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ELEUTHERODACTYLUS COLOSTICHOS,
A NEW FROG SPECIES FROM THE PÁRAMO
DE LOS CONEJOS, IN THE VENEZUELAN ANDES
(ANURA: LEPTODACTYLIDAE)

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Three species of the genus *Eleutherodactylus* have been described from the high altitude environments of the Venezuelan Andes known as "páramos." These distinctive environments are visually dominated by members of the plant genus *Espeletia*, scattered over a grassy background. Páramos occur between altitudes of 2800 and 4800 m asl, and vary in temperature and precipitation from -0.4 to 10°C and 650 to 1800 mm, respectively (Monasterio, 1980). *Eleutherodactylus lancinii* and *E. ginesi* occur in the Páramo de Mucubají, Mérida, and *E. boconoensis*, *E. lancinii* and *E. ginesi* in the Páramo de Guaramacal, Trujillo (Rivero, 1973) (see Fig. 1).

A fourth species of the genus was collected in July 1977 in the herpetologically previously unexplored Páramo de Los Conejos, a

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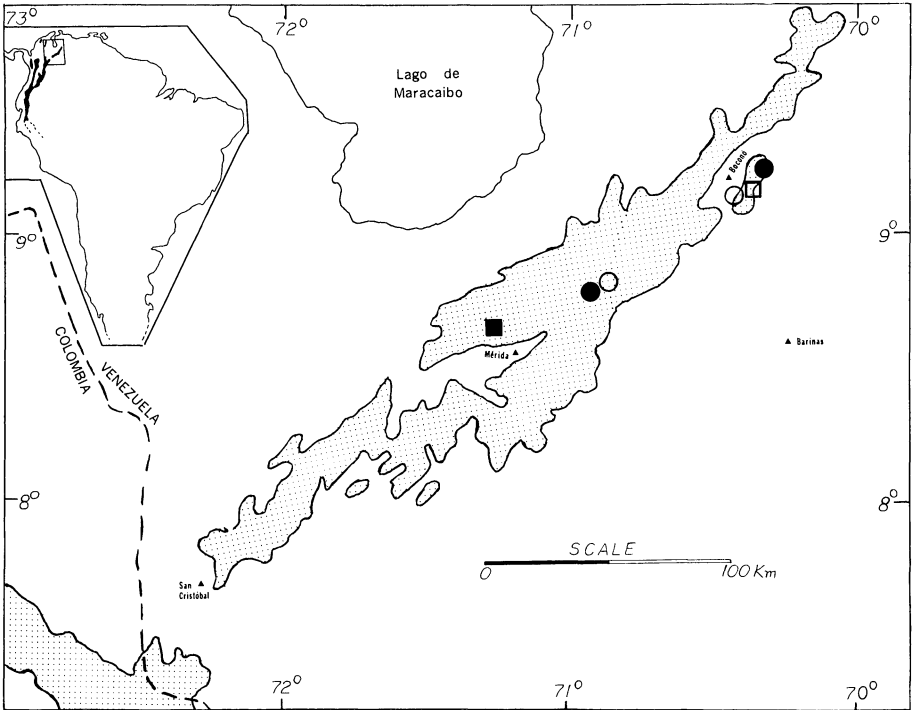


Figure 1. Map showing localities of occurrence of reported species of *Eleutherodactylus* in the páramos of Venezuela. Shaded area is contained within the 2000 m contour line, within which the paramos occur. Open square, *E. boconoensis*; solid square, *E. colostichos*; open circle, *E. lancinii*; solid dot, *E. ginesi*.

portion of the Serranía del Norte, north of the city of Mérida, Mérida state. Description of this animal has been delayed in hope that more would be obtained, but none have since come to hand, although nine specimens of a frog closely related to *E. lancinii* were taken in an adjacent páramo. Because the region is not of easy access and there is a growing need for establishment of concepts of relationships and distribution of the species in the genus, it is desirable to describe the new form without further delay. Museum acronyms conform with Leviton *et al.* (1981).

Eleutherodactylus colostichos sp. nov.

