



Two new *Pristimantis* (Anura: Terrarana: Strabomantidae) from the Sierra de Perijá, Venezuela

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Abstract

Two new species of *Pristimantis* are described from Cerro Las Antenas, on the Venezuelan versant of the Sierra de Perijá, a region that is being rapidly destroyed by extensive cultivation and civil unrest. The first species (*P. lassocalcai* **sp. nov.**) has dirty-white spots surrounded by black in the groin and on the hidden surfaces of the hind limbs—a characteristic shared by members of the "*lentiginosus*" group (Rivero 1982) from the Cordillera de Mérida—and marbled to reticulated venter. The second species (*P. rivasi* **sp. nov.**) is currently the largest member of the genus known from Perijá, and presents conspicuous cranial crests. The two new species are assigned to the *P. unistrigatus* species group.

Key words: *Eleutherodactylus*, *Pristimantis*, new species, Sierra de Perijá, Venezuela, Colombia

Resumen

Se describen dos nuevos *Pristimantis* del Cerro Las Antenas, en la vertiente venezolana de la Sierra de Perijá, una región amenazada por la incontrolada expansión agrícola y problemas de orden público. La primera especie (*P. lassocalcai* **sp. nov.**) podría estar relacionada con las del complejo "*lentiginosus*" de Rivero (1982) de la Cordillera de Mérida, ya que las especies de este grupo comparten la presencia de manchas claras rodeadas de negro en la región inguinal y en las superficies ocultas de las extremidades posteriores, y por su vientre jaspeado a reticulado. La segunda especie (*P. rivasi* **sp. nov.**) es la de mayor tamaño de Perijá por el momento, y muestra crestas craneales notables. Las dos especies nuevas son asignadas al grupo de especies *P. unistrigatus*.

Introduction

Recently, Heinicke *et al.* (2007) split the long established genus *Eleutherodactylus*, formerly in the family Leptodactylidae (Lynch 1971, 1981; Frost 1985; Duellman 1993; Barrio Amoros 1998), and subsequently placed in the family Brachycephalidae by Frost *et al.* (2006), into three major genera: *Eleutherodactylus* for the Caribbean species, *Craugastor* for mainly Central American species, and *Pristimantis* for almost all South American species. Hedges *et al.* (2008) offered a more comprehensive panorama of the so-called "eleutherodactylines" and erected the new taxon Terrarana for four families (Brachycephalidae, Craugastoridae, Eleutherodactylidae, Strabomantidae). Most of the former South American members of *Eleutherodactylus* are now placed tentatively in the genus *Pristimantis*, within Strabomantidae. We follow the classification proposed by Hedges *et al.* (2008).

The Sierra de Perijá is the northernmost spur of the Andean range, and forms a natural boundary between Colombia and Venezuela. The amphibian fauna of this region has been only superficially explored. Thirty one

species (seven undescribed) are known to occur on the Venezuelan versant of Perijá (Aleman 1953, Barrio-Amorós 1998, 2001, Barrio-Amorós & Fuentes 2003; Barros & Barrio 2001, Barrio-Amorós *et al.* 2007, Castroviejo-Fisher *et al.* 2007, Infante *et al.* 2006a, 2006b, La Marca & Garcia 1987, Vilorio & Calchi 1993; FRR unpubl.). Among these 31 species, *Pristimantis urichi* (Boettger, 1894) was listed by Rivero (1964) but that name was misapplied according to Kaiser *et al.* (1994) and Barrio-Amorós *et al.* (2007) because *Pristimantis urichi* is indeed restricted to the island of Trinidad. Barrio-Amorós *et al.* (2007) described the three first *Pristimantis* from the Venezuelan side of Perijá: *P. fasciatus* Barrio-Amorós, Rojas-Runjaic & Infante, 2007, *P. turik* Barrio-Amorós, Rojas-Runjaic & Infante, 2007, and *P. yukpa* Barrio-Amorós, Rojas-Runjaic & Infante, 2007. *Pristimantis cuentasi* (Lynch, 2003) and *P. reclusus* (Lynch, 2003) were described by Lynch (2003) from the high paramos of the Colombian versant of Perijá. Because the habitat of *P. cuentasi* and *P. reclusus* is continuous between the two versant of the Sierra, both species are also expected to occur on the Venezuelan side. Another species previously unknown from Perijá is herein reported: *P. prolixodiscus* (Lynch, 1978), based on the specimen EBRG 202 (see Appendix I). During four recent expeditions to two localities of cloud forest on the Venezuelan side of the Sierra de Perijá, two new species of *Pristimantis* were collected, and are described herein.

Study area. The collection area lies at the northern half of the Sierra de Perijá. It is a mountainous area with abrupt relief and altitudinal range between 1400 and 1950 m (Fig. 1 top). It belongs to the SubAndean belt (1000-2400 m) as reported by Cuatrecasas (1958). Ewel *et al.* (1968) consider the area to be occupied by very humid, premontane and montane forest. Huber & Alarcón (1988) described the vegetation as ombrofilous submontane evergreen forest. The forests mentioned have a high canopy (Zambrano *et al.* 1992). In Perijá, this belt is predominantly covered by cloud forests and has a surface of 1811 km². The temperature in this altitudinal belt fluctuates from 16-24°C with annual rainfall of 2000-4000 mm. Rain regimes are bimodal and tetra seasonal. The area has dry periods in December–March and June–August and rainy periods in April–June and August–November. The collection area is located in a mountainous sector at an altitude between 1490 and 1950 m. Access to the nearest town (Villa del Rosario) is via a rural dirt road. This mountainous sinuous path is surrounded by cloud forest. The two new *Pristimantis* were collected along this part of the road (Fig. 1 bottom); the frogs were frequently seen and heard along this mountainous path. This site is between the Río Lajas basin in the northwest and the Río Cogollo basin to the northeast, including their respective mountain tributaries like the Quebrada Seco, Río Piche, and Quebrada Agua Hedionda. In addition to the infrastructure for radio and TV antennas, there are a moderate to strong intrusion into the forest by peasants that cultivate *malanga* (*Xanthosoma sagittifolium*, Araceae). Their extensive agriculture has eliminated many hectares of the natural forest between 400 and 1400 m.

Materials and methods

All measurements were taken with calipers to the nearest 0.1 mm. Terminology for morphological characters follow Lynch & Duellman (1997). Comparisons were taken from Lynch & Ruíz-Carranza (1985), Lynch (1983, 1994, 1996, 2003), and Rivero (1982a, 1982b). We follow Hedges *et al.* (2008) with regard to the generic, familiar and suprafamiliar classification.

Measurements of adult frogs follow Barrio-Amorós *et al.* (2006) and are: SVL: straight length from tip of snout to vent; ShL: shank length from outer edge of flexed knee to heel; HeL: head length from tip of snout to the posterior border of skull (posterior edge of prootic, noted through the skin); HW: head width between angle of jaws; InD: internarial distance between centers of nares; EN: distance of anterior edge of eye to nostril; ED: horizontal eye diameter; TD: horizontal tympanum diameter; ETS: distance between the anterior edge of the eye to the tip of snout; FD: disk width of Finger III; T4D: disk width of Toe IV; 1FiL: length of Finger I from inner edge of thenar tubercle to tip of disk; 2FiL: length of Finger II from the junction of Finger I and III to the tip of finger disk. Some classical measurements like IOD (interorbital distance) and UEW

(upper eyelid width) are not included, because we consider them to be too variable because of differences in preservation (see discussion about the topic by Hayek *et al.* 2001, and Deichmann *et al.* 2009).

Museum acronyms used are: CVULA: Colección de Vertebrados, Facultad de Ciencias, Universidad de los Andes, Mérida, Venezuela. EBRG: Museo de la Estación Biológica Rancho Grande, Maracay, Venezuela. KU: Natural History Museum, Kansas University, Lawrence, Kansas. MHNLS: Museo de Historia Natural La Salle, Caracas, Venezuela.

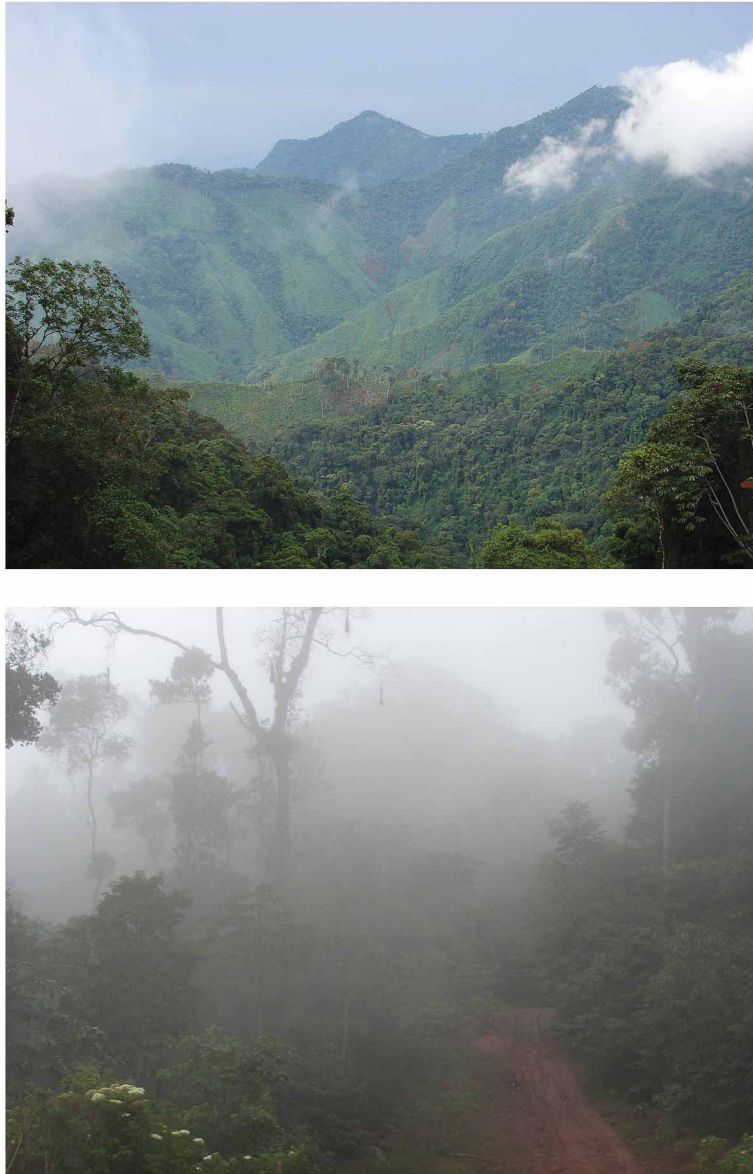


FIGURE 1. Top: general view of the area where *Pristimantis lassoalcalai* **sp. nov.** and *P. rivasi* **sp. nov.** inhabit at the Sierra de Perijá, estado Zulia, Venezuela. Bottom: dirt road in cloud forest, where the specimens of *Pristimantis lassoalcalai* **sp. nov.** and *P. rivasi* **sp. nov.** were collected. Photos by T.R. Barros.

