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## A NEW SPECIES OF *ELEUTHERODACTYLUS* FROM GUIANA (LEPTODACTYLIDAE, ANURA)

by

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With 2 text-figures and one plate

### SUMMARY

*Eleutherodactylus gutturalis* nov. spec., belonging to the *E. fitzingeri* group and characterised by a black to grey throat with a median white stripe, a shagreened dorsum with larger tubercles interspersed, absence of digital webbing, relatively long legs, and uniformly coloured concealed parts of the thighs, is described from Surinam, French Guiana and Brazil.

### RÉSUMÉ

*Eleutherodactylus gutturalis* nov. spec., qui appartient aux *Eleutherodactylus* du groupe *fitzingeri* se distingue par une bande longitudinale blanche au milieu de la gorge noire ou grise, la peau du dos finement granuleuse avec des tubercules grands épars, l'absence de palmure, des jambes relativement longues et les faces cachées des cuisses uniformément colorées. L'espèce est décrite des frontières du sud-est Surinam, de la Guyane française et de l'Amapá (Brésil).

### INTRODUCTION

The number of species of *Eleutherodactylus* reported to occur in the Guianas is only small as compared with the number of species in areas in north-western South-America and Central America. This probably is due to the more uniform topography in north-eastern South-America, which offers fewer ecological niches than are available in the rugged mountainous areas of the north-western part of the continent. Another reason for the apparently low number of species in the area under discussion is the fact that there only in recent years important herpetological collections were made. During

fieldwork of one of us (Lescure) in French Guiana, a number of *Eleutherodactylus* were collected that appeared to be new to science. At the same time additional preserved specimens were discovered in Brazilian and U.S. collections. We describe the species here.

The first species of *Eleutherodactylus* mentioned for the Guianas is *E. marmoratus*, described in 1900 as *Hylodes marmoratus* by Boulenger on the basis of a single specimen, collected at the foot of Mount Roraima. The next author to mention species of *Eleutherodactylus* from Guiana was Van Lidth de Jeude (1904), in a report on the herpetological material collected by several topographical expeditions into the interior of Surinam. This author mentioned *Hylodes gollmeri* and described a new species, *H. grandoculis*, but as will be pointed out in an extensive paper on the Guianese species of *Eleutherodactylus*, the specimen identified by Van Lidth de Jeude as *H. gollmeri* belongs to an undescribed species, whereas *H. grandoculis* Van Lidth de Jeude turned out to be a synonym of *E. marmoratus* (Boulenger). In 1940 Parker described some new species from a collection made by C. A. Hudson on the border between Surinam and Brazil. Among these species was *E. inguinalis*, of which a male and a female were collected. In 1956 Cochran described *E. beebei* on the basis of a single specimen from Kartabo, Guyana, but since it has become clear that the specimen she had before her was incorrectly labelled and actually belonged to an Antillean species. Since 1961 Rivero (1961, 1965, 1968) described several new forms of the genus *Eleutherodactylus* from Venezuela and Schwartz (1967) mentioned *E. urichi* (Boettger) from French Guiana and Guyana.

***Eleutherodactylus gutturalis* nov. spec. (figs. 1, 2; pl. 1)**

Holotype. — 1 ♀, LACM 44651, Lower Matarony River, French Guiana, 31-VII-1968, leg. P. A. Silverstone.

Paratypes. — FRENCH GUIANA: Lower Matarony River: 1 ♂, LACM 44649, 30-VII-1968, leg. P. A. Silverstone; Saül: 1 ♀, MNHNP 1974-995, 23-XII-1972, leg. J. Lescure. Antecume-pata, Marouini River: 1 ♀, MNHNP 1974-1002, leg. J. P. Gasc. SURINAM<sup>1)</sup>: Koulimapopane, Tumuc Humac Mountains: 1 juv., MNHNP 1974-996, 30-VII-1972, leg. Y. M. Brandily; Mitaraca, Tumuc Humac Mountains: 2 ex., 1 ♀, MNHNP 1974-997/999, 8-VIII-1972, leg. Y. M. Brandily; 1 ♀, 1 ♂, MNHNP 1974-1000/1001, 5-VIII-1972, leg. J. P. Gasc. BRAZIL: Mazagão, Território Amapá: 6 juvs., WCAB 19178-82, 35969, December 1964, leg. A. Silva; Porto Platon, Território Amapá: 1 juv., WCAB 19982; Serra do Navio, Território Amapá: 1 juv., WCAB 35241; 1 ♀, LACM 44881, 1-VII-1968, leg. P. A. Silverstone & Ferreira; Serra do Veado: 1 ♀, LACM 44884, 7-VII-1968, leg. P. A. Silverstone & Ferreira.