HOLOTYPE.—UMMZ 173044 (Field number ELM [Enrique La Marca] 1), an adult female taken in the Páramo de Los Conejos at the

intersection of Quebrada Las Gonzales with the trail Manzano Alto-Las Gonzales, 2 1/2 hours on foot from the water pipe line known as "Las Canalejas," Serranía del Norte, Estado Mérida, Venezuela, 3600 m. Collected by Enrique La Marca and Frederic Arp, 15 July 1977.

DIAGNOSIS.—A small *Eleutherodactylus* (33 mm SVL) referable to the *unistrigatus* group (first finger shorter than second, skin of venter coarsely areolate, head narrow) (Lynch, 1968, 1976); head wider than long; tympanum 1/3 diameter of eye; interorbital space wider than upper eyelid; prevomerine odontophores present but inconspicuous; limbs not barred; hands and feet not webbed; digits bearing discs; discs grooved anteriorly; first finger slightly shorter than second; tubercles along outer edge of forearm; inner metatarsal tubercle much larger than outer; skin of dorsum and venter prominently tuberculate. Most closely resembling *E. boconoensis*, but differing by having a wider head, smaller tympanum, larger size, linear vomerine teeth, largest digital disc almost size of tympanum, glandular ridge from shoulder to lumbar region and more prominent metatarsal tubercles.

DESCRIPTION.—Adult female (eggs visible through skin of venter) (see Fig. 2). Snout short, subovoid in dorsal view, rounded in lateral profile; eye-nostril distance (3.2 mm) slightly less than length of eye (3.3 mm); a pair of very weak, short (± 4 mm) interorbital crests; upper eyelid (2.7 mm max.) narrower than interorbital distance (3.1 mm), finely tuberculate; tympanum distinct, its upper edge not (concealed by overhanging glandular tissue), annulus elsewhere distinct; horizontal diameter of tympanum (1 mm) less than vertical diameter (1.2 mm), about 1/3 diameter of eye opening; tympanum-eye distance (1.8 mm) somewhat more than length of eye opening, 3/4 distance (2.4 mm) of eye from upper lip; see Fig. 2 for depiction of some cranial characters.

First finger slightly shorter than second; all fingers with a small terminal disc no or little wider than digits; an anterior groove bordering each disc; several rows of tubercles along outer edge of antebrachium; tubercles on knee and tarsus, but not well defined; two metatarsal tubercles, inner prominent, oval, somewhat more than 1/3 length of first toe; outer metatarsal tubercle low, conical, 1/4–1/3 size of inner; subarticular tubercles on both manus and pes rounded, prominent; terminal discs on toes as large as those on fingers, slightly wider on digits 3 and 4 than on others; a weak rounded ridge suggesting an

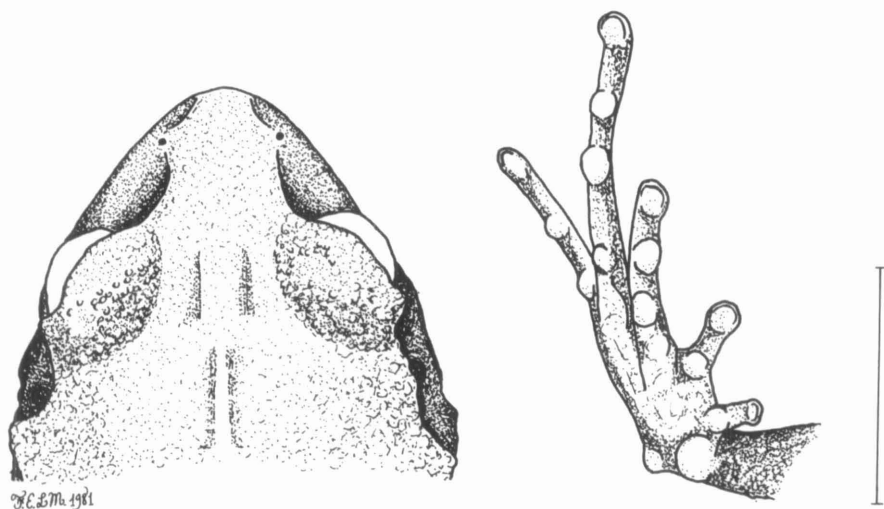


Figure 2. Dorsal view of head and plantar view of right pes of the holotype of *Eleutherodactylus colostichos*. The bar represents 5 mm.

outer metatarsal fold; inner metatarsal fold similar but somewhat larger and distal end narrow, sharp; see Fig. 2 for illustration of foot.

