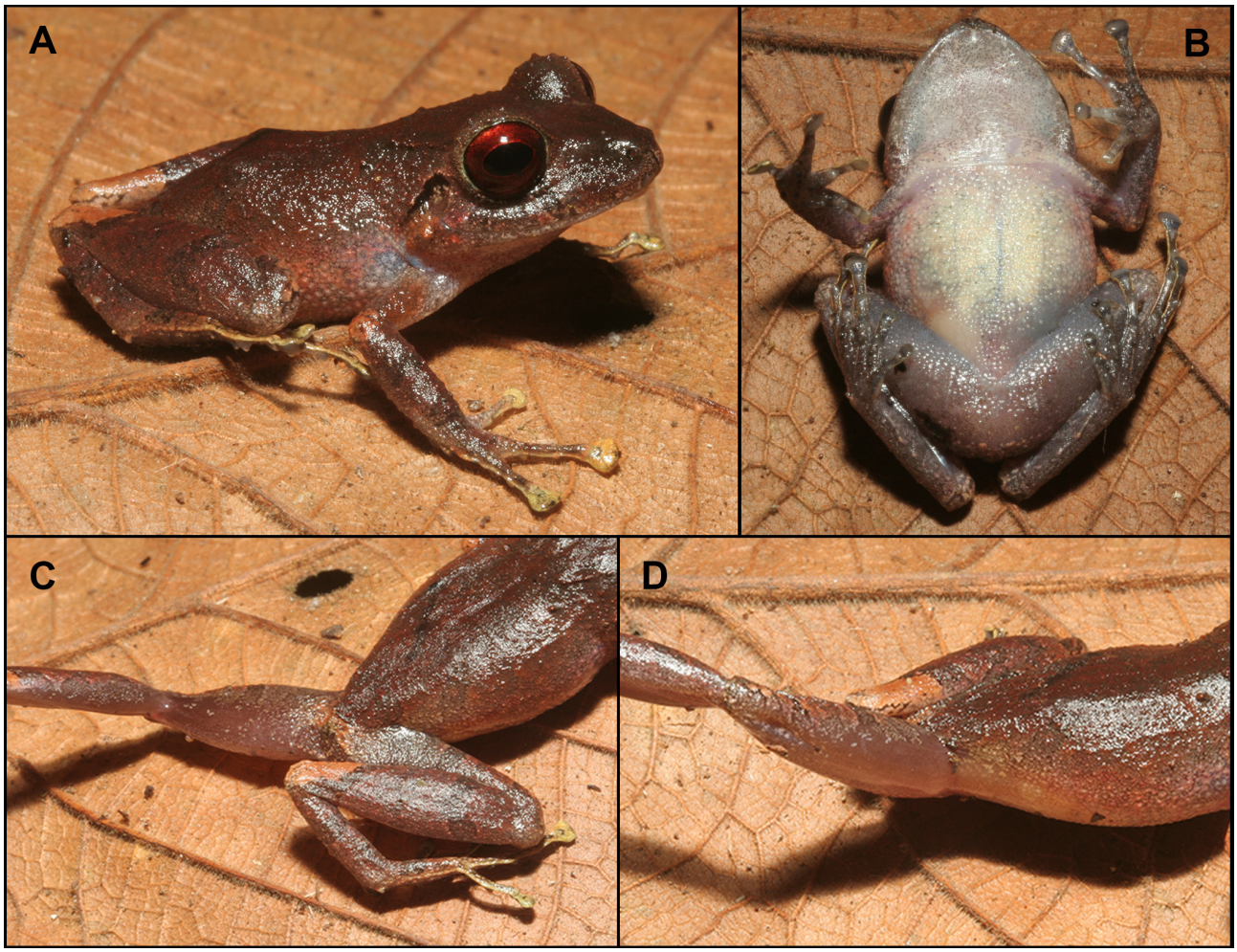

FIGURE 3. Holotype of *Pristimantis mecada* in life (EAFIT-0050, SVL = 26.2 mm, adult female). (A) Lateral view; (B) ventral view; coloration of the posterior surfaces of thigh (C) and groin (D), showing absence of conspicuous marks or spots. Photos by JCA.

Pristimantis mecada can be easily differentiated from the other species of the *P. ridens* group: *P. almendariz, P. cruentus* and *P. gretathunbergae* have a concealed or slightly distinguishable tympanum (tympanum readily distinguishable and prominent in both sexes; Peters 1873; Brito & Pozo-Zamora 2013; Mebert *et al.* 2022); in *P. gretathunbergae* the vocal slits, nuptial pads and inner tarsal fold are all absent (all present; Mebert *et al.* 2022). In *P. almendariz, P. bicolor*, *P. carylae*, *P. cremnobates*, *P. cruentus, P. erythropleura*, *P. factiosus, P. laticlavius*, *P. latidiscus*, *P. museosus*, *P. orpacobates, P. penelopus*, *P. rosadoi*, *P. sanguineus* the vocal slits are absent (present; Boulenger 1896; Boulenger 1898; Lynch & Duellman 1980; Rueda-Almonacid & Lynch 1983; Flores 1988; Lynch & Burrowes 1990; Ibáñez *et al.* 1994; Lynch *et al*. 1994; Lynch,1998; Lynch & Rueda-Almonacid 1998 Lynch & Rueda-Almonacid 1999; Brito & Pozo-Zamora 2013; Rivera-Correa *et al.* 2021); *P. ferwerdai, P. museosus, P. penelopus* and *P. postducheminorum* have a conical tubercle on the heel and other on the eyelid (present but non conical; Ibáñez *et al.* 1994; Lynch & Rueda-Almonacid 1999; Amézquita *et al*. 2019; Palacios-Rodríguez *et al*. 2022); in *P. museosus* the lateral fringes on fingers are absent (present; Ibáñez *et al.* 1994). In *P. cisnerosi* has low cranial crests (absent), and nuptial pads and ulnar tubercles absent (all present; Reyes-Puig *et al.* 2020); in *P. cerasinus* and *P. variabilis* the lateral fringes on fingers are absent (present; Cope 1875; Lynch 1968); *P. variabilis* has an acuminated snout in dorsal view (snout rounded in dorsal view; Lynch, 1968). Females in *P. satagius* have massive cranial crests (absent; Lynch 1995).