Diagnosis. — A medium-sized *Eleutherodactylus* (snout-vent length in young males 19.0-20.3 mm, in females 17.9-40.9 mm (only one adult female

<sup>1)</sup> This region of Surinam is disputed by France (French Guiana).

known)), lacking webs between fingers and toes. Skin of dorsum finely shagreened, with larger pustules interspersed. Upper eyelid with much larger warts than on upper surface of head. A feeble supratympanic fold, traces of a dorsolateral fold. Skin of throat and belly smooth. Fingers and toes with discs, those of the toes small, scarcely wider than the digits, those of the fingers large, about half the diameter of the tympanum. First finger longer than second, outer metacarpal tubercle bifid, more or less U-shaped, sub-articular tubercles distinct, round, conical. Tympanum large, distinct. Dorsum

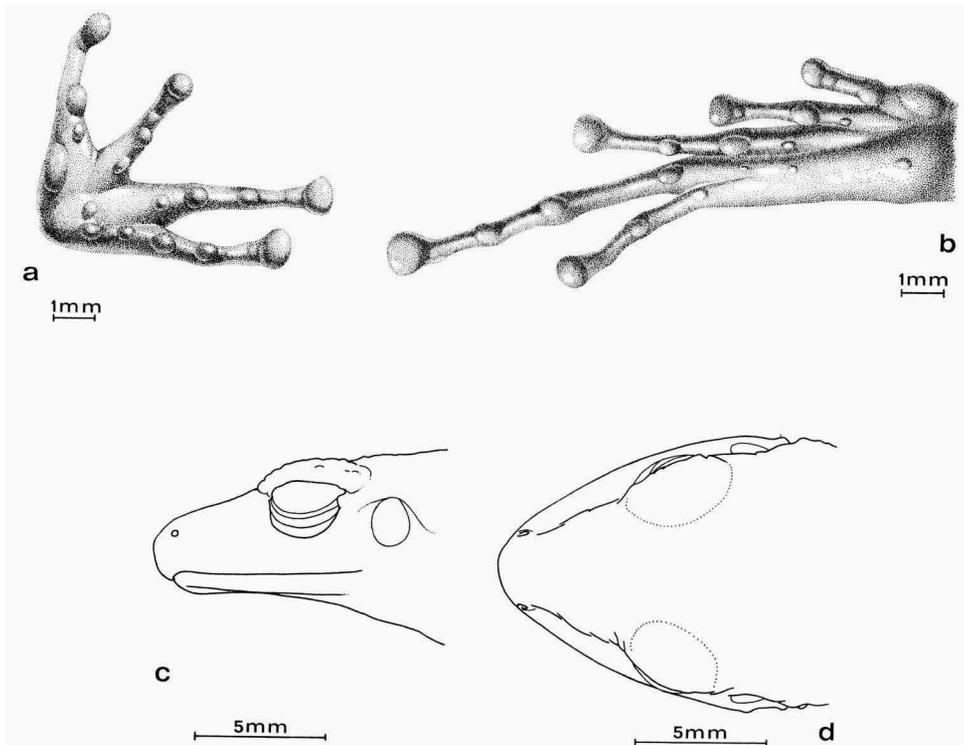


Fig. 1. *Eleutherodactylus gutturalis* nov. spec. a, ventral view of left hand; b, ventral view of right foot; c, lateral profile of head; d, dorsal profile of head (LACM 44651, holotype).

greyish brown with a blackish W-shaped mark on the scapular region, followed by one or two chevrons. Two labial bars originating from the eye, continued on the lower lip, a small labial bar anterior of the eye, a dark bar from nostril to upper lip, an indistinct, narrow supratympanic stripe. Limbs with oblique, darker cross-bands. A dark triangular anal patch. Back of thighs uniformly brownish. Black spots on the knees.