Prevomerine odontophores much larger than choanae, narrowly linear, oblique in position, extending from level of posterior edge of choanae to level of anterior margin of orbit, not concealed by palatal shelf of maxillary arch. Tongue oval, longer than wide, $\frac{1}{3}$ free, with a very shallow posterior notch.

A narrow, low, middorsal ridge from occipital region to near vent; a dorsolateral ridge from shoulder to mid-abdominal region; dorsum finely granular; sides and venter coarsely granular; a prominent, protuberant glandular area on shoulder above tympanum, extending from behind orbit nearly to upper edge of arm insertion; heels not touching when thighs at right angles to body axis, reaching to axilla when legs adpressed forward.

Color in preservative uniform brown (dark brown in life); dorsolateral ridges slightly (conspicuously in life) lighter than dorsum elsewhere; no supratympanic mark; a dark line along canthus rostralis and from nostril to tip of snout; upper and lower labial edges dark; area dorsal to upper labial dark stripes somewhat lighter than rest of

head; general dark tone over entire ventral surfaces of head, trunk and limbs, but somewhat lighter than dorsum; no barring on limbs.

Snout-vent length 33 mm; head width 13.5 mm, length 10 mm; length of thigh 13 mm, of shank 8 mm.

COMPARISONS.—*E. colostichos* is the first frog to be reported from the Páramo de Los Conejos. In general form it resembles the other three species of *Eleutherodactylus* known from the Venezuelan páramos, but it most closely resembles *E. boconoensis* Rivero and Mayorga. The latter species differs from *E. colostichos* (character-states in parentheses) in having the head as wide as long (wider than long); anterior part of dorsum smooth, with small, scattered warts (finely granular throughout); tympanum $\frac{1}{2}$ to $\frac{2}{3}$ diameter of eye ($\frac{1}{3}$); prevomerine odontophores short and prominent (elongate, inconspicuous); tongue $\frac{3}{5}$ free, not notched ($\frac{1}{3}$ free, notched); two single or one fused infrapostympanic tubercles (a diffuse, parotoid glandlike enlargement, multituberculate, no enlarged tubercles); largest digital disc $\frac{1}{2}$ size of tympanum (almost same size); smaller, snout-vent measurement 21 mm max. in ♂♂, 28 in ♀♀, N = 14 (larger, 33 mm in ♀, N = 1); skin in general smoother (more granular); metatarsal tubercles smaller, less prominent (larger, more prominent); dorsolateral fold to groin (to level of mid-abdomen).

E. lancinii Donoso-Barros differs from the present species by having no dorsolateral light lines (present); a supratympanic line (none); limbs cross-barred (not); heel of adpressed limb reaching eye (between axilla and tympanum); eye diameter equal to eye-nostril distance (slightly greater).

E. ginesi (Rivero) differs in having shorter hind legs (longer); a short body with a rounded shape (more elongate); no dorsolateral light lines (present); smaller (larger); no vomerine teeth (present).

Outside of the Venezuelan Andes, the species most closely similar to *Eleutherodactylus colostichos* (irrespective of phylogenetic relationship) are *E. bogotensis*, *E. myersi* and *E. niceforoi* from Colombia, and *E. trepidotus* and *E. vidua* from Ecuador. These species can be differentiated from *Eleutherodactylus colostichos* (character-states in parentheses) as follows:

E. bogotensis (Peters) has the eye-nostril distance greater than diameter of eye (less, see Fig. 2); diameter of tympanum slightly greater

than $\frac{1}{2}$ that of eye (about $\frac{1}{3}$); fingers with lateral ridges (none); hind legs bent at right angles to body, heels just touching (not touching).

E. myersi (Goin and Cochran) has no vomerine teeth (present); dorsolateral region with rows of pale orange spots (none); light spots in groin and axilla (absent); pale yellow spots on posterior surface of thighs (absent).