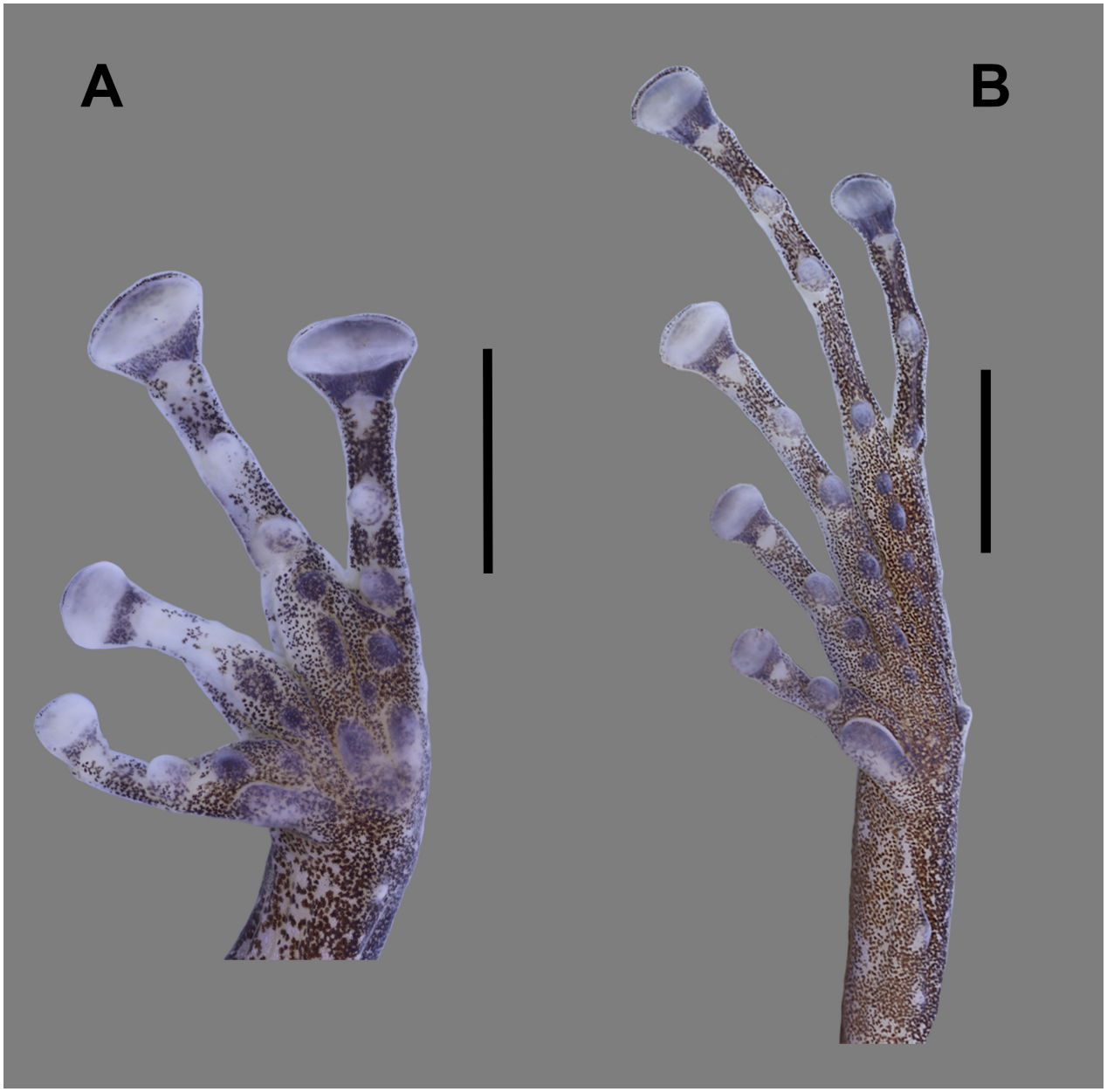

FIGURE 4. Left hand (A) and feet (B) of the holotype of *Pristimantis mecada* (EAFIT-Am 0050). Scale bars: 3 mm.

Pristimantis caryophyllaceus and *P. educatoris* have smooth skin texture on dorsum (skin on dorsum shagreen with some scattered tubercles; Barbour 1928; Ryan *et al.* 2010); additionally, *P. caryophyllaceus* and *P. educatoris* have a pointed heel tubercle (small non pointed tubercle on heel; Barbour 1928; Ryan *et al.* 2010), and in *P. educatoris* the lateral fringes on fingers are absent (present; Ryan *et al.* 2010). *Pristimantis colomai* has a rostral papilla on the tip of snout (absent), and the inner tarsal fold is absent (inner surface of tarsus bearing a tubercle–like fold; Valencia-Zuleta *et al.* 2016); *P. calcaratus*, *P. jubatus* and *P. kelephus* have conical tubercles on the upper eyelid and heel (upper eyelid and heel bearing small non conical tubercles; Boulenger 1908; Lynch 1998; García & Lynch 2006), and in *P. jubatus* the vocal slits and nuptial pads are absent (present; García & Lynch 2006).

Among the sympatric species not belonging to the *P. ridens* species group, *P. esmeraldas* (Guayasamin 2004) is the most similar species to *P. mecada,* however, it has spadate discs covers on fingers III–IV and most toes (rounded to truncated discs covers on fingers and toes), and bright yellow spots in the groin (in some cases with a golden, cream or tan spot in the groin, Fig. 7 M–O). *Pristimantis taeniatus* (Boulenger 1912)—see redescription given by Lynch (1980)—has a smooth to finely shagreen dorsal skin texture (skin on dorsum shagreen with scattered

tubercles, mainly on the flanks and the posterior region), dorsolateral folds absent (short dorsolateral folds present), inner edge of tarsus without a fold and bearing 2–3 tubercles (inner surface of tarsus with a well–developed fold), and absence of dermal ridges on scapular region (scapular ridges present, forming a "\ /" shape). Additionally, *P. taeniatus* has a bicolored iris with a silvery or golden coloration crossed by a dark reddish horizontal bar, with fine or thick black reticulations (uniform coppery or reddish bronze iris coloration, with fine black reticulations).