Description. <sup>1</sup> — Head longer than wide, as wide as the body in males, slightly wider in females; snout suboval in dorsal view, rounded, slightly projecting over the lower jaw in lateral view; tip of snout rounded in dorsal view. Snout long, much longer than diameter of orbit, distance between eye and nostril longer than diameter of orbit, more than twice the distance between nostril and tip of snout. Canthus rostralis distinct, rounded, convex in its posterior part, concave in its anterior part; loreal region flat to weakly concave, sloping abruptly to lips. Nostrils lateral of the canthus rostralis, slightly protuberant, directed laterally. Distance between the nostrils equal to the width of an upper eyelid. Interorbital space slightly narrower than an upper eyelid in males, wider in females, flat to slightly convex, no cranial crests. Temporal region nearly vertical, tympanum large, distinct, vertically oval, about half the eye diameter, space between eye and tympanum about two thirds the horizontal tympanum diameter. Supratympanic fold present, weakly developed, obscuring the upper edge of the tympanum. Choanae small, round, prevomerine processes present in most specimens (absent in MNHNP 1974-995), small, triangular in outline and situated well behind and medially to the choanae. Tongue small, oval, notched behind, its posterior third free. Males with long vocal slits, large subgular vocal sac.

Skin of dorsum finely shagreened, interspersed with larger, round, flat pustules. Upper eyelid with irregularly dispersed large warts, much larger than the pustules on top of head. In most specimens several large warts, of which two may be larger than the rest, on the snout. Dorsolateral folds present, but weakly developed. Over each forelimb a >-shaped scapular fold. Skin of the limbs with scattered pustules. A transverse, indistinct smooth fold over the anal opening. Two warts dorsally and laterally of the anal opening, ventrally of the transverse fold. Skin of ventral parts smooth, discoidal folds present. Posteroventral surface of thighs areolate.

Hand with a large, bifid, U-shaped outer metacarpal tubercle and a smaller, oval inner metacarpal tubercle. Subarticular tubercles distinct, single, round, conical, larger than the four supernumerary palmar tubercles. Fingers free

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1) During a recent visit of Hoogmoed to the Museu de Zoologia in São Paulo (MZUSP, Dr. P. E. Vanzolini) (travel-grant WR 87-131 from the Netherlands Foundation for the Advancement of Tropical Research (WOTRO)) some additional specimens of this species were found: 1 ♀, 2 juvs., MZUSP 10130, 10135-36, Rio Amapari, Serra do Navio, Territorio Amapá, Brazil, April-May 1950, leg. C. P. Coubert; 1 ♀, MZUSP 23170, Anapaikekondre, Lawa River, Marowijne district, Surinam, 27/29-XI-1963, leg. B. Malkin. ♀ MZUSP 10130 was carrying eggs, no. 23170 had well developed oviducts. The measurements of these specimens could not be included in the description of the species, because of technical problems. Neither could Anapaikekondre be indicated on the map.

of web, lacking lateral fringes. Tips of fingers with well developed, more or less circular discs, largest on the third and fourth, smallest on the first and second fingers. All discs with a groove around the edge. First finger longer than second, slightly shorter than fourth.

Tarsus smooth, with a series of four or five tubercles from the heel to the outer metatarsal tubercle, and sometimes an indistinct, elongate tubercle, just proximal of the inner metatarsal tubercle, on its inner edge. A large, oval inner metatarsal tubercle and a small, round outer metatarsal tubercle,  $1/4-1/3$  the size of the inner one. Base of second, third and fourth toes each with a small supernumerary tubercle, absent in one badly preserved specimen (MNHNP 1974-997). Subarticular tubercles distinct, single, round, conical, much larger than the supernumerary tubercles. Tips of toes with well developed, more or less circular discs, smallest on the first, largest on the fourth toe. Discs of the third finger and fourth toe equal in size,  $1/2-2/3$  the diameter of the tympanum. All discs with a groove around the edge. Third toe slightly shorter than fifth. Toes free of web, lacking lateral fringes. Heel of adpressed hind limb reaches the nostril. When hind limbs are flexed at right angles to the longitudinal body axis, the heels show considerable overlap.

