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A NEW *ELEUTHERODACTYLUS* FROM THE AMAZONIAN SLOPES OF THE ECUADORIAN ANDES

GLENN FLORES

ABSTRACT: A new *Eleutherodactylus, E. kirklandi,* is described from Cuyuja, Napo Province, on the Amazonian slopes of the Ecuadorian Andes. This species is characterized by the combination of a unique color pattern with numerous distinctive dark markings, a vaulted canthal region, and large digital discs. It is a member of the *unistrigatus* species group of Lynch, but it does not readily fit into any of the existing intragroup assemblies.

Key words: Amphibia; Anura; Leptodactylidae; *Eleutherodactylus*; New species; Ecuador

WITH over 450 species (Lynch and Ruíz-Carranza, 1983), *Eleutherodactylus* is not only the most speciose frog genus but the most speciose genus of vertebrates. Equally impressive is the realization that we are only just beginning to appreciate the extent of this diversity, for a substantial number of species await description.

Among the three subdivisions of the distributional range of *Eleutherodactylus*, the West Indies, Central America, and South America, the greatest species diversity is in South America, where over 250 species occur. Within South America, the Ecuadorian fauna accounts for over 100 species (Miyata, 1982), and within Ecuador, the cloud forests of the Andean slopes harbor more than 60 species (Lynch and Trueb, 1980).

The eleutherodactyline fauna of the western slope cloud forests of Ecuador is mostly undescribed (Lynch and Trueb, 1980), but the 44 species from the eastern slopes were extensively reviewed by Lynch

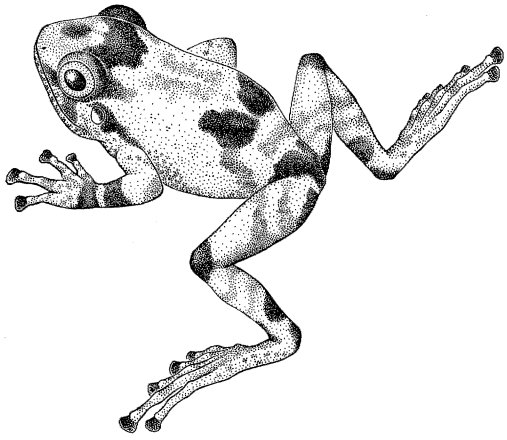

FIG. 1.—Dorsolateral view of the holotype of *Eleutherodactylus kirklandi* (MCZ 104140, 23.9 mm).

and Duellman (1980). Several localities were particularly well collected, including the vicinity of Cuyuja, a small village in Napo Province, where several collections were made by James A. Peters and William E. Duellman (Lynch and Duellman, 1980). It was therefore quite surprising when a recent collection from Cuyuja revealed a very distinctive, undescribed species, for which a description follows.

In the species account below, I follow the methods of Lynch and Duellman (1980) except that I place the verbal diagnostic statement before the numbered statement. The holotype was sexed by gonadal examination; adult females are distinguished by enlarged, convoluted oviducts and, if mature eggs are present, large, yellow ovarian eggs, while males have swollen testes and, in some species, vocal slits and/or nuptial pads. All measurements were taken to the nearest 0.1 mm using dial calipers. I employ the following abbreviations: SVL = snout–vent length; E–N = eye to nostril distance; HW = head width; HL = head length (snout tip to line between ricti, as per Lynch and Duellman, 1980).

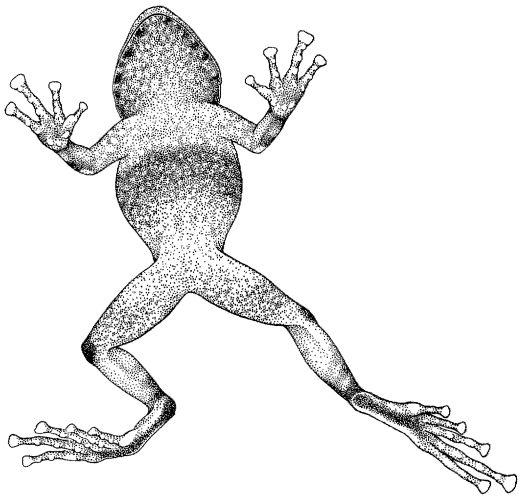

FIG. 2.—Ventral view of the holotype of *Eleutherodactylus kirklandi* (MCZ 104140, 23.9 mm).