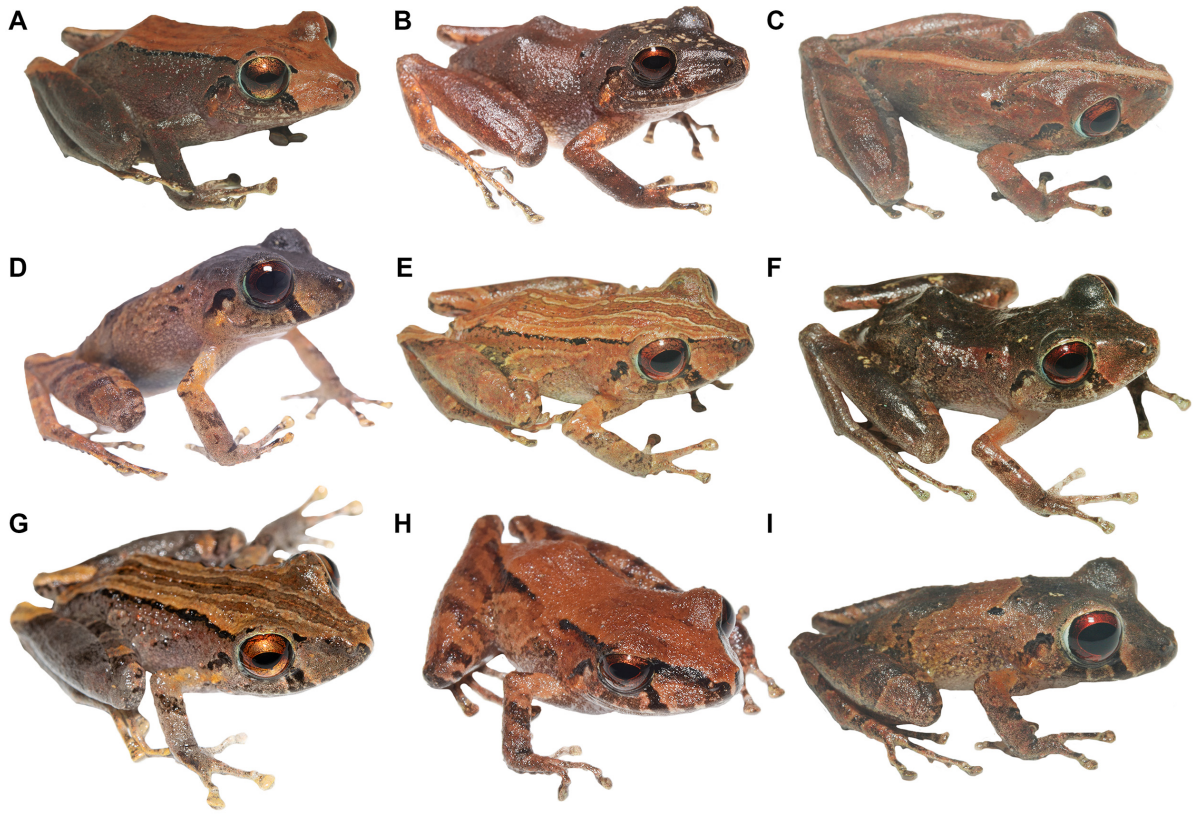

FIGURE 5. Color variation in some paratypes of *Pristimantis mecada* in life. (A) adult female, EAFIT-Am 0083 (SVL 30.75 mm); (B) adult female, CBUCES-D 857 (SVL 29.55 mm); (C) subadult female, EAFIT-Am 0263 (SVL 21.87 mm); (D) adult male, EAFIT-Am 0621 (SVL 20.9 mm); (E) adult male, CBUCES-D 854 (SVL 21.01 mm); (F) subadult female, CBUCES-D 846 (SVL 24.1 mm); (G) juvenile female, CBUCES-D 848 (SVL 18.15 mm); (H) adult male, EAFIT-Am 0206 (SVL 19.45); (I) adult male, EAFIT-Am 0272 (SVL 19.52 mm). Photos by JCA and EGF.

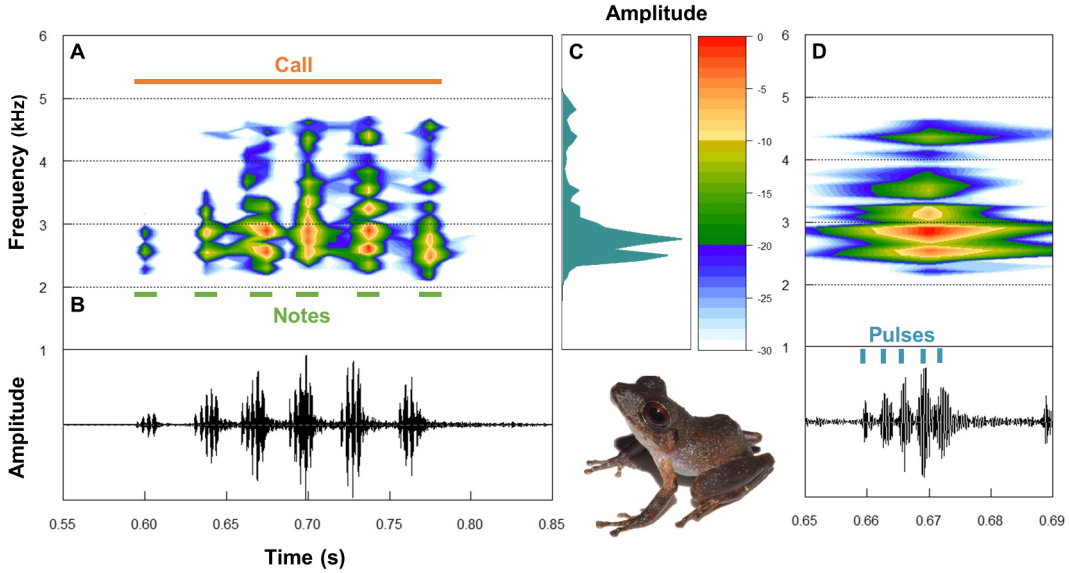

FIGURE 6. Advertisement call of a paratype of *Pristimantis mecada* (EAFIT-Am 0212; Record voucher BSOC 207). (A) Spectrogram; (B) Oscillogram; (C) Mean frequency spectrum; (D) Zoom of fifth note.

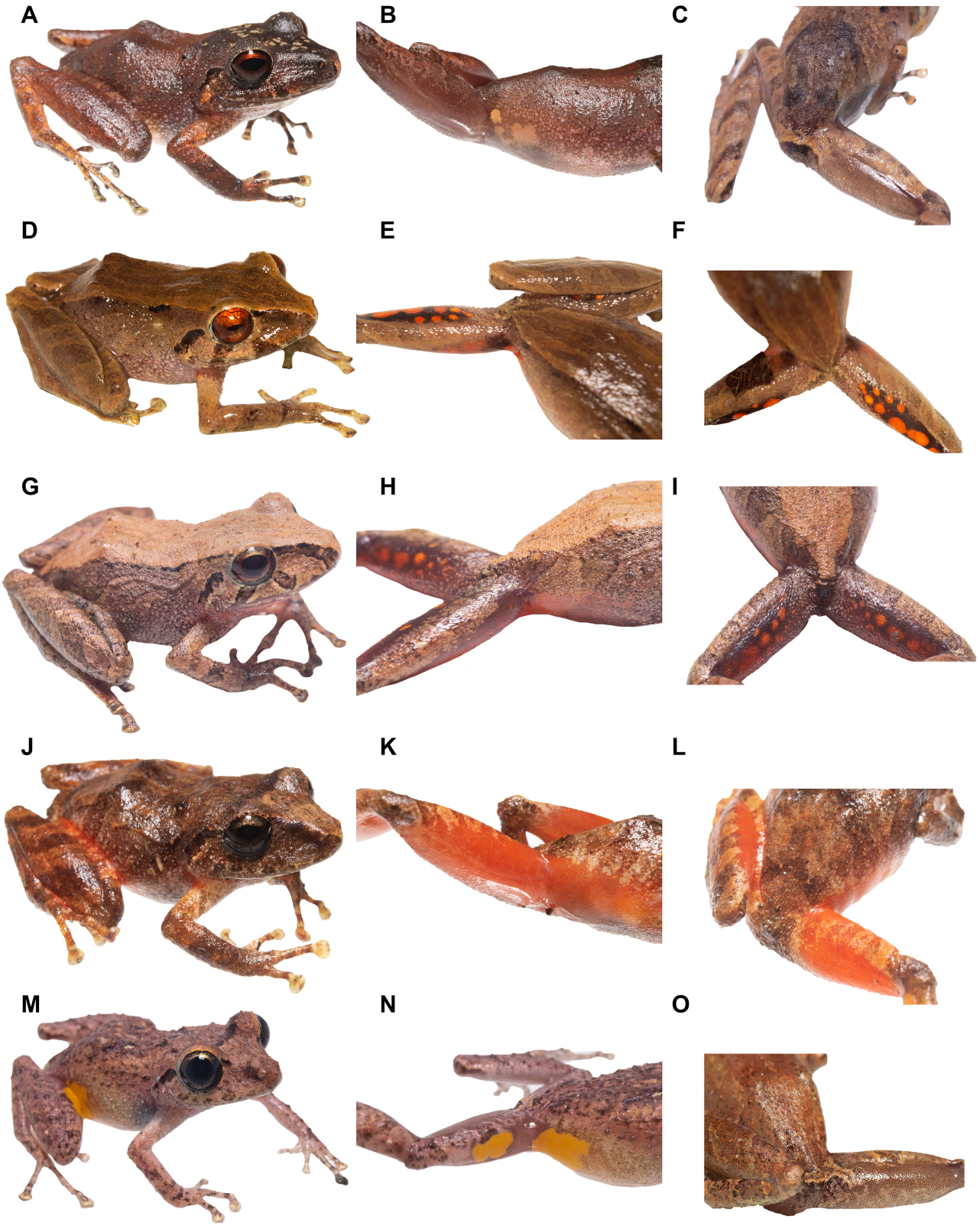

FIGURE 7. Comparison of some of the morphologically similar and sympatric species with *P. mecada*. General view (A), groin coloration (B) and thigh coloration (C) in *P. mecada* (A–B, CBUCES-D 857; C, EAFIT-Am 0621); general view (D), groin coloration (E) and thigh coloration (F) in *P. campesino* (EAFIT-Am 0520); general view (G), groin coloration (H) and thigh coloration (I) in *P. viejas* (CBUCES-D 607); general view (J) groin coloration (K) and thigh coloration (L) in *P. ridens* (EAFIT-Am 0635); general view (M), groin coloration (N) and thigh coloration (O) in *P. esmeraldas* (EAFIT-Am 0618).