Results

Hedges *et al.* (2008) list the following selected features as characteristic for *Pristimantis*: head as wide as body, tympanic membrane differentiated, dentigerous process of vomers present, terminal discs of digits expanded, bearing well defined circumferencial grooves, toe V longer than toe III. *Pristimantis* is a genus not

known to have synapomorphies, and therefore the assignation of the new species to this genus is tentative until molecular data confirms their final assignation. However, *Pristimantis* is the only genus known to occur in the Sierra de Perijá, the Cordillera de Mérida and the Cordillera oriental de Colombia presenting the combination of morphological characters of the two new species, as described below.

We assign these species to the *P. unistrigatus* species group as defined by Lynch & Duellman (1997) and Hedges *et al.* (2008) by being small to medium sized frogs, with bodies slender to robust, short snouts and moderately long limbs, having the finger I shorter than finger II, the toe V longer than toe III, the digital discs expanded, the tympanic annulus and membrane present, with cranial crests usually absent (present in *P. rivasi* **sp. nov.** as well as in *P. ruidus* (Lynch, 1979) and *P. thymalopsoides* (Lynch, 1976)), vomerine teeth and vocal sacs present. The morphology of both new species agrees with the diagnostic traits of the *P. unistrigatus* species group. See remarks under *P. lassoalcalai* **sp. nov.**

***Pristimantis lassoalcalai* sp. nov.**

Fig 2

Holotype: MHNLS 18898, an adult female from Cerro Las Antenas, elevation 1827 m, 10°19'40.0"N-72°35'27.0" W, Sierra de Perijá, Municipio Rosario de Perijá, Estado Zulia, Venezuela, collected on 29 March 2008, by Fernando Rojas-Runjaic, Edwin Infante, Paul Granado, Pio Colmenares and Pablo Velozo.

Paratypes: seven adult females: MHNLS 18460, with immature ova, collected by Gilson Rivas and Tito Barros on 31 March 2007; MHNLS 18877 collected on 29 March 2008, by Fernando Rojas-Runjaic, Edwin Infante, Pablo Velozo, and Paul Granado; MHNLS 18893-97, all collected in the type locality; six adult males (MHNLS 18873, 18874, 18876, 18878, 18879 and 18900) collected on 29 March 2008, by Fernando Rojas-Runjaic, Edwin Infante, Pablo Velozo and Paul Granado, collected at the type locality.



FIGURE 2. A: *Pristimantis lassoalcalai* **sp. nov.** A: MHNLS 18878, male paratype in life. B: MHNLS 18877, female paratype in life. Photos by P. Velozo.

Diagnosis. *Pristimantis lassoalcalai* is a small (SVL of males 21.3–23.2 mm [n=6], mean= 22.1 mm; SVL of females 23.2–27.4 [n=7], mean=25.3 mm) member of the *P. unistrigatus* species group characterized by: (1) dorsal skin shagreen with a distinct to indistinct middorsal raphe; ventral skin areolate; cranial crests absent; (2) tympanum distinct, about $\frac{1}{3}$ of ED; (3) snout subacuminate in dorsal view, subacuminate in

profile; canthus rostralis distinct, rounded; (4) upper eyelid smooth, with small granules; (5) choanae small, round to oval; dentigerous processes of the vomers small, slightly oblique, with 3–4 teeth on each; tongue large, round, $\frac{1}{3}$ free posteriorly; (6) vocal slits on males, single nuptial pads on thumb small, white; (7) Finger I shorter than II; (8) fingers without lateral keels; (9) ulnar tubercles absent; (10) tarsal tubercles absent, calcars usually absent, only apparent in life; (11) inner metatarsal tubercle indistinct and oval, outer small, protuberant; (12) toes without lateral keels; webbing absent; Toes III, IV and V with relatively broad disks, slightly smaller than those on Fingers III and IV; Toe V slightly longer than III; (13) colour in life golden brown to gray, with small irregular dark brown spots; dark brown canthal and supratympanic stripes; a narrow labial whitish stripe; hind limbs barred or not; hidden surfaces of hind limbs pale to dark brown, sometimes with small round white spots surrounded by dark brown. Throat light gray, chest, belly and inferior part of limbs light gray, dark brown marbled or reticulated. Iris metallic golden, finely black reticulated. In preservative, dorsal colour pale to dark grey or bronze, usually unpatterned or with a few irregular marks, including an ill defined interorbital bar; canthal, and supratympanic stripes wide and conspicuously dark grey to black; narrow dirty white labial stripe; ventrally dirty white marbled, spotted or reticulated with gray; in 30% of the individuals there are dirty white flash marks (pale yellow in life) surrounded by black in groin and on hidden surfaces of hind limbs.

Pristimantis lassoalcalai is unique among northern Andean *Pristimantis* in the following combination of characters: body and head slender, poorly defined marks on dorsum, marbled to reticulated venter; on 30% of the specimens there are pale (pale yellow in life) flash marks on the groin and on the hidden surfaces of the hind limbs; middorsal raphe and short anterior dorsolateral folds; cranial crests absent.

Pristimantis lassoalcalai (characters in parentheses) is here compared with species from cloud forest and paramo in Venezuela and adjacent Colombia (including two species inhabiting paramo in the Sierra de Perijá). The only two paramo-dwelling species in Perijá are known from the Colombian side, though their presence on the Venezuelan side is possible. *Pristimantis cuentasi* is a paramo dweller with short legs, shank 32.7–39% of SVL (49.6%), can be distinguished by snout rounded in profile (subacuminate), and fingers without distinct disks (moderately large). *Pristimantis reclusus*, another paramo dweller, robust (slender), with disks on fingers only slightly more expanded than digit (Finger III twice width of adjacent phalanx), and a row of low ulnar tubercles (absent). *Pristimantis lassoalcalai* is compared with species from the Sierra de Santa Marta in Colombia, the closer Cordillera Oriental de Colombia, Cordillera de Mérida and Sierra de Perijá that lack cranial crests and/or have pale flash marks in the groin and on the hidden surfaces of hind limbs. *Pristimantis carmelitae* (Ruthven, 1917) has a finger IV reaching the proximal edge of the disc of FIII (shorter, reaching only the proximal edge of the intercalary cartilage), smooth skin on venter (areolate), males lack vocal slits (present), and is a larger species, males 29.9–39.2 mm; females 36.4–48.8 mm (males 21.3–23.2 mm; females 23.2–27.4 mm). *Pristimantis insignitus* (Ruthven, 1917) has occipital folds (absent), skin on venter smooth (areolate), and first finger longer than second (shorter). *Pristimantis megalops* (Ruthven, 1917) has shagreen dorsum skin with enlarged warts (warts absent), finger and toes with lateral fringes evident at their bases (absent), and the posterior surfaces of the thighs reticulated (grey with pale spots). *Pristimantis sanctamartae* (Ruthven, 1917) lack nuptial pads (present), has large pads on outer fingers (moderate), lateral keels on fingers and toes (absent) and ulnar and tarsal tubercles (absent). *Pristimantis douglasi* (Lynch, 1996) is a member of the *Pristimantis galdi* species group (*P. unistrigatus* species group), with females having crests (absent), but males lack them and are quite similar in general appearance; *P. douglasi*, from the northernmost Cordillera Oriental de Colombia, have fingers and toes with fleshy lateral keels (absent), inner tarsal fold (absent), a labial white stripe (absent or ill defined), dark brown venter sometimes with white large spots (dirty white to marbled, spotted or reticulated with gray), usually a narrow white vertebral stripe (absent in the type series of *P. lassoalcalai*) and cream lines on canthus, eyelids and back of scapula (absent), iris greenish yellow with a red horizontal streak (metallic golden with greenish tonalities). Rivero (1982) diagnosed his "*Eleutherodactylus lentiginosus*" group from the Cordillera de Mérida as having cream or yellow spots in the groin and on the anterior and posterior surfaces of the thigh (this is a variable character and its presence or absence is not necessarily diagnostic, CLBA pers. obs.). *Pristimantis mondolfii* (Rivero, 1982) has a large

tympanum, $\frac{1}{2}$ of ED ($\frac{1}{3}$), angular canthus rostralis (round), distinct, round outer metatarsal tubercle (indistinct), small plantar supernumerary tubercles (absent), and is larger, females up to 48 mm (KU 181021) (females up to 27.4 mm). *Pristimantis melanoproctus* (Rivero, 1982) has a large tympanum, $\frac{1}{2}$ of ED ($\frac{1}{3}$), lacks vocal slits (present), fingers and toes with lateral fringes (absent), and has basal webbing (absent). *Pristimantis lentiginosus* (Rivero, 1982) has a large tympanum, $\frac{2}{3}$ of ED ($\frac{1}{3}$), a rounded snout dorsally (subacuminate), and an inner tarsal fold (absent). *Pristimantis vanadisae* (La Marca, 1984) has prominent tubercles on eyelids (only small granules), and prominent ulnar, tarsal, and heel tubercles (very low to indistinct). The sympatric *P. rivasi* **sp. nov.** is a larger species, females reaching 41 mm in SVL (maximum adult female SVL 27.4); with cranial crests (absent); subacuminate snout in profile (acuminate), truncate snout in dorsal view (subacuminate); broadly expanded finger disks (moderately expanded), and without flash marks in groin or on hidden surfaces of hind limbs (present). Other Perijá species without cranial crests are *P. prolixodiscus*, *P. fasciatus* and *P. yukpa*. *Pristimantis prolixodiscus* is a member of the *P. lacrimosus* species group (*P. unistrigatus* species group), and is herein reported from The Sierra de Perijá, therefore compared with *P. lassoalcalai* since it does not bear cranial crests; it has a snout with a pointed papilla at tip (lacking papilla), discs on digits longer than wide (wider than long), fingers and toes with lateral fringes (absent), heel lacking conical tubercle (present in living specimens), venter white (dirty white to marbled), and green on the dorsum (never green); furthermore, *P. prolixodiscus* is a bromeliad inhabitant (never found in bromeliads) *Pristimantis fasciatus* has fingers with lateral fringes and basal webbing (absent), toes with lateral fringes and basally webbed (absent), tympanum annulus completely exposed (its posterodorsal section hidden under a supratympanic fold), skin on dorsum finely granular (shagreen), a striped pattern (never striped in the known series). *Pristimantis yukpa* has lateral fringes on fingers II and III (absent), webbing between toes IV and V (absent), toe V much longer than III, surpassing distal tubercle on TIV (slightly longer, reaching penultimate subarticular tubercle on TIV), an immaculate white venter (white background with grey spots or reticulations) and no inguinal marks surrounded by black (present in many individuals).