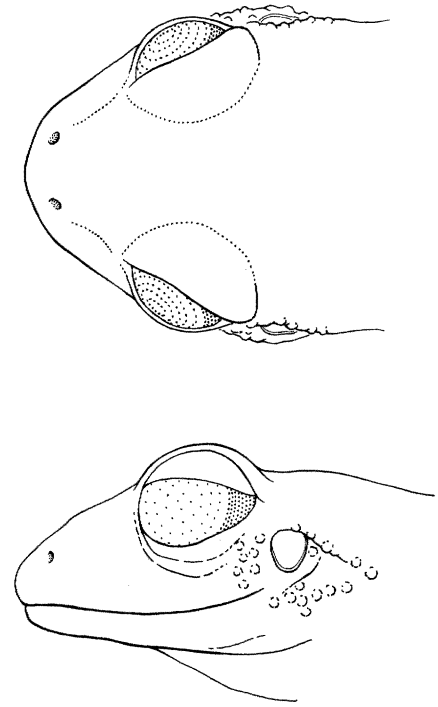

FIG. 3.—Dorsal and lateral views of the head of the holotype of *Eleutherodactylus kirklandi* (MCZ 104140); ×6.

Eleutherodactylus ***kirklandi*** sp. nov.

Holotype.—MCZ 104140, a gravid female taken from Cuyuja (also known as Cuyujua), Napo Province, Ecuador, 2200 m, January 1983 by Giovanni Onore.

Diagnosis.—The combination of the unique color pattern, with numerous distinctive dark markings such as large interocular, axillary, preanal, knee, and shank blotches, short mid-dorsal stripes, and a thick belly band (Figs. 1 and 2), along with the vaulted canthal region (Fig. 3) and large digital discs serve to clearly distinguish this species.

(1) Skin of dorsum smooth with dorsolateral ridge, that of venter coarsely areolate; (2) tympanum distinct, its length one-third eye-length; (3) snout round in dorsal view and in profile; canthus rostralis rounded, weakly concave, highly vaulted in profile; (4) upper eyelid narrower than IOD, not bearing pungent warts (but a few low ones); no cranial crests; (5) vomerine odontophores prominent, oval in outline, oblique; [(6) no males are known]; (7) first finger shorter than second; fingers bearing very large pads (largest on II–IV); discs broader than long; (8) fingers lacking lateral fringes or keels; (9) no ulnar tubercles; (10) no tubercles on heel or tarsus; (11) two metatarsal tubercles, inner elongate, four times size of outer, outer round, very indistinct; five low supernumerary plantar tubercles; (12) toes bearing indistinct lateral keels, no webbing; toe pads smaller than those of outer fingers; (13) dorsum pale brown to light tan with numerous dark gray to black darker markings including very large interocular blotch, posterodorsal oval snout spot, labial bars, supratympanic stripe, axillary, sacral and large preanal blotch, postanal triangle, large bars on forearm and wrist, and large blotches on knee and just anterior to heel, with vaguer darker markings including two short mid-dorsal stripes, oblique and single transverse sacral stripes, limb bars, and elbow and heel spot; lighter areas on upper arm and thigh; venter light tan heavily punctated with dark gray and brown, row of dark spots on lower lip, vague, thick darker band on upper belly, concealed tarsal surface and sole of foot with black stripe.