FIGURE 8. (A) General view of the forests of Bahia Solano, Chocó. (B) Habitat of *P. mecada* and (C) amplectant couple (unvouchered specimens). Photos: (A–B) Mateo Giraldo Amaya; (C) EGF.

The advertisement call of *P. mecada* is readily distinguished from the call of *P. campesino, P. colomai*, *P. erythropleura* and *P. viejas* by the presence of a single note (4 to 14 notes) and the shorter call duration (longer; Table 2). Furthermore, from *P. viejas* it can be differentiated by the absence of pulses (present) and the presence of frequency modulation (absent; Table 2).

TABLE 2. Comparison of the advertisement call parameters for the available described calls from the *P. ridens* group species. Values are given as range (mean±SD).

Measures	*P. mecada sp. nov*	*P. campesino*	*P. colomai*	*P. cruentus*	*P. erythropleura*	*P. viejas*
Work	This study	Sepúlveda-Seguro *et al.* 2022	Valencia-Zuleta *et al.* 2016	Salvador & Cossel 2016	Duarte-Marín & Arango-Ospina 2019	Sepúlveda-Seguro *et al.* 2022
Harmonics	No	No	No	Yes	No	No
Notes	4–14 (7±2.14)	1	1	1	1	1
Pulses	3–8 (5±1)	–	13.0–27.0 (17.6±3.2)	13.8 ±1.6	9–10 (9.25±0.25)	–
Call duration	0.1–0.6 (0.2±0.09)	–	–	–	–	–
Note duration	0.01–0.05 (0.03±0.01)	0.027±0.004	0.69–0.97 (0.84±0.9)	0.063±0.009	0.470–0.472 (0.471±0.02)	0.062±0.005
Inter–note interval	0.001–0.021 (0.008±0.005)	–	–	–	–	–
Dominant frequency	2437.5–3187.5 (2865.3±200.8)	2.649±0.175	2497.9–2799.3 (2570.0±64.5)	2129.4±233.4	2067	2.916±0.144
Low frequency	2098.9–2651.6 (2374.9±125.4)	2.328±0.056	2072.3–2287.0 (2137.6±59.8)	1353.1±269.9	–	2.670±0.111
High frequency	3084.2–4702.5 (3542.1±311.2)	3.503±0.246	2851.9–3405.5 (3093.7±176.2)	8603.7±2175.4	–	3.282±0.202

In *P. cruentus* the mean call duration is 0.063 s (0.228 s), the mean dominant frequency is 2129.4 Hz (2865.3 Hz), the range of the frequency band is 1353.1–8603.7 Hz (2374.9–3542.0 Hz) and the presence of harmonics (absent; Table 2). *Pristimantis taeniatus* has a call duration of 0.53 s (0.228 s).

Description of the Holotype

An adult female, 26.2 mm SVL; head slightly longer than wide, and slightly wider than body; HW 42.9 % of SVL; HL 45.4% of SVL; snout moderately long, rounded in dorsal and lateral views, and lacking papilla; eye–nostril distance 74.4% of eye diameter; somewhat protruding nostrils, slightly dorsolaterally directed and slightly visible in dorsal view. (Fig. 2A–B). Detailed measurements of the holotype are presented in Table 1. Canthus rostralis distinct, slightly concave in dorsal view and rounded in profile; loreal region weakly concave; lips not flared; upper and lower jaw without tubercles; internarial region slightly concave from dorsal view; interorbital area flat without tubercles or fold, moderately wider than the upper eyelid, UE 95% of IOD; upper eyelids with a shagreen texture, bearing two subconical tubercles and among seven small tubercles on its outer margin; tympanic annulus prominent, dorsally covered by the supratympanic fold, which extends almost from the posterior corner of the eye posteriorly to be nearly parallel to the insertion of the arm; TD is 35.1% of ED, tympanum superficial and higher than wide; two subconical postrictal tubercles (Fig. 2A–B; Fig 3A). Choanae small and ovoid, not concealed by palatal shelf of maxillary arch; dentigerous process of vomer small, subtriangular in shape, positioned posteriorly to the edge of choanae and moderately separated from each other, being this distance slightly higher to the width of the visible dentigerous process; each odontophore bearing six teeth; tongue as long as broad, with its anterior edge notched and with the posterior two thirds not adherent to the floor of the mouth. Skin texture of dorsum finely shagreen with some scattered tubercles, which become larger and evident in the flanks and sacral region; scapular tubercles present on each side; dermal ridges on scapular region present, forming a "\ /" shape; short and thin dorsolateral folds present, almost restricted to the anterior half of the body (Fig. 2D; Fig 3A, C–D). Skin on ventral surfaces of thighs areolate and on belly coarsely areolate; skin on throat smooth; discoidal fold present, well anterior to groin; several low tubercles on the cloacal region (Fig 2C; Fig 3B).

Forearm slender, FAL 24.3% of SVL; hand longer than the forearm, HAL being 28.7% of SVL; outer edge of the forearm bearing three low and not coalesced ulnar tubercles; antebrachial tubercles present; palmar tubercle deeply bifid; thenar tubercle oval, slightly smaller than the palmar tubercle; prominent subarticular tubercles, with the basal ones having a rounded base and the distal ones having an oval base, larger than the supernumerary tubercles; hyperdistal subarticular tubercles less prominent than the distal and basal subarticular tubercles; two subarticular tubercles on thumb and second finger, and three on third and fourth; supernumerary tubercles low, with rounded to oval bases and distributed along the palmar surfaces; fingers with lateral fringes; finger length formulae I<II<IV<III; all fingers with well–defined circumferential grooves; disc on Finger I almost rounded, smaller than the disc of Finger II, which is slightly truncated and noticeably smaller than the discs of fingers III and IV, which are much larger (broader than long) and truncated than the others (Fig. 4A). Hind limbs moderately robust; TL is 60.5% of SVL; FL is 50.1% of SVL; heel with one small tubercle; outer edge of tarsus bearing one small tubercle; inner surface of tarsus bearing a well–developed fold, which begins thinner and slightly elevated proximal to the inner metatarsal tubercle and ends thicker and more elevated distally, not extending beyond one–third the size of the tarsus; inner metatarsal tubercle oval, twice as long as wide; outer metatarsal tubercle conical, four times smaller than the inner; toes with lateral fringes and discs, and without webbing; toe length formulae I<II<III<V<IV; Toe III shorter than Toe V; Toe III extending to the distal edge of the antepenultimate subarticular tubercle of Toe IV, and Toe V extending to the proximal edge of the penultimate subarticular tubercle of Toe IV; all toes with well–defined circumferential grooves; discs of toes smaller than the discs on fingers III and IV; disc of toes III–V truncated and nearly equal in size, noticeably larger than disc on Toe II, which in turn is larger than the slightly rounded disc on Toe I (Fig 4B); subarticular tubercles prominent, with a rounded to oval base, two subarticular tubercles on toes I and II, three on toes III and V, and four on Toe IV; supernumerary tubercles rounded to slightly oval and distributed all along the plantar surfaces.