Description of the holotype: an adult female, of 26.2 mm of SVL. Body slender; head slightly longer than wide, HW 38.16% of SVL. Snout subacuminate in profile (Fig. 3a), subacuminate in dorsal view (Fig. 3b); EN slightly shorter than ED; nostrils non-protuberant, directed dorsolaterally; canthus rostralis distinct, rounded; loreal region slightly concave. Upper eyelid without tubercles or warts. Cranial crests absent. Tympanum distinct, 33.3% of ED, surrounded by a tympanic annulus, with a supratympanic fold covering a small portion of its posterodorsal section. Choanae small, round, not concealed by palatal shelf of maxillary arch; vomerine dentigerous processes small, slightly oblique, bearing 4 teeth each, posterior and medial to choanae. Tongue round, slightly notched posteriorly, posterior one third free.

Dorsal skin shagreen (Fig. 3c); one large tubercle posteroventral to tympanum present; occipital ridges poorly-defined; middorsal raphe only present, but difficultly detectable, on the head; dorsolateral folds present on the anterior half of the body, low and indistinct. Throat and chest smooth, belly and ventral surfaces of thighs areolate (Fig. 3d); posterior surfaces smooth. Ulnar, tarsal, and heel tubercles absent.

Relative lengths of adpressed fingers III>IV>II>I; when adpressed, Finger I not reaching disk on Finger II. Finger disks much broader than long, disk on Finger III twice width of adjacent phalanx; oval except on Finger II, which is rounded; disk on thumb round, not distinctly expanded. Finger II disk on right hand 1.5 times wider than adjacent phalanx. Lateral fringes on fingers absent; webbing absent. Bifid palmar tubercle, and ovoid thenar tubercles low, indistinct; subarticular tubercles protuberant, single, round; supernumerary tubercles protuberant, in rows under each finger (Fig 3e).

Hind limbs moderately short; shank 49.6% of SVL. Relative lengths of appressed toes IV>V>III>II>I. Disk on Toe IV slightly smaller than disk on Finger III. Toes without lateral fringes, unwebbed. Disks slightly wider than long, wider than phalanges, horizontally oval, except on Toe I, which is round. Inner metatarsal tubercle oval, indistinct; outer small, protuberant, round; subarticular tubercles protuberant, single, round; four supernumerary tubercles distinguishable under left plant (Fig 3f).

Colour in life (Fig 2a). Dorsum golden brown with small scattered irregular dark brown spots; head slightly lighter, especially over the external borders of the upper eyelids and snout; with two dark brown

stripes, one interorbital, another transversal irregular black bar anterior to the upper eyelids; dark brown canthal and supratympanic stripes; a narrow labial stripe interrupted by lighter transverse intersections. Ill defined dark brown transverse bars on anterior limbs; on hind limbs little more defined over a light grey background; hidden surfaces of hind limbs grey with small round white spots surrounded by dark brown. Throat light grey, chest belly and inferior part of limbs light grey spotted with white. Iris metallic golden with greenish tonalities and finely black reticulated.

Colour in preservative. Dorsum grey, with small black spots irregularly spread along dorsum; on the head, an irregular black, broken interorbital bar, and another transversal irregular black bar anterior to the upper eyelids (Fig. 3b). Canthal stripe black, wide, covering nare; supratympanic stripe black, covering upper half of tympanum and turning behind tympanum towards the upper arm; a narrow longitudinal labial grey stripe on each side. Transverse dark bars on hind limbs only on shanks and tarsi. Anterior surface of thighs with pale spots surrounded by dark grey. Throat grey, chest, belly and ventral surfaces of arms dark grey with white marbling (Fig 3d); downsides of shanks and tarsi dark grey with white round little spots.

Measurements of holotype (in mm): SVL: 26.2; ShL 13; HeL: 10.3; HW: 10; InD: 2.4; EN: 3; ED: 3.6; TD: 1.2; ETS: 4.7; FD: 1.2; T4D: 1; 1FiL: 3; 2FiL: 3.8.

Variation: Females are consistent in the majority of characters with the female holotype. Some variation can be seen in the shape of the middorsal raphe (distinct on MHNLS 18460, 18894, 18895, present but indistinct on MHNLS 18877, 18893, 18897). The two dorsolateral folds are present on all females although they are low and ill-defined; they are completely indistinct on 18460 due to its bad preservation state. There also is consistently present a tubercle posteroventral to the tympanum. Small calcars are present at least in two specimens photographed in life (a male MHNLS 18878, Fig. 2a; a female MHNLS 18877, Fig. 2b) but not appreciable in preservative; small ulnar and tarsal tubercles are also appreciable in the male MHNLS 18878 (Fig 2a), but are indistinct in preservative. Appendix II shows the dorsal pattern variation of the type series. Males dorsally can be dark grey (MHNLS 18878), pale grey (MHNLS 18879, 18873–74), to bronze (MHNLS 18876), with transverse bars on the limbs, a W postoccipital mark, irregular spotting on dorsum, and a well defined black interorbital bar. The paler specimens (MHNLS 18879, 18873–74) have a uniform dorsum, with no spotting at all, except a few small irregular marks on the head of MHNLS 18876. The most appreciable variation is on ventral pattern and disposition of spots on the groin and on the hind limbs (Fig. 4a–d).

On all females but MHNLS 18894 the belly is patterned with dark grey marbled with white large mostly round spots. On MHNLS 18894 the pattern is discernible but paler. On females MHNLS 18460 and 18894 there are many pale spots surrounded by black on the groin (Fig 4a), anterior and posterior surfaces of the thighs, as is characteristic for the species in the *lentiginosus* group of Rivero (1988). Variation on the belly pattern is as follows: MHNLS 18876 is the paler, with an almost unpatterned belly (Fig 4b), MHNLS 18873 and 18874 have a pale reticulation; MHNLS 18879 has a spotted belly, without marbled or reticulation; MHNLS 18900 has a mostly white belly with irregularly scattered small round spots; and MHNLS 18878 has a dark grey belly with a few whitish small spots; the most patterned belly is on MHNLS 18877 (Fig. 4c). Males accord with all characters with females, and there is not a clear sexual dimorphism in pattern. The male MHNLS 18878 has also a profusion of white round spots on the groin and posterior side of the thighs (Fig.4d). Sexual dimorphism is only evident by the smaller size, presence of vocal slits and single white nuptial pads on males.

Natural history: One of the localities at Cerro Las Antenas corresponds to a section of a narrow rapid creek at 1780 m, surrounded by a dense primary cloud forest. At this site 18 specimens were collected and two more observed during the expedition of March 2008 (end of the dry season); all were found on different bush leaves in the creekside foliage, rocks in the creek's bed, and in sympatry with *Cryptobatrachus remotus* Infante-Rivero, Rojas-Runjaic & Barrio-Amorós, 2008, *Cochranella* sp., and *Hyalinobatrachium tatayoi* Castroviejo-Fischer, Ayarzagüena & Vila, 2007. The other locality is a secondary low forest, at the summit of Cerro Las Antenas, at 1933 m, with a high density of arboreal ferns, vines and *Cecropia*. At this site *Pristimantis lassoalcalai* was found in sympatry with *P. rivasi* **sp. nov.**