E. niceforoi (Cochran and Goin) has vomerine teeth in transverse series (oblique); diameter of tympanum $\frac{1}{2}$ that of eye (about $\frac{1}{3}$); interorbital distance nearly twice that of upper eyelid (slightly wider, see Fig. 2); toes slightly webbed (not); a rather flat, oval, inner metatarsal tubercle (rounded, prominent, see Fig. 2).

E. trepidotus Lynch has red spots on venter and concealed surfaces of limbs (absent); yellow spots on throat (uniformly brown); ground color green in life (dark brown); subarticular tubercles on palm low, flattened (high, protuberant, see Fig. 2); tympanum $\frac{1}{2}$ length of eye ($\frac{1}{3}$); toes bearing very short web (free); black bands on limbs (no barring).

E. vidua Lynch has tympanum concealed beneath skin (distinct); interorbital space flat (weak interorbital crests); snout obtuse in dorsal view (subovoid, see Fig. 2).

REMARKS.—The name *colostichos* is from the Greek “kolos” meaning “short” and “stichos” meaning “row” or “line”, applied in reference to the short dorsolateral ridges. It is used as a noun in apposition with the generic name.

The holotype was found by a remarkably skilled dog at 5:30 p.m. on a foggy, rainy day, hidden in grass 8 m from a mountain stream. The dominant vegetation was the “frailejón” (*Espeletia* sp.). No calls were heard and no other specimens seen. At Laguna de Las Iglesias a few km NE of the type locality but in the same habitat at 3700 m, calls were heard but could not be associated with specimens; they may or may not have been produced by examples of *E. colostichos*.

The four species of *Eleutherodactylus* now known from the Venezuelan páramos are only part of the representatives of this genus that actually occur there. Two others are being reported by our colleagues, and other páramos have not yet been investigated. We suspect that a complete catalog will include at least twice as many species as are now known.

ACKNOWLEDGMENTS

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MATERIAL EXAMINED

- Eleutherodactylus boconoensis*. VENEZUELA. Trujillo: Páramo de Guaramacal, Boconó (UPRM 4931, 4933–4943 [paratypes], 4932 [holotype]).
- Eleutherodactylus colostichos*. VENEZUELA. Mérida: Páramo de Los Conejos (UMMZ 173044–holotype).
- Eleutherodactylus ginesi*. VENEZUELA. Mérida: Paramo de Mucuchies (UMMZ 157030-4); Páramo de Mucubají (ELM 28 in Universidad de los Andes, Mérida; ELM 347, 471–476).
- Eleutherodactylus lancinii*. VENEZUELA. Mérida: Apartaderos (USNM 165604–holotype); Dist. Rangel, Páramo below Hotel Los Frailes, along road to Santo Domingo, 3070 m (AMNH 90314–90316); La Corcovada, nr Páramo de Mucubají (ELM 45–53, 556, 74–75, 382–384).
- Eleutherodactylus* sp. VENEZUELA. Mérida: Páramo de Los Conejos (ELM 6–8, 10–13, 659–660).

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RESUMEN

Una nueva especie de ranas, *Eleutherodactylus colostichos*, es descrita del Páramo de Los Conejos, Venezuela, siendo la cuarta en ser reportada de los páramos de ese país.

La especie más relacionada con *E. colostichos* parece ser *E. boconoensis*, del Páramo de Guaramacal, de la cual difiere por tener un tamaño mayor, cabeza más ancha, cresta glandular desde los hombros hasta la región lumbar, el disco más grande de los dedos ocupa casi todo el tímpano, tímpano más pequeño, dientes vomerianos alargados e inconspicuos, y tubérculos metatársicos más prominentes.

E. colostichos se compara con otras dos formas de los páramos de Venezuela, *E. ginesi* y *E. lancinii*; con tres de los Andes de Colombia, *E. bogotensis*, *E. myersi* y *E. niceforoi*; y con dos de los Andes de Ecuador, *E. trepidotus* y *E. vidua*.

El nombre específico hace referencia a las dos bandas dorsolaterales cortas y de color amarillo claro, que en el ejemplar vivo contrastaban fuertemente con el resto del dorso marrón oscuro.

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