Coloration of the holotype in life

Dorsum brown with reddish–brown shades; sacral region with dark brown marks that extends onto the posterolateral surfaces of body. The lateral surfaces of the body are brown, fading to a cream color with pinkish tones towards the belly, having also some scattered iridiophores (Fig. 3A). Translucent white venter with scattered dark brown flecks, with a higher density on the sides; iridiophores spread all around the belly, throat, and ventral surfaces of limbs; throat white densely scattered with dark brown flecks, with a higher density along the jaw line (Fig. 3B). Supratympanic dark stripe present, extending along with the supratympanic fold. Dark brown vertical labial bars below the eye, with the anterior one more demarcated and bordered externally by a fine cream stripe. Forelimbs brown with darker transverse markings, and with a beige patch in the elbow (Fig. 3C). The dorsal surface of the fingertips and lateral fringes with a cream coloration, that extends on to the ventral surface of the lateral fringes. Hind limbs with a similar color pattern to that of the forelimbs, but with a cream band across the heel and with a series of dark transverse bands; toes with the same color pattern as fingers. Concealed surfaces of thighs, shanks, and groin brown without any pattern, except for the posterior surfaces of the thighs that exhibit small cream flecks; cream band present in the dorsal edge of the cloaca (Fig 3C–D). The axillary region is pale brown with dark flecking. Iris reddish bronze with thin black reticulations and light blue sclera.

Variation

Sexual dimorphism is evident in the size, with the adult females being larger than the adult males. Measurements and body ratios of the type series are presented in Table 1. No sexual dimorphism in coloration was observed, with the females having the same color pattern variation than the males. Both iris coloration patterns (coppery or reddish bronze) were present in both sexes. Individuals of *Pristimantis mecada* did not present a particular or exclusive dorsal coloration pattern, varying between a uniform light or dark brown, with variation of reddish and grayish shades, with the latter being more common in the dorsal region of the head and in the posterior region of the dorsum (Fig. 5). In addition, some irregularly distributed cream–colored spots may be present along the dorsum. EAFIT-Am 0206 (adult male, Fig. 5H) is the only specimen that exhibits a marked black canthal stripe and a black dorsolateral stripe that extends just behind the posterior corner of the eye to the dorsal edge of the cloaca. The pattern of dark dorsolateral stripes accompanied by a broad and lighter middorsal band is present in EAFIT-Am 0083 and CBUCES-D 847, 852 (Fig. 5A). Similarly, the broad lighter middorsal band pattern, but without dark dorsolateral stripes is present in EAFIT-Am 0264 and CBUCES-D 855–856. On the other hand, a pattern of longitudinal lines was also present in individuals EAFIT-Am 0250 and CBUCES-D 848, 854 (Fig. 5E; G). Finally, only two individuals (EAFIT-Am 0117, 0263), exhibit a light middorsal stripe, which goes from the tip of the snout to the vent (Fig. 5C). In most individuals, the coloration pattern of the groin and posterior surfaces of the thighs is uniform brown, with a few individuals showing golden, cream, or tan spots on one or both areas, such as CBUCES-D 846–849, 857 and EAFIT-Am 0086, 0247, 0264. The number of teeth on the dentigerous processes of vomer varies between three to seven. The number of subconical tubercles in the upper eyelid varies between one and three, and the number of low tubercles in the outer margin of eyelid varies from three to eight. Living specimens have well–defined short dorsolateral folds and dermal ridges forming a "\ /" shape in the scapular region, being less prominent in preserved specimens.

Distribution and natural history

Pristimantis mecada inhabits the primary and secondary humid lowland tropical forests of the western slopes of the Serranía del Baudó (Fig. 8–A), between the 17 and 456 m asl. This zone is characterized by two stational periods, one of high rainfall (rainy season) between September and November with an average of 627 mm of rain monthly; and one of low rainfall (dry season) between January and March with average of 196 mm of rain monthly (Torres-Torres *et al.* 2016; Lemos 2017). Additionally, the forests in the areas where it was found, mainly within the JBP, are characterized by a transition from sea to forest through mangroves and mangrove–forest ecotones. These usually present tall trees with dense canopy covers and thick layers of leaf litter and organic material on the ground.

Pristimantis mecada is currently known from a few localities in the municipalities of Bahía Solano and Nuquí, in the department of Chocó, but may possibly be found further north and/or south in the Pacific region of Colombia, as is the case with other species of *Pristimantis* found in sympatry with it (Fig. 1).

This species exhibits a nocturnal activity pattern, being found active just after sunset. At night the individuals of *P. mecada* were found on leaves and branches of shrubs, ferns, and on palm fronds between 0.2 and 1.5 m inside the forest, far away from any water body (Fig. 8–B). During the day the individuals of this species were found within the litter leaf on the forest floor, generally near the roots of trees.

Almost all individuals from Cerro Chulé locality were found on the top of edge barrier traps or climbing the barriers. Acoustic activity was observed in both stational periods (rainy and dry seasons), although showing a greater activity during the rainy period. Males call from leaves or branches of shrubs and small trees, with a peak acoustic activity between 1700 and 2200 h. Amplectant couples can be found in both stational periods, presenting an axillary amplexus (Fig. 8–C). *Pristimantis mecada* is found in sympatry with the congeners *P. achatinus*, *P. esmeraldas*, *P. latidiscus*, *P. ridens* and *P. roseus*.

Bioacoustics

Based on three recordings of two males the advertisement call of *Pristimantis mecada* consists of a single pulsed call composed of 4–14 notes per call (7 ± 2.14; 22 calls; Fig. 6A–B) and 3–8 pulses per note (5 ± 1.11; 156 notes from the 22 calls analyzed; Fig. 6D). The call is 0.103–0.599 s in duration (0.228 ± 0.098; 22 calls; Fig 6B), with notes of 0.011–0.051 s in duration (0.03 ± 0.01; 156 notes; Fig. 6D), and an interval between notes of 0.0008–0.0214 s (0.008 ± 0.005; 133 intervals). The dominant frequency is 2437.5–3187.5 Hz (2865.3 ± 200.8; 22 calls; Fig 6C). The frequency band goes from 2098.8–2651.5 Hz (2374.9 ± 125.4; 22 calls; Fig 6C) in the low frequency to 3084.2–4702.5 Hz (3542.0 ± 311.1; 22 calls; Fig 6C) in the high frequency.

Etymology

The specific epithet, used as a noun in apposition. “Mecada” is the original spelling of Mecana in the Emberá language. This is in honor to the corregimiento and community of Mecana (from where the new species was identified for the first time, and where the Jardín Botánico del Pacífico Nature Reserve is located), due to its commitment with the conservation and restoration of local ecosystems trough ecotourism and environmental education. Mecada is also the name of the river that runs through the region.