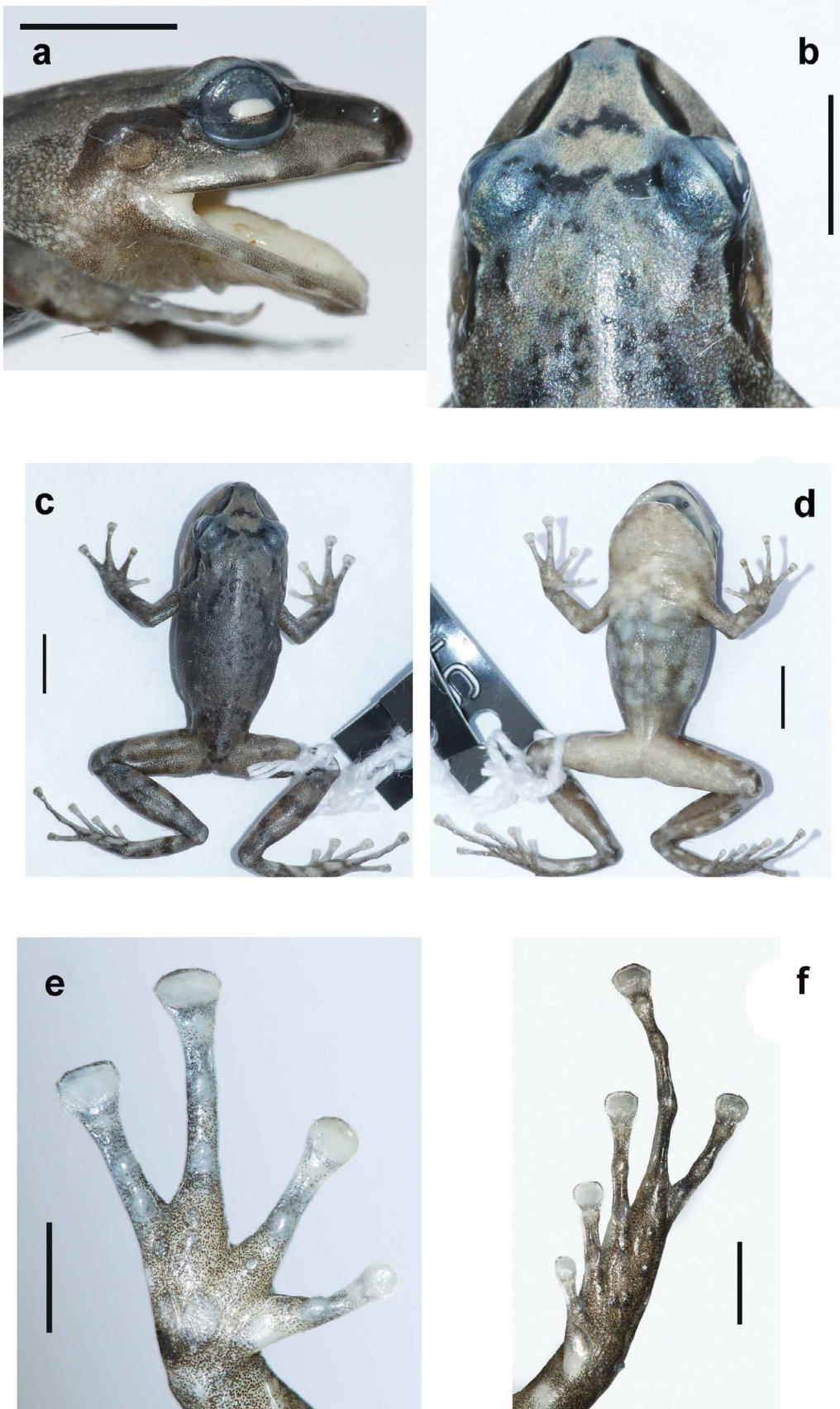


FIGURE 3. *Pristimantis lassoalcalai* sp. nov. MHNLS 18898, holotype. A: Lateral view and B: Dorsal view of the head; C: Dorsal view and D: ventral view of the preserved specimen. Scales equal to 5 mm. E: Palmar view of the right hand and F: Plantar view of the left feet. Scales equal to 2 mm.

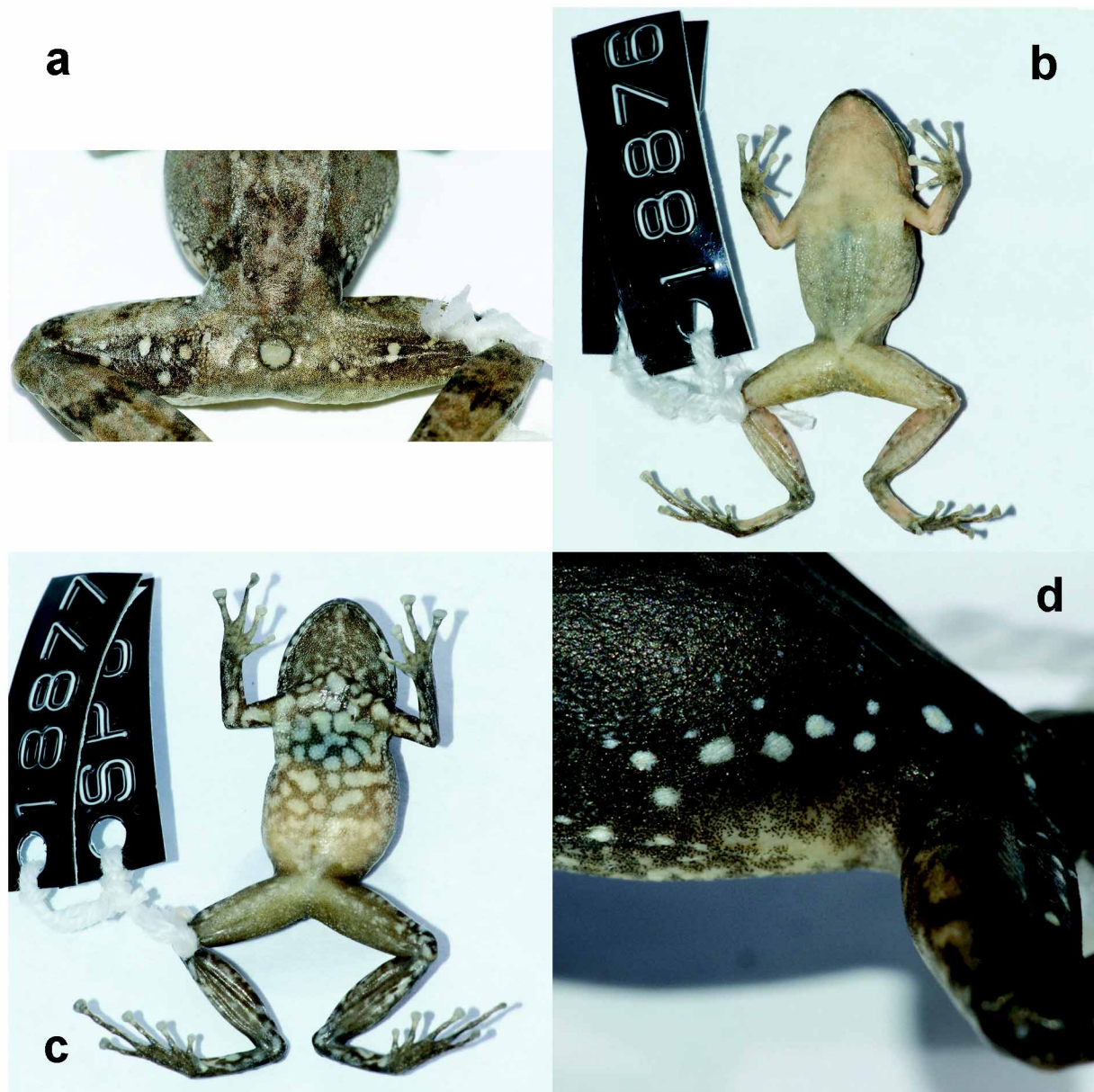


FIGURE 4. Details on pattern of *Pristimantis lassoalcalai* **sp. nov.** A: Posterior spotting of female MHNLS 18894; B: minimum ventral pattern marking, MHNLS 18876; C: maximum ventral pattern marking, MHNLS 18877; D: groin spotting of male MHNLS 18878.

During the expedition of March 2008 many males were heard vocalizing profusely between 1600 and 1900h, from leaves, usually exposed. All specimens seen or collected were at less than 1 m over the ground; several called from dry folds of *Cecropia* leaves. After 1900h the call activity declined abruptly and only a few males called sporadically until 2100h. During July 2008 many vocalizing males were heard calling profusely in the early morning hours (around 0800h) in a clear day near the summit of Cerro Las Antenas.

The vocalization of *P. lassoalcalai* consists of single notes emitted every few seconds to every few minutes. The call remains a lament and could be described onomatopoeically as “nheek, nheek, nheek”.

Distribution: (Fig. 5). *Pristimantis lassoalcalai* is only known from two localities on Cerro Las Antenas, from 1827 to 1950 m. It is expected to occur throughout similar environments and elevation in the Sierra de Perijá.

Etymology: The species epithet is a patronymic for Oscar Lasso-Alcalá, ichthyologist at Museo de Historia Natural La Salle, for his continued support and friendship.

Remarks: *Pristimantis lassoalcalai* fits almost entirely in what Lynch & Duellman (1997) defined as the *Pristimantis unistrigatus* group in that it has an areolate skin on the belly, Finger I shorter than II, and a V Toe longer than III, but with the disk on Toe V not reaching the anterior edge of the distal subarticular tubercle of Toe IV. This last character should be contrasted with the state “disk on Toe V reaching the anterior edge of the distal subarticular tubercle of Toe IV” as in *P. rivasi* **sp. nov.**, which unequivocally belongs into the *unistrigatus* species group; the difference could be of taxonomic importance, but to our knowledge this has been not tested.