Description.—Head about as wide as body, wider than long; HW 39.7% SVL; snout rounded in dorsal view and in profile; snout short, E–N 79.4% eye length; nostrils not protuberant, directed anterolaterally; canthus rostralis rounded, weakly concave; loreal region weakly concave, sloping abruptly to lips; lips not flared; upper eyelid with a few low warts (none conical), its width 69.7% IOD; cranial crests absent; tympanum directed posterodorsally, prominent, round, its upper edge concealed by moderately heavy supratympanic fold, separated from eye by distance equal to tympanum length; tympanum length 41.2% eye length; postrictal tubercles small, round, subconical, one slightly enlarged; choanae moderately large, round, not concealed by palatal shelf of maxillary arch; vomerine odontophores median and posterior to choanae, separated by a distance equal to one-third choanal width, oval, elevated, each bearing five teeth; tongue slightly longer than wide, cordiform, posterior border feebly notched, posterior one-third not adherent to floor of mouth; not known whether males possess vocal slits or sac.

Skin of dorsum and upper surfaces of limbs smooth, with short, faint dorsolateral ridge, that of venter coarsely areolate, large glandular triangular axillary patch present; discoidal folds prominent; anal opening not extended, several small, low para-anal tubercles present above and below; ulnar tubercles lacking; palmar tubercle bifid, nearly twice size of elongate thenar tubercle; four distal supernumerary tubercles, large but flattened and indistinct; subarticular tubercles round, non-conical, somewhat flattened; fingers lacking lateral fringes and keels, all with large discs (broader than long) on dilated pads; pad of third finger three times wider than narrowest portion of penultimate phalanx; thumb shorter than second finger; not known whether males possess nuptial pads.

Heel and tarsus lacking obvious tubercles; inner metatarsal tubercle elongate, length thrice width; outer metatarsal tubercle round, extremely flattened and indistinct, one-fourth the size of outer; five

distal, low supernumerary plantar tubercles; subarticular tubercles round, flattened lateral keels on toes; toe discs broader than long on dilated pads, pads smaller than those on outer fingers, rounded apically (approaching truncate); shank 47.7% SVL; heels of flexed hind legs just overlap.

In preservative, dorsum pale brown to light tan with numerous dark gray to black darker markings; darkest dorsal markings include an oval spot on posterior of snout (at anterior level of eyes), large shield-shape interocular blotch, two labial stripes, triangular post-ocular patch, supratympanic bar, supra-axillary bar, oval sacral blotches, large preanal triangle, forearm bar, wrist blotch, knee patch, and blotch just above the heel (on medial side of shank); vaguer dark dorsal markings include pair of parallel short mid-dorsal stripes, oblique (posteroventrally oriented) sacral stripes, transverse sacral stripe, an elbow spot, one stripe on fingers II and IV, two on III, three limb bars on concealed thigh, two on shank (besides darker blotch), and heel blotch; lighter patches on part of thumb, upper arm, and thigh; venter light tan to dark cream, heavily punctated with dark gray and brown; dark ventral markings include row of spots along lower jaw margin, vague, thick band across upper belly, stripe from heel spot to distal plantar surface; palmar surface cream with scattered brown and dark gray punctations; rear of thigh dusted with dusky-brown.

Measurements of holotype.—SVL = 23.9, shank = 11.4, HW = 9.5, head length = 8.9, upper eyelid width = 2.3, IOD = 3.3, tympanum length = 1.4, eye length = 3.4, E–N = 2.7.

Etymology.—Named for Benjamin E. Kirkland, as an expression of gratitude to a most inspirational, devoted, caring high-school biology teacher.

Remarks.—As described by Lynch and Duellman (1980), the area around Cuyuja is pasture with remnants of upper montane rainforest in ravines. No information was available from the collector on the particular ecological conditions under which the holotype was collected. Other species collected with the holotype include *Eleutherodactylus glandulosus, Atelopus ignescens, Bufo spinulosus, Osteocephalus verrucigerus,* and an undetermined species of *Colostethus.*

Although only a single specimen was collected, this species is so distinctive that there seems little doubt that it is new. Indeed, it is so distinctive that it does not appear closely related to any other *Eleutherodactylus* from the Amazonian slopes or lowlands of Ecuador. With an areolate venter and the first finger shorter than the second, *E. kirklandi* is a member of the *unistrigatus* species group of Lynch (1976), which includes well over 100 species. However, it does not readily fit into any of the 16 intragroup assemblies proposed for Amazonian slope *Eleutherodactylus* by Lynch and Duellman (1980).

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