Discussion

The species of the *Pristimantis* (*Hypodictyon*) *ridens* group can be found from Central America to northern Peru, with Colombian species mainly distributed in the trans–Andean region, with most of its diversification in the Andean Hotspot (Batista *et al.* 2014; Padial *et al.* 2014; Reyes-Puig *et al.* 2020; Rivera-Correa *et al.* 2021; Mebert *et al*. 2022; Sepúlveda-Seguro *et al.* 2022; Frost 2024). The stunning diversity of *Pristimantis* species in the Tropical Andes Hotspot region could be considered a byproduct of the large number of studies on the fauna in this region, mainly in function of the closeness of the natural habitats to large development centers, and its accessibility (Heinicke *et al.* 2007; Pinto-Sánchez *et al.* 2012).

Due to its geographical position in the Colombian Biogeographic Chocó, its topography, and environmental characteristics, the Serranía del Baudó mountain range encompasses an extremely particular and diverse flora and fauna, exhibiting high rates of endemism and endangered species (Misas-Urreta 2005; Mosquera-Ramos *et al.* 2007; Blanco-Libreros & Carvajal-Quintero 2015; Garzón-Franco & Arredondo in prep). In the case of the Colombian Biogeographic Chocó, the synergy of the difficulty to access to the natural habitats, the lack of governmental support to scientific development and the socio–political conflict makes very difficult to better understand the biodiversity found in this region. Scientific efforts are needed for future research in the Baudó region and other areas of the Biogeographic Chocó, which will probably lead to the discovery of new species of terraranas and other biotic groups.

Over the years several errors have been perpetuated, leading to uncertainty about the currently recognized species within the group. For example, Pinto *et al*. (2012) were the first to include *Pristimantis paisa* in the *ridens* species group, based on the phylogenetic relationships of two specimens (MHUA-4811 and ANDES-0466). Subsequent studies revealed that both individuals actually corresponded to *P. penelopus*, a species that truly belongs to the *ridens* group, whereas *P. paisa* is in fact part of the *frater* species group (Hedges *et al*. 2008 Restrepo *et al*. 2017). This misclassification of *P. paisa* as a member of the *ridens* group was later replicated by Reyes-Puig *et al*. (2020), leading to an overestimation of the species diversity within this group. Thus, after an extensive revision we conclude that the *Pristimantis ridens* group is composed of 31 species with the inclusion of *P. mecada*, of which 17 are found in the Biogeographic Chocó (Reyes-Puig *et al.* 2020; Rivera-Correa *et al.* 2021; Mebert *et al.* 2022; Sepúlveda-Seguro *et al.* 2022; this study). Additionally, the *Pristimantis* genus reaches approximately 69 species for the Biogeographic Chocó (Reyes-Puig *et al.* 2020; Mebert *et al.* 2022; this study).We found *P. mecada* to be morphologically similar to *P. viejas* and *P. campesino*, which are distantly distributed in the northern of the Cordillera Central, in the oriental piedmonts that descend to the Magdalena River valley, at different elevations —100–1600 m a.s.l. for *P. viejas* and 1500–2150 m a.s.l. for *P. campesino*— (Sepúlveda-Seguro *et al.* 2022). This morphological divergence observed in *P. mecada* aligns with patterns of differentiation typically associated with geographic isolation, supporting an allopatric speciation scenario in which species from the chocoan lowlands have diverged from those of the Andean region of Colombia —*P. campesino* and *P. viejas*— (Heyer 2005; Angarita-Sierra & Lynch 2017). *Pristimantis mecada* can be easily separated from these two species by striking morphological differences, where the absence of a conspicuous color pattern in the groin (vs red/orange spots) is the most notorious characteristic to diagnose these species. This character has been consistently used over the years to diagnose *Pristimantis* species due to its conservative nature (Lynch & Duellman 1997; Duellman & Lehr 2009; Crawford *et al.* 2010; Cuellar-Valencia *et al.* 2021). A similar scenario occurs with *P. adnus* and *P. ridens*, which occurs in the Biogeographic Chocó of Panamá and Colombia and can be readily diagnosed by the coloration pattern of the groin and by other distinctive internal and external morphological characters (see comparisons section). Additionally, we highlight the importance of including *P. mecada* in future phylogenetic studies to better elucidate its position within this genus.

The type series of *P. mecada* is composed of 33 individuals (12 females and 21 males), including a comprehensive number of individuals of different ages and sizes. This sample largely allowed us to recognize, characterize and understand the morphological variability of this new entity. According to this, we strongly recommend, when possible, describing new species with large type series (Walsh 2000), especially in a genus like *Pristimantis*, which has a high phenotypic diversity combined with high levels of sympatry between species (Ruiz-Carranza *et al.* 1997; Rivera-Correa *et al.* 2017; Rivera-Correa *et al.* 2022).

While examining the type series of *P. campesino* (specimens listed in Appendix 1), we found differences in character states presented in the original description. Males (including the holotype MHUA-A 12022) do possess a pair of white nuptial pads, located at the base of the thumb and along the thenar tubercle (Appendix. 3B), very similar to *P. mecada* and to its sister species *P. viejas*. We also found that all type specimens of *P. campesino* have a discoidal fold and an inner tarsal fold in both sexes, which are more evident in adult females (Appendix.3A).

For species belonging to the *Pritimantis ridens* species group, quantitative and detailed descriptions of vocalizations only exist for *P. campesino*, *P. colomai, P. cruentus, P. erythropleura* and *P. viejas* (Salvador & Cossel 2016; Valencia-Zuleta *et al.* 2016; Duarte-Marín & Arango-Ospina 2019; Sepúlveda-Seguro *et al.* 2022). This lack of information most likely masks further differences among these species, including possible unknown cryptic diversity. Emphasizing the importance of describing advertisement calls within a group as conspicuous and rich as *Pristimantis*, as an exercise in truly understanding diversity within it.

The advertisement call of *P. mecada* is longer than that of *P. campesino*, *P. colomai*, *P. viejas* and *P. erythropleura*, but the note length between these species is in the same order of magnitude. Thus, difference appears from the fact that *P. mecada* shows a call composed of notes and the call of the other species are tonal —see Köhler *et al.* (2017) for a discussion on this matter.

Although there are several recent descriptions of the advertisement call of *P. taeniatus*, there was no comparison with the work of Arias *et al.* (2023), as there seems to be several incongruences in the scale in which they state their temporal measurements. And in general, all the works that describe the advertisement call of *P. taeniatus* have no sampling from near the type locality, and as noted by Falcón-Espitia *et al.* (2023) these populations might correspond to different entities.

Pristimantis mecada was found within a special protected area (Reserva Natural de la Sociedad Civil) in the municipality of Bahía Solano (JBP) and was also found very near the Utría National Natural Park in the municipality

of Nuquí. This may provide and guarantee stability for its populations, added to the fact that it is a relatively common species in these places. However, until additional areas where *P. mecada* can be found are known, we are reluctant to propose a threat category for this species. It should be noted that forests within Colombia's Biogeographic Chocó are threatened by deforestation due to mining, commercial logging and growth of illicit crops (Lara-Rodríguez *et al.* 2020; Meyer *et al.* 2019; Ramírez & Ledezma 2007), so we also recognize the importance of advancing conservation strategies in areas within this unique diversity Hotspot.