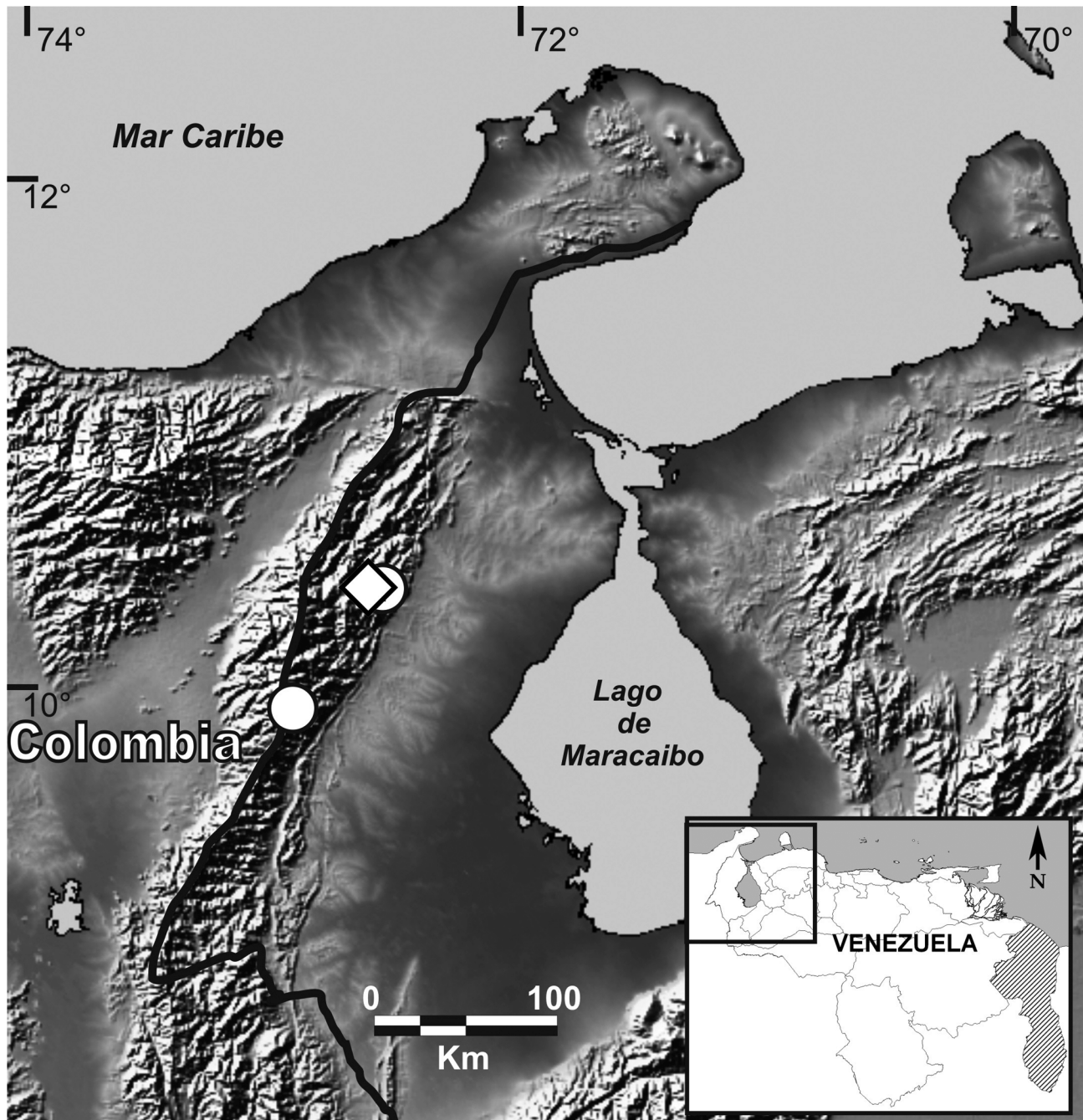


FIGURE 5. Map of NW Venezuela, showing major physiographic elements: Maracaibo Lake, Sierra de Perijá to the west, and Cordillera de Mérida to the south east. Type locality and known distribution of *Pristimantis lassoalcalai* **sp. nov.** is shown by a white rhomb. *Pristimantis rivasi* **sp. nov.** distribution is shown by white circles; that to the north correspond to the type locality.

***Pristimantis rivasi* sp. nov.**

Figures 6, 9

Holotype: MHNLS 18445, field number WES (Walter Schargel) 3029; an adult female with convoluted oviducts, collected by Walter Schargel, Gilson Rivas and Tito Barros on 11 August 2006, from Cerro Las Antenas, elevation 1670 m, 10°20' N-72°35' W, Sierra de Perijá, Municipio Rosario de Perijá, estado Zulia, Venezuela.

Paratypes: two adult males (MHNLS 18797, 18872) from the summit of Cerro Las Antenas, elevation 1933 m, 10°19'31.0"N-72°35'29.0"W, Sierra de Perijá, Municipio Rosario de Perijá, estado Zulia, Venezuela, collected on 26 March 2008, by F. Rojas-Runjaic and Pablo Velozo; one adult male (MHNLS 18459) from the path to Antenas Héctor Dario Socorro, elevation 1600 m, 10°20'N-72°34'W, collected on 31 March 2007, by T. Barros and G. Rivas; four adult males (MHNLS 18835-36, 18865-66), from the creek behind the house at Cerro Las Antenas, elevation 1449 m, 10°20'37.0"N-72°33'41.0"W, Sierra de Perijá, Municipio Rosario de Perijá, estado Zulia, Venezuela, collected on 27 March 2008, by Fernando Rojas-Runjaic and Edwin Infante; one adult male (MHNLS 18860), from the path between the first and second antennas, Cerro Las Antenas, elevation 1480 m, 10°19'34.2"N-72°35'28.4"W, Sierra de Perijá, Municipio Rosario de Perijá, estado Zulia, Venezuela, collected on 27 March 2008, by Pablo Velozo and Paul Granado; three adult males (MHNLS 19010-12), from coffee plantation near Yurumuto (Yukpa indigenos village), elevation 1640 m, 09°54'11.1"N-72°54'17.0"W, Río Tokuko basin, Sierra de Perijá, Municipio Machiques de Perijá, estado Zulia, Venezuela, collected on 14 September 2008, by F. Rojas-Runjaic and Pedro Cabello.

Diagnosis. *Pristimantis rivasi* is a medium sized (males with SVL 25–30.8 mm, mean=27.4 mm; one female SVL 41 mm) member of the *P. unistrigatus* species group. (1) Dorsal skin smooth anteriorly, having ill-defined occipital ridges, shagreen posteriorly with conspicuous and scattered small granules; ventral skin areolate; (2) tympanum distinct, with a tympanic annulus, 43% of ED; (3) snout subovoid with truncate tip in dorsal view, truncate in profile; canthus rostralis rounded; (4) upper eyelid with small granules; (5) choanae small, round; dentigerous processes of the vomers small, slightly oblique, each with five odontophores; tongue large, cordiform; (6) males with vocal slits, subgular vocal sac, and single white nuptial pads; (7) Finger I shorter than II; (8) fingers with lateral keels; outer pads enlarged; (9) ulnar tubercles absent; (10) tarsal tubercles and calcars absent; (11) two metatarsal tubercles, inner oval, large; outer conical, very small, almost indistinct; (12) toes with well marked lateral keels; webbing basal; toes III, IV and V with relatively broad disks, slightly smaller than those on fingers III and IV; (13) in life dorsal colour creamy brown, with an ill-defined to contrasting X, W and V-shaped marks over pale brown or gray on dorsum; incomplete canthal stripe dark brown to dark olive; supratympanic stripe black; ill-defined to very contrasting transverse bars are present on legs; iris orange bronze with fine black reticulations. In preservative, female dorsal colour bluish brown with no pattern; some small dark grey spots irregularly spread; flanks with a dark brown reticulation on whitish background; cross bars on legs ill-defined; ventral colouration whitish with small irregularly spread dark brown spots, more profuse on throat, with an ill defined mid-gular line, better defined mid-ventrally; lip bars dark brown, ill-defined, more like spots; iris grey with black reticulation; males with a contrasting pattern.

Pristimantis rivasi is unique among other *Pristimantis* from the northern Andes of Colombia and Venezuela in the following combination of characters: tympanum with a distinct tympanic annulus, absence of calcars, all tubercles on hands and feet distinct and protuberant, except outer metatarsal tubercle, preserved dorsal skin smooth, fringes on fingers and toes; basal webbing on feet; cranial crests present.

Pristimantis rivasi (characters in parentheses) is here compared with cloud forest, subparamo and paramo inhabitants from Venezuela and nearby Colombia. The only two paramo dwellers in Perijá are known from the Colombian side. *Pristimantis cuentasi* can be distinguished by its flat tubercles on dorsal skin and dorsolateral folds (absent), rounded dorsal profile (truncate), no cranial crests (present), and fingers without distinct disks (large). *Pristimantis reclusus* has flat tubercles on dorsum (absent), no cranial crests (present), disks on fingers slightly expanded (very expanded), and a row of low ulnar tubercles (absent). Other species from the Sierra

Nevada de Santa Marta in Colombia can be easily separated by not having cranial crests (present): *P. carmelitae*, *P. insignitus*, *P. megalops*, *P. sanctamartae*, *P. tayrona* (Lynch & Ruíz Carranza, 1985), and *P. w-nigrum* (Boettger, 1892). The following three species share with *P. rivasi* the presence of cranial crests, but can be differentiated by additional characters. *Pristimantis cristinae* (Lynch & Ruíz Carranza, 1985) has dorsolateral folds reaching the sacrum (absent), a rounded dorsal snout profile (truncate), one tubercle on each eyelid (absent), and tubercles on heel and outer edge of tarsus (absent). *Pristimantis delicatus* (Ruthven, 1917), has a middorsal raphe (absent), a rounded dorsal snout profile (truncate), one prominent conical tubercle on eyelid (absent), and toe disks that are small and barely expanded (large, expanded). *Pristimantis ruthveni* (Lynch & Ruíz Carranza, 1985), has a middorsal raphe and paravertebral and dorsolateral folds (absent), a rounded dorsal snout profile (truncate), and disks on fingers and toes not as enlarged and expanded as in *P. rivasi*. The following three species are known from the Cordillera Oriental de Colombia, and also live in or near the Venezuelan paramo de Tamá. *Pristimantis nervicus* (Lynch, 1994), has small digital disks (large, expanded), skin with warts (absent), no cranial crests (present); *P. nicefori* (Cochran & Goin, 1970), has no enlarged finger disks (present, large) (Lynch 1994). *Pristimantis anolirex* (Lynch, 1983) has flat warts on dorsum (absent), dorsolateral folds (absent), a rounded dorsal snout profile (truncate), and possess both ulnar tubercles and a calcar (absent) (Lynch 1983). *Pristimantis douglasi* is a member of the *P.galdi* species group (*P. unistrigatus* species group), with an acuminate dorsal view of the snout (subacuminate with truncate tip), ulnar and tarsal tubercles present (absent), inner tarsal fold (absent), short dorsolateral folds (absent), toe V slightly longer than III, surpassing penultimate tubercle on TIV (much longer, reaching anterior edge of distal subarticular tubercle on TIV), a labial white stripe (absent), usually a narrow white vertebral stripe (absent in the type series of *P. rivasi*), cream lines on canthus, eyelids and back of scapula (absent), *Pristimantis turik* is the only other species of the genus with cranial crests inhabiting the Sierra de Perijá. It has a Toe V slightly longer than III, thus not falling in the *unistrigatus* group (Toe V considerably longer than III, with the disk on Toe V reaching the anterior edge of the distal subarticular tubercle of Toe IV); a small tympanum, 1/3 of the ED (1/2); and lacks supernumerary tubercles on palms and soles (present).

Description of the holotype. The female holotype has 41 mm of SVL (Fig. 6). Head roughly as wide as long: head width 41.4% of SVL. Snout subovoid in dorsal view with the tip truncate (Fig. 7a), round in profile (Fig. 7b); EN longer than ED; nostrils not protuberant, directed dorsolaterally; canthus rostralis rounded and distinct, loreal region slightly concave. Upper eyelid with small granules. Cranial crests present, low, along postero-exterior half of the frontoparietals (Fig. 7c). Tympanum distinct, 43% of ED, surrounded by a tympanic annulus, with a supratympanic fold hiding little less than half of its posterodorsal section. Choanae small, rounded, not concealed by palatal shelf of maxillary arch; vomerine dentigerous processes small, slightly oblique, bearing 5 teeth each, posterior and medial to choanae. Tongue cordiform, posterior one third free.