Acknowledgments

We are deeply grateful to J. F. Diaz-Nieto, J. Correa Álvarez, L. Puerta (Chacha), L. Salinas, and the Semillero Biodiversidad and the Department of Biological Sciences of the EAFIT University. We are in debt to the Jardín Botánico del Pacífico Nature Reserve and the Mecana community for their help and logistical support during the field trips. We also thank the Medina family of the Pakoré Wera Nature Reserve for all their help during our field trips and for supporting the conservation of their territory. For their assistance in the field, we thank A. Cunampia, Á. M. Ibargüen, E. A. Higuita, O. S. Alzate, D. Abreu-Acosta, L. Gómez-Mesa, J. M. Lozano-Arias, V. Sierra-Arias and all the students who attended the Vertebrate Zoology course between 2017 and 2022. We thank Mateo Giraldo Amaya for allowing us to use his photos of Bahía Solano landscapes. For the availability of the collection specimens, workspaces and for providing photographs of some specimens, we are grateful to D. Bocanumenth, J. M. Daza and C. Torres (MHUA); J. D. Lynch and M. Rivera-Correa (ICN), X. Rueda-Isaza (EAFIT); L. Latorre, R. Alessandro and A. Crawford (ANDES); J. W. Streicher (BMNH); W. E. Duellman † (KU) and D. Urrego Cardenas (CSJ). Collection permits were issued to the EAFIT University (RNC 277) by the National Authority of Environmental Licenses (ANLA), Resolution 1566 of 2014, and by the Amnesty granted by the Law 1955 issuing the National Development Plan 2018–2022 'Pact for Colombia, Pact for Equity'.

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Appendix 1. Specimens and acoustic records examined of *Pristimantis* (n = 859) with their respective localities. Museum acronyms for specimens exanimated are Amphibians collection of the Universidad EAFIT Biological Collections (EAFIT-Am), Herpetology collection of the Universidad CES Biological Collections (CBUCES-D) and OcainaCua Sound Bank (BSOC) from the Museo de Ciencias Naturales de La Salle (CSJ). Remain museum acronyms follow Sabaj (2020) and Frost (2024). Departments are given in capitals and municipalities in bold lowercase. ˚ Holoype. ***** Paratype. [a] Recording.

Pristimantis achatinus: CALDAS: **Salamina**: CSJ-h 413, 426; CAUCA: **Morales**: MHUA-A 9616; CHOCÓ: **Bahía Solano**: EAFIT-Am 0046, 0090, 0094, 0141, 0176, 0205, 0278, 0305, 0638; QUINDÍO: **Filandia**: EAFIT-Am 0579; RISARALDA: **Cartama**: EAFIT-Am 0385.

Pristimantis bicolor: SANTANDER: **Betulia**: MHUA-A 1790–93, 1811.

Pristimantis campesino: ANTIOQUIA: **Alejandría**: MHUA-A 8538; **Amalfi**: CSJ-h 4982, MHUA-A 9428*, 1969, 1974,1976, 2438, 2442–43, 2453–52, 2910, 2917, 2919, 2924, 3086, 3089, 3132, 5593; **Angostura**: MHUA-A 10238; **Anorí**: MHUA-A 791, 1727, 1738, 1741, 1744–45, 2428, 2912, 2923, 3014, 3091, 3963, 4318, 4465, 4470–71, 4474, 4581–83, 4620–33, 4635, 4638–42, 4644–70, 4677–92, 4694–99, 4700–05, 5048, 5141–42, 5555*, 5562*, 11731*, 11733*, 11734*, 11737*, 11913*, 11914*, 12019*, **12022**˚, 12021*, 12023*, 12024*, 12027*; **Barbosa**: MHUA-A 5592–93, 5595–96, **Carolina del Príncipe**: MHUA-A 8510; **Concepción**: MHUA-A 11018, 11023, **Don matías**: MHUA-A 7746, 8592; **Granada**: MHUA-A 10473*, 10477*, 10484, 10489*, 10508*, 10514*, 10814*, 11164*; **Guatapé**: MHUA-A 4393, 4395, 4449, 8059*, 8088*, 8099*, 8317, 8810*, 8819, 11385*, 12319–18; **San Carlos**: MHUA-A 11057; **San Rafael**: MHUA-A 11033; **Santo Domingo**: EAFIT-Am 0520, MHUA-A 65–64, 6567; **Valdivia**: CBUCES-D860, 863; **Yarumal**: MHUA-A 4089, 6865, 6868, 6870–76, 6881–82, 12320–25, 12327.

Pristimantis carylae: ANTIOQUIA: **Valdivia**: MHUA-A 12213*, 12215*; **Yarumal**: MHUA-A 12326, 12431, 12432.

Pristimantis cruentus: ANTIOQUIA: **Frontino**: CBUCES-D 96, 116–18, 220–21.

Pristimantis erythropleura: ANTIOQUIA: **Amagá**: CSJ-h 2093: **Frontino**: CSJ-h 2087, 2089, 2094, 2804; **Guadalupe**: CSJ-h 5001; **Guarne**: CSJ-h 2095, 2442–44; **Mutatá**: CBUCES-D521; **San Vicente**: CSJ-h 2437–41, 2803; **Támesis**: CBUCES-D 1004–05; **Urrao**: CSJ-h 2086, 2088, 2090–92, 2096-2122, 2124–41, 2143–45, 2799–2802.

Pristimantis esmeraldas: CHOCÓ: **Bahía Solano**: EAFIT-Am 0048, 0108, 0112, 0171, 0173–74, 0238, 0292, 0618; VALLE DEL CAUCA: **Buenaventura**: MHUA-A 13234, 13237, 13250, 13255, 13264–65.

Pristimantis laticlavius: NARIÑO: **Ricaurte**: MHUA-A 4004–05.

Pristimantis latidiscus: ANTIOQUIA: **Mutatá**: CBUCES-D 414, 548, 550, 1064–66, 1076, 1078, 1088, 1095, 1101; CHOCÓ: **Bahía Solano**: EAFIT-Am 0027, 0065, 0070, 0093, 0098, 0099, 0145, 0148, 0175, 0177, 0179, 0202, 0215, 0228–29, 0254–55, 0270, 0613, MHUA-A 13236, 13251, 13253, 13260, 13262–63, 13266, 13276–78, 4604–07; **Nuquí** MHUA-A 5130; VALLE DEL CAUCA: **Buenaventura**: MHUA-A 4603.

Pristimantis lemur: ANTIOQUIA: **Ituango**: CSJ-h 1565*, 1566*, 1567*, 1568*, 1569, 1570*, 1571*, 1572*, 1573*, 1574*, 1575*, 1599, 1600–03.

Pristimantis mecada: CHOCÓ: **Bahía Solano**: BSOC 207[a].

Pristimantis miyatai: SANTANDER: **San Vicente del Chucurí**: MHUA-A 5410, 5413.

Pristimantis orpacobates: ANTIOQUIA: **Frontino**: CBUCES-D 111, 124; **Ituango**: CSJ-h 190–232, 1548*, 1549*, 1550*, 1551*, 1552*, 1553, 1554*, 1555–64.

Pristimantis paisa: ANTIOQUIA: **Barbosa**: MHUA-A 3906, 5267, 5597; **Bello**: MHUA-A 5768, 5811–12; 5814; **Caldas**: CBUCES-D 166–67, 170, 172–73, 311, MHUA-A 62* 64* 66* 67* 72*; **Copacabana**: MHUA-A 4995, 5001, 5003; **Envigado**: MHUA-A 4955; 4956, 5773; **Guatapé**: MHUA-A 204; **Itagüí**: MHUA-A 4962; **La Estrella**: MHUA-A 5817; **Medellín**: CBUCES-D 682–85, 690–91; **Nariño**: MHUA-A 6026–27; **Sabaneta**: MHUA-A 5771; **San Pedro de los Milagros**: CBUCES-D 627–28; **Santo Domingo**: EAFIT-Am 0517–19, 0523–26, CBUCES-D 154–155; **San Vicente**: CBUCES-D 323; **Santa Rosa de Osos**: MHUA-A 8598; **Yarumal**: CBUCES-D 312–13.

Pristimantis palmeri: RISARALDA: **Guática**: EAFIT-Am 0327, 0332–33, 0335, 0337–38, 0353–55, 0362, 0365–66, 0368, 0371, 0380, 0388–90, 0407, 0414–15, 0417–20, 0427–29, 0431, 0433–34, 0436, 0440–42, 0448–52, 0455–61.

Pristimantis parectatus: ANTIOQUIA: **Caldas**: CBUCES-D 158.

Pristimantis penelopus: ANTIOQUIA: **Amalfi**: CBUCES-D 497–98, 575, 604, 705–07, 733, 737, 754–55, MHUA-A 1432, 3135; **Gómez Plata**: MHUA-A 5839; **Maceo**: CBUCES-D 81, 301–02, MHUA-A 12328; **Mutatá**: CBUCES-D 415, 551; **Remedios**: CBUCES-D 256; **San Roque**: CBUCES-D 806, 807, 811; **Valdivia**: CBUCES-D 867; **Yolombó**: MHUA-A 1280.

Pristimantis permixtus: ANTIOQUIA: **Angostura**: MHUA-A 7757; **Bello**: MHUA-A 5856, 5863; **San Pedro de los Milagros**: CBUCES-D 636.

Pristimantis ridens: COLOMBIA. CHOCÓ: **Bahía Solano**: EAFIT-Am 0005, 0125, 0170, 0232, 0635, 10953; **Nuquí**: MHUA-A 4891. PANAMÁ: **Bocas del Toro:** KU 114730; **Cocle**: KU 114712.

Pristimantis roseus: CHOCÓ: **Bahía Solano**: MHUA-A 6733, 6734, EAFIT-Am 0078, 0080, 0097, 0105, 0106, 0114, 0116, 0137, 0167, 0172, 0178, 0180, 0241, 0295, 0622; **Nuquí**: MHUA-A 4892. VALLE DEL CAUCA: **Calima:** KU 168554–55.

Pristimantis sanguineus: ANTIOQUIA: **Frontino**: CBUCES-D 89, 92, 93, 210, 213, 214, 219, MHUA-A 11595, ICN 37833˚ (Photo examined).

Pristimantis taeniatus: ANTIOQUIA: **Amalfi**: CBUCES-D 465, 483, 506, 566, 598, 616, 708, 736, 992, MHUA-A 470, 679–80, 742, 1144, 1439, 1979, 4489, 4737, 5224, 6116; **Anorí**: MHUA-A 789, 5351, 5577, 5587, 8578; **Don matías**: MHUA-A 2198; **Gómez Plata**: MHUA-A 812, 813, 1105, 1265, 1268, 5841, 5848, 5972; **Guadalupe**: CBUCES-D 656, 658; **Maceo**: CBUCES-D 80, MHUA-A 2656; **Remedios**: CBUCES-D 252, 257; **San Carlos**: MHUA-A 7212, 7431; **San Luis**: MHUA-A 6660; **San Roque**: CBUCES-D 801, MHUA-A 6510; **Valdivia**: CBUCES-D866, MHUA-A 393; **Yolombó**: MHUA-A 317, 834, 1152, 1440, 4731; CHOCÓ: **Istmina (Noanama)**: BMNH 1947.2.16.99˚ (Photo examined); SANTANDER: **San Vicente del Chucurí**: MHUA-A 5387–88, 5389, 5393, 5397, 5401–02, 5405, 5408, 5411, 5416–21, 5423, 5425–27, 5429.

Pristimantis thectopernus: QUINDÍO: **Filandia**: EAFIT-Am 0549–54, 0562, 0564, 0573, 0580, 0582–83, 0585–86; CALDAS: **Salamina**: CSJ-h 1713–17.

Pristimantis viejas: ANTIOQUIA: **Alejandría**: MHUA-A 7136, 7140, 7418, 7426–30, 8335, 8341, 10465, 10474, 10521; **Amalfi**: CBUCES-D 607, 977, MHUA-A 116, 453, 1454, 5226, 5235, 6035, 11901; **Anorí**: MHUA-A 3602–07, 8572, 11468–69, 11471–75; **Cocorná**: 8527–28, 10257, 11194, 11421; **Don Matías**: MHUA-A 11378; **Gómez Plata**: MHUA-A 5838; **Granada**: MHUA-A 10472, 10509, 10526; **Maceo**: CBUCES-D 303–04; **Nariño**: MHUA-A 7018; **Remedios**: CSJ-h 4999, MHUA-A 6922; **San Carlos**: MHUA-A 745, 6597, 7119, 7135, 8294, 10475, 11243, ICN 42426˚(Photo examined); **San Francisco**: MHUA-A 11364; **San Luis**: MHUA-A 10278, 11323; **San Rafael**: MHUA-A 7058, 9742–44, 9759, 11118, 11261; **Sonsón**: MHUA-A 10429; 10431, 10433; CALDAS: **Norcasia**: MHUA-A 2052; **Samaná**: MHUA-A 7200; **Victoria**: MHUA-A 5705.

Pristimantis w-nigrum: ANTIOQUIA: **Armenia**: CSJ-h 404; **Caldas**: CSJ-h 395, 409, 412; **Envigado**: CSJ-h 392, 408 410; **Frontino**: CSJ-h 445; **Guarne**: CSJ-h 419; **Heliconia**: CSJ-h 417; **Ituango**: CSJ-h 432–33, 437–39, 441–43, 446–47, 449–50, 452, 455, 458–59, 2148; 2152; 2154–58; **Medellín**: CSJ-h 394, 400, 425, 436, 453–54, 2151; **San Vicente**: CSJ-h 431; **Urrao**: CSJ-h 2123, 2150, 390, 391, 396, 399, 402, 405, 406, 407, 411, 416, 420, 421, 422, 423, 428, 429, 434, 435, 440, 444, 460, 461, 462, 463, 464, 465, 466; **Yarumal**: CSJ-h 414, 415, 448, 451, 456, 457; CALDAS: **Pácora**: CSJ-h 430; **Salamina**: CSJ-h 427; **San Vicente**: CSJ-h , 398, 418, 424, 2147, 2153, 2159–60; **Santa Rosa de Cabal**: CSJ-h 393; VALLE DEL CAUCA: **Yotoco**: CSJ-h 397, 403.

Appendix 2. Online resource containing the table of diagnostic characters for the species in the *Pristimantis ridens* group, as referenced in the text, is available on FigShare: https://doi.org/10.6084/m9.figshare.30081928

Appendix 3. Corrected characters for *Pristimantis campesino*. (A) Ventral view of an adult female (MHUA-A 5555, paratype) showing the inner tarsal fold (In. tf) and the discoidal fold (D. f); (B) hand of an adult male (MHUA-A 12022, holotype) showing the double nuptial pad (N. p).