Dorsal skin smooth anteriorly, shagreen posteriorly in preserved holotype (Fig 8a), with scattered tubercles and two tubercles at mid level of the nasals only notable in life (Fig. 6); some small post tympanic tubercles also present (seen only in life); ill-defined occipital ridges; middorsal raphe absent; dorsolateral folds absent. Ventrally (Fig 8b), throat and chest smooth, belly and inferior part of thighs areolate. Ulnar, tarsal tubercles and calcars absent.

Relative length of adpressed fingers III>IV>II>I; first finger reaching first third of disk on finger II. Finger disks much broader than long, disk on finger III of right hand three times wider than adjacent phalanx; truncate except on Finger II of left hand, which looks smaller; disk on thumb distinctly expanded but smaller than those on the other fingers. Finger II disk on right hand double wide than adjacent phalanx; Finger II disk on left hand only 1.3 times wider than adjacent phalanx. Single white nuptial pads on thumbs. Lateral fringes along all fingers, weaker on thumb; giving the appearance of ill-developed basal webbing. Palmar and thenar tubercles distinct, bifid and larger the first, ovoid the last. Subarticular tubercles protuberant, single, round. Supernumerary tubercles protuberant, in rows under each finger (Fig. 8c).

Hind limbs relatively short; shank 53.6% of SVL. Relative lengths of adpressed toes IV>V>III>II>I. IV toe disk slightly smaller than III finger disk. Toes with prominent lateral fringes; toes with basal webbing.

Disks wider than long, wider than phalanges, truncate. Inner metatarsal tubercle large, oval; outer almost indistinct, conical; subarticular tubercles protuberant, single, round; supernumerary tubercles small (Fig 8d).

Colour in life (Fig.6). The dorsal colour is creamy brown, with an ill-defined black interorbital bar. There is a poorly defined X-shaped pattern over pale brown on the dorsum. The canthal stripe is black and cut in two on both sides; the supratympanic stripe is black. Ill-defined pale brown transverse bars are present on the legs. The iris is a bronze orange with fine black reticulations. Gilson Rivas noted that the undersides of the legs were red (GR, field notes).



FIGURE 6. *Pristimantis rivasi* sp. nov. in life, female holotype. Photo by T. R. Barros.

Colour in preservative. Dorsal colour pattern bluish brown, with irregular darker spots spread, without any particular pattern (Fig. 8a). A narrow interorbital bar is almost indistinct. There are two symmetrical spots anterior to each eye, the superior one apparently forming part of a poorly defined canthal stripe, and an inferior one similar to a lip bar. Tympanic membrane dark brown; tympanic annulus bluish grey; supratympanic fold black. Three transversal bars on shanks ill-defined. Posterior part of flanks, inguinal region, and hidden surfaces of posterior extremities with a black reticulation on whitish background. Ventrally (Fig 8b), throat and chest dirty white with a profusion of small dark brown spots, more evident on the edges; belly whitish with less profusion of dark brown spots; a mid gular and mid ventral line is evident especially on belly. Iris grey with black reticulation.

Measurements of holotype (in mm): SVL: 41; ShL 22; HeL: 17; HW: 17.1; InD: 3.3; EN: 7; ED: 5.1; TD: 2.2; ETS: 8.3; FD: 2.4; T4D: 2.2; 1FiL: 7; 2FiL: 7.6.

Variation: Eight male paratypes have subgular sac, well-developed vocal slits, and ill defined single white nuptial pads. Their size is smaller (SVL 25–30.8 mm, mean= 27.4 mm, n = 8) than the only available female. The shape of the snout seen from above vary from truncate (holotype, MHNLS 18459, 18836, 18865,

18872) to subovoid (MHNLS 18797, 18860, 18866). The disk on fingers III and IV can be oval, round, or heart-shaped, although not notched. Dorsal pattern of males is much more contrasting (Appendix III top), usually consisting of an occipital W mark, an inverted and discontinuous V formed by dark brown spots, diagonal dark bars on flanks, and transverse vertical bars on hind limbs (from the less contrasting to the most MHNLS 18866, 18835, 18836, 18459, 18860, 18797, 18872 and 18865). Ventrally (Appendix III bottom) all are whitish, with a profusion of melanophores on the throat (from the less contrasting to the most MHNLS 18865, 18860, 18872, 18866, 18835, 18836, 18459 and 18797). The colour in life of MHNLS 18459 (Fig 9a) was dorsally light brown with the W and inverted V made by black spots; other marks were dark reddish brown, and forearm and hind limbs transverse bars were dark brown. A more contrasting individual (MHNLS 18860; Fig. 9b) was whitish dorsally with the same but much defined greenish marks. The iris was in all individuals constantly golden orange with a fine black reticulation.

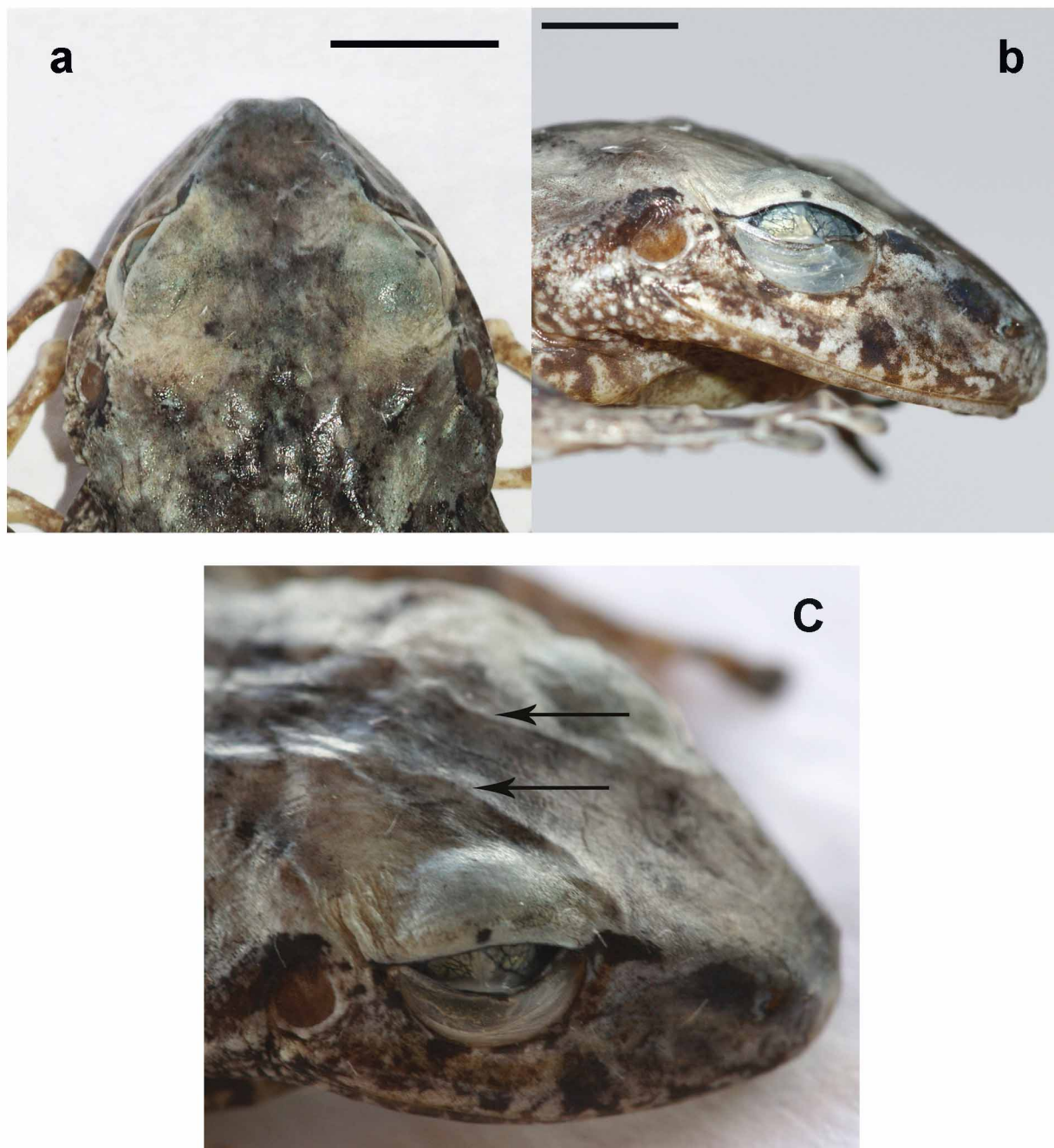


FIGURE 7. A: Dorsal and B: Lateral view of the head of the holotype of *Pristimantis rivasi* **sp. nov.** Scale equal to 5 mm. C: Frontoparietal crests apparent on female holotype.

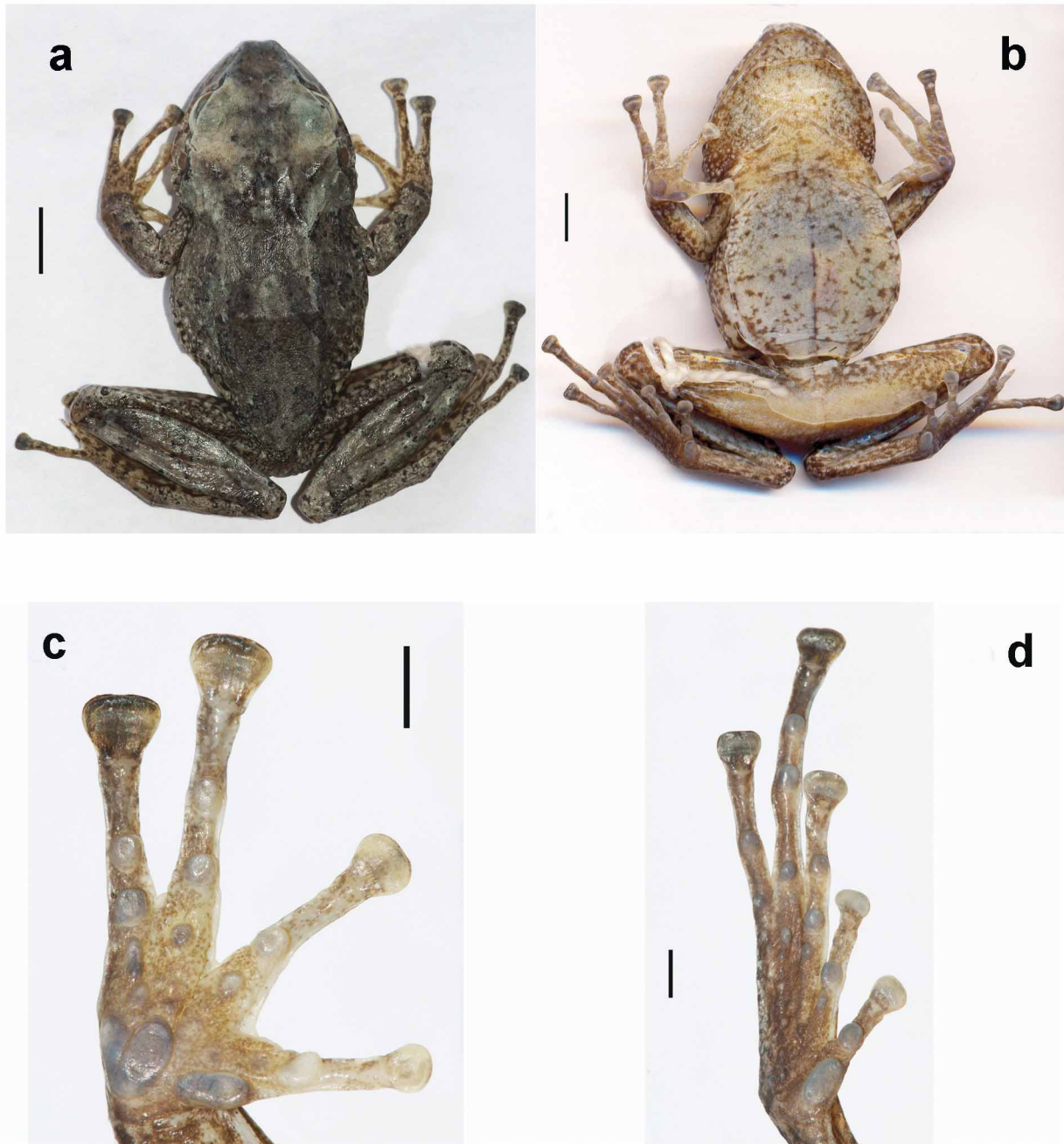


FIGURE 8. A: Dorsal and B: Ventral view of the female holotype of *Pristimantis rivasi* **sp. nov.** Scale equal to 5 mm. C: Palmar view of the right hand and D: Plantar view of the right feet of the holotype of *Pristimantis rivasi* **sp. nov.** Scale equal to 2 mm.

Natural history: *Pristimantis rivasi* is known from two localities: Cerro Las Antenas, between 1438 and 1945 m, and the Río Tokuko basin, between 1389 and 1640 m. At each locality, the species was collected at three different sites (see Distribution). One of the sites at Cerro Las Antenas corresponds to a section of a narrow rocky creek at 1450 m elevation, surrounded by a dense primary cloud forest. Here *P. rivasi* was found in sympatry with *Cryptobatrachus remotus*, *Cochranella* sp., *Hyalinobatrachium tatayoi* and *Rhinella marina* (Linnaeus, 1758). During March 2008 (end of the dry season), several individuals were observed on leaves of bushes and palms, from the forest litter level to four meters over the ground. The second site at Cerro Las Antenas is a section of a dirt road surrounded by cloud forest between 1548 and 1620 m in elevation, and *P.*

rivasi was found in sympatry with *P. yukpa*, *Hypsiboas* cf. *crepitans* (Wied-Neuwied, 1824) and *Rhinella marina*. The last site at Cerro Las Antenas is a secondary and short forest at the summit of Cerro Las Antenas, at an elevation of 1933 m, with dominant tree ferns, abundant vines and *Cecropia*. In this last site, *Pristimantis rivasi* was found in sympatry with *P. lassoalcalai* **sp. nov.** The holotype was collected in this last locality, after a heavy but short rain. Male paratypes were calling from bush leaves on the talus of the road, on leaves, tree branches, shrubs and bamboo sticks.

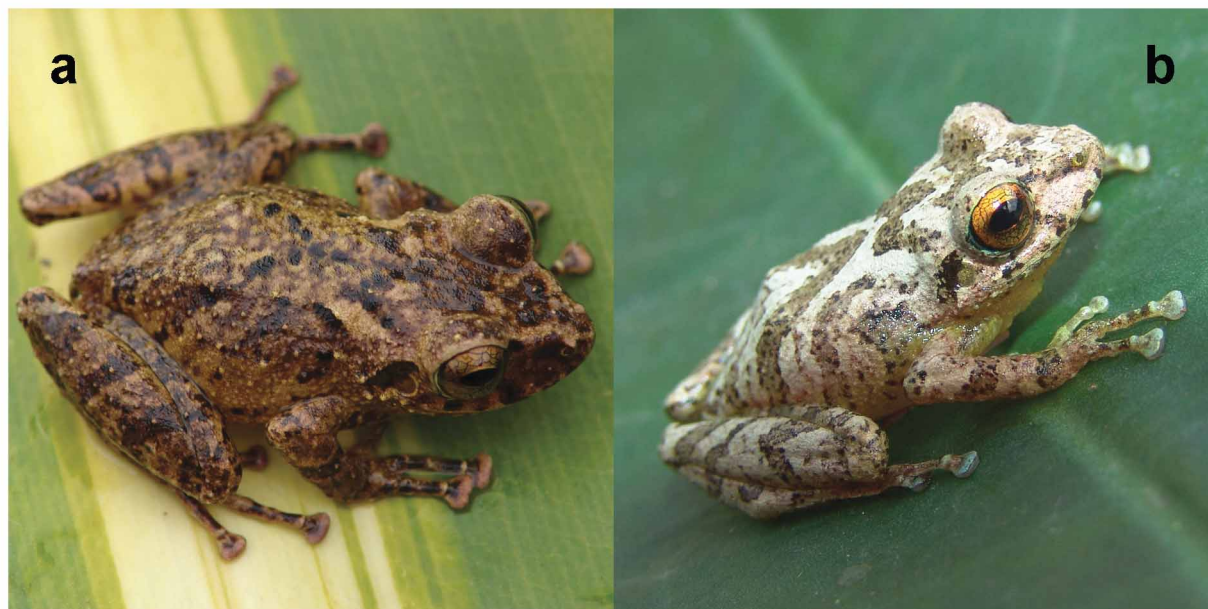


FIGURE 9. A: male paratype MHNLS 18459. Photo by T. R. Barros. B: Male paratype in life MHNLS 18860, showing extreme pattern. Photo by P. Velozo.

During March and July 2008, many males of *P. rivasi* were vocalizing intensely in choruses, between 1800 and 2000 h., some from short plants and higher bushes and other hidden in the forest litter; afterwards, some males called sporadically to 0130 h. The vocalization of *P. rivasi* is a series of clicks similar of what we could produce with the tongue against the palate. Onomatopoeically those notes can be described as “cloc, cloc, cloc,” emitted in series from a few to many, lasting for at most one minute.

During the September 2008 expedition to the Río Tokuko basin, many *P. rivasi* were heard vocalizing actively and also in choruses after a short rain about 2030h in a shadow coffee field. *Pristimantis yukpa* and another new species of *Pristimantis* (F. Rojas.Runjaic *et al.* unpubl.) were sympatric at that site. We confirmed the presence of *P. rivasi* in two more places of this same basin: surroundings of the Yupka indigenous village named Pishikakao at an elevation of 1603 m, 09°54'28.4"N-72°54'59.3"W; and around the other Yupka village called Yurumuto, at 1389 m, 09°53'51.2"N-72°54'06.4"W; there we only could heard the distinctive call of the species around 1830h. In both last localities *P. rivasi* was sympatric with *P. yukpa*.

Etymology: The name of this species is a patronym for Gilson Rivas Fuenmayor, one of the original collectors of the new species, a good friend and enthusiastic Venezuelan herpetologist, for his many contributions to Venezuelan herpetology.

Distribution: (Fig 5) The species is known from six sites in two localities: 1—creek behind the house of Cerro Las Antenas, 2—section of the path between the first and second antennas (type locality), and 3—second antenna, in the summit of Cerro Las Antenas, Municipio Rosario de Perijá (these three sites are comprehended in a lineal transect of 6.2 km and appear as a single circle on the map of Fig 5); 4—surroundings of the Yupka village Yurumuto, 5—the hill between Yurumuto and Pishikakao, and 6—surroundings of the Yupka village Pishikakao, in the río Tukuko basin, Municipio Machiques de Perijá (all three sites are in within 2 km and appear as a single circle on the map of Fig 5). The northernmost locality is

separated from the southernmost by an air distance of ca. 62 km; the elevational range is from 1438–1933 m. It is expected to occur throughout similar environments in the Sierra de Perijá.

Comment: *Pristimantis rivasi* is clearly a member of the *unistrigatus* group sensu Lynch and Duellman (1997) and Hedges *et al.* (2008), as it has areolate belly skin, Finger I shorter than II, and Toe V considerably longer than III, with the disk on Toe V reaching the anterior edge of the distal subarticular tubercle of Toe IV. However, as noted before, this group is phenetic, and must be tested genetically.

Remarks. The area where the two species described here reside is in permanent danger of habitat loss. In addition to the activities of Yukpa indigenous people, there exist persistent deforestation activities by *criollo* inhabitants, who cultivate *malanga* using a highly destructive procedure. Only the southernmost locality of *P. rivasi* lies inside the Parque Nacional Sierra de Perijá. Cerro Las Antenas is unprotected. Despite we have punctually explored other areas of the Sierra, the two new species have been observed in only two localities. Although nothing is known about the population status of these two new species, or the real distribution, we recommend listing these species under category VU D2 of the IUCN (vulnerable with very small distributional area of 20 km² or 5 localities), following Stuart *et al.* (2008), due to its apparent very restricted distribution and the dangers that the area is facing (named above).

The *Pristimantis* fauna of Perijá must be rich, as revealed by recent work (Lynch 2003; Barrio-Amorós *et al.* 2007), but exploring the area is a dangerous activity due to problems of civil unrest as presence of guerrillas, paramilitares and narco-dealers.

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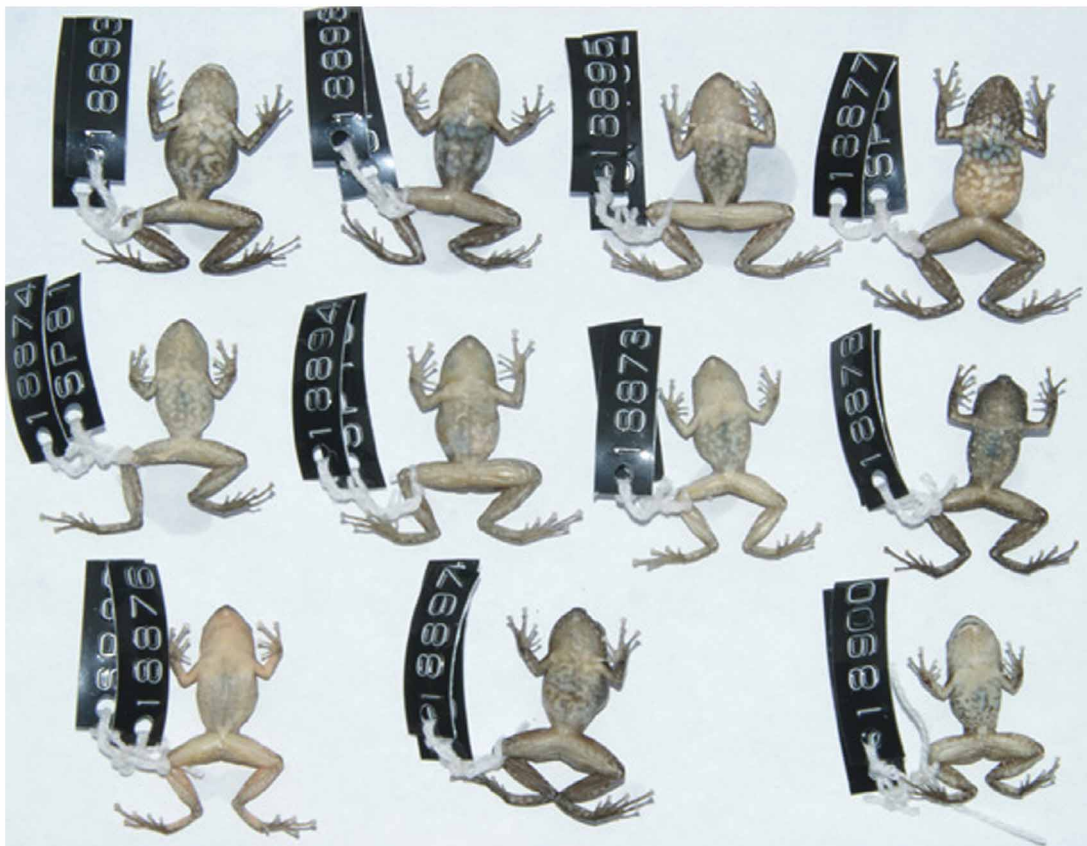
Appendix I. Specimens examined.

VENEZUELA:

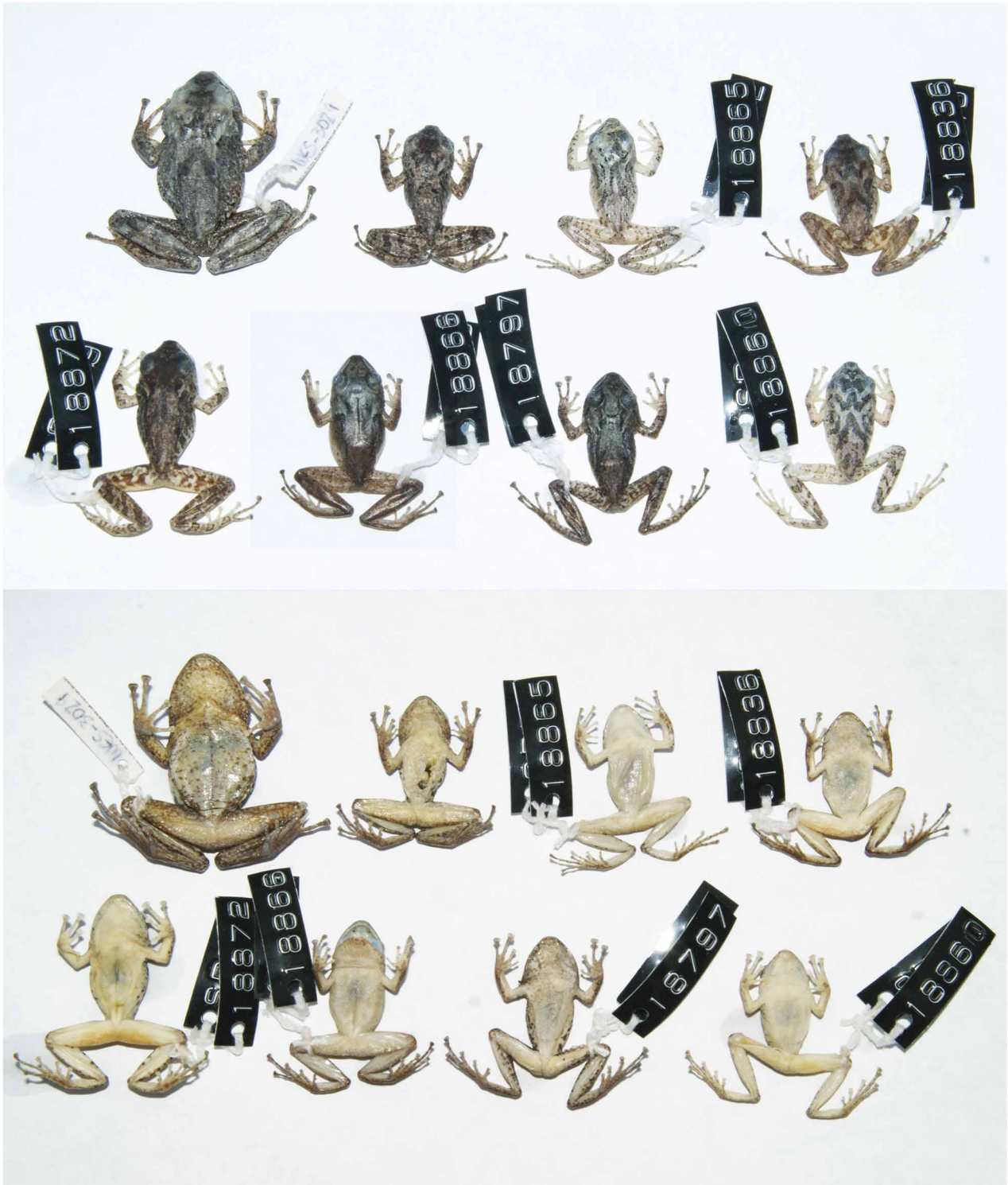
- Pristimantis bricensi*: CVULA 2752-56, Páramo de la Culata, Estado Mérida.
- Pristimantis fasciatus*: MHNLS 18466 (female holotype): Kunana, cuenca del río Negro, Sierra de Perijá, Municipio Machiques de Perijá, Estado Zulia; MHNLS 18470, adult male paratype from Fundo “El Progreso”, río Socuy upper basin, Sierra de Perijá, Municipio Jesús E. Lossada, Estado Zulia; MHNLS 18540, juvenile from Cascada Kusare, near Ipika, río Tokuko basin, Sierra de Perijá, Municipio Machiques de Perijá, Estado Zulia.
- Pristimantis lancinii*: CVULA 0621, 0995-98, 1000, 1007-08, 1010-11, 1993, 1995-96, 5826-27: Páramo de Mucubají, Estado Mérida.
- Pristimantis lassoalcalai*: see type series.
- Pristimantis melanoproctus*: KU 181023-26, 15 km SSW Zumbador, 1919 m, Estado Táchira.
- Pristimantis mondolfii*: KU 181017-22, 3 km SE Zumbador, 2650 m, Estado Táchira.
- Pristimantis paramerus*: CVULA 0766, 0992-93, 1003-04, 1859, 5828, 5830-34, 5836, 5839-46, 5848, 5850, 5853: Páramo de Mucubají, Estado Mérida.
- Pristimantis prolixodiscus*: EBRG 202: Sierra de Perijá, 2000 m, Estado Zulia, collected by M. Castro on 13 July 1975. This voucher is the first report of the species for the Sierra de Perijá and Estado Zulia. Unfortunately there is not clear data about the collecting locality, but serves to report the species for the whole sierra.
- Pristimantis rivasi*: see type series.
- Pristimantis turik*: MBLUZ 155 (male holotype): Cueva del Agua (Northern wall Cave), Mesa Turik, Municipio Rosario de Perijá, Sierra de Perijá, estado Zulia.
- Pristimantis vanadisae*: CVULA 0744-47, 3108-20, 3123-27: La Mucuy, Parque Nacional Sierra Nevada, Estado Mérida.
- Pristimantis yukpa*: MHNLS 18525 (male holotype): Kiriponsa, Yukpa indigenous village, río Tokuko basin, Municipio Machiques de Perijá, Sierra de Perijá, Estado Zulia; MHNLS 18524, 18526-18530 from type locality; MBLUZ A-023-25: Caño María Lionza, San José de los Altos, Sierra de Perijá, Municipio Jesús Enrique Lossada, Estado Zulia; MHNLS 18115-18118, 18485-18489: Ipika, Yukpa indigenous villaje, río Tukuko basin, Municipio Machiques de Perijá, Sierra de Perijá, estado Zulia.
- Pristimantis* sp.: MHNLS 409, Sierra de Perijá, Estado Zulia.

COLOMBIA:

- Pristimantis anolirex*: KU 168626: 18.5 km S Chitaga, 2850 m, Departamento Norte de Santander.
- Pristimantis megalops*: CVULA 3095-96: Sierra de Santa Marta, San Lorenzo, Departamento Magdalena.
- Pristimantis nicefori*: CVULA 5558-60: El Alto, km 5, carretera Capilla-Cocuy, Departamento Boyacá.
- Pristimantis w-nigrum*: CVULA 3097-98: Páez, km 34, Belcázar-Tacuayo. Departamento Cauca.



APPENDIX II. Dorsal view of the type series of *Pristimantis lassocalcai* sp. nov.



APPENDIX III. Ventral view of the type series of *Pristimantis rivasi* sp. nov.