In life the back is brown (the colour of dead leaves) with some small red spots. The belly is creamish yellow. The throat shows a wide creamish median band, bordered by two black longitudinal stripes and a number of small and large dark-brown spots. Groins and posterior surface of shanks brick-red (fieldnotes J. Lescure on MNHNP 1974-995). According to the fieldnotes of P. A. Silverstone on LACM 44881 (personal communication) the colour of that specimen (♀) in life was as follows: "Dorsum very dark brown, with two very short light brown longitudinal stripes on scapular region; suffusion of gold on dorsal surface of snout; iris yellow above and gold below (both parts of the iris have a thin black reticulum); thin gold ring around pupil; lips spotted brown and white; tympanum gold; side of body white with dark brown mottling; ventral surface of forelimb light gray, with dark brown mottling on edges; dorsal surface of thigh very dark pink; gold stripe on posterior surface of shank; ventral surface of hind limb pinkish, with dark brown mottling on edges; throat and breast mottled dark brown and white; white median longitudinal stripe on throat; belly white with gold tinge".

In preservative the back is greyish brown with darker (blackish) markings. Among these markings are a wide interorbital bar, a spot in front of it on the snout, a W-shaped marking on the scapular region and a chevron further down the back. Anterior part of the scapular folds creamy, bordering on the

posterolateral margins of the W-shaped scapular marking. Upper lips with four black bars continued on the lower lips, two radiating from the eye, one from the nostril and one between nostril and eye. Tip of snout with a white, vertical stripe, which is continuous with the median white stripe on the throat when the mouth is closed. Areas between the black stripes on the upper lips brown, with a white spot at the edge of the lip. Lower lips with corresponding white spots. An indistinct, narrow supratympanic stripe. Tympanum yellowish brown. Limbs with oblique blackish cross-bands, four on the dorsal surface of the thighs, the widest close to the body, the narrowest near the knee. Knee and anterior surface of thigh near knee with several black spots. Fingers and toes with black cross-bands, more distinct on the fingers than on the toes. A distinct dark-brown triangular anal patch. Back of thighs uniformly brown. Tarsus and sole dark-brown. Throat in both sexes with a wide, median white band, bordered on both sides by dark-brown or grey longitudinal bands, which are to a greater or lesser degree connected with dark spots near the side of the throat. Chest and anterior part of belly mottled with dark-brown, the rest of the belly and the ventral surfaces of the limbs immaculate, white.

Measurements of holotype in mm. — Snout-vent length 30.4; tibia length 17.3; head width 9.9; head length 11.6; upper eyelid width 2.5; interorbital distance 2.8; eye length 3.9-4.1; tympanum length 1.8; eye-nostril distance 4.1-4.3; tip of snout to nostril 1.6; eye to tip of snout 6.1-5.9.

#### Proportions of type-series

head width/snout-vent length	♂ ♂	33.2- 34.0 (N= 2, $\bar{x}$ = 33.6)
	♀ ♀	29.6- 34.6 (N= 8, $\bar{x}$ = 32.9)
upper eyelid/IOD	♂ ♂	105.6-116.7 (N= 3, $\bar{x}$ = 109.3)
	♀ ♀	70.4-100.0 (N=13, $\bar{x}$ = 84.7)
tympanum/eye length	♂ ♂	36.4- 50.0 (N= 4, $\bar{x}$ = 43.6)
	♀ ♀	37.1- 51.5 (N=16, $\bar{x}$ = 45.1)
distance eye-nostril/eye	♂ ♂	87.9- 93.3 (N= 2, $\bar{x}$ = 90.6)
	♀ ♀	85.3-115.2 (N=16, $\bar{x}$ = 99.4)
tibia/snout-vent length	♂ ♂	56.3- 63.1 (N= 4, $\bar{x}$ = 59.6)
	♀ ♀	48.9- 58.1 (N=16, $\bar{x}$ = 54.6)
head length/snout-vent length	♂ ♂	33.1- 34.0 (N= 2, $\bar{x}$ = 33.6)
	♀ ♀	29.6- 34.6 (N= 8, $\bar{x}$ = 32.9)

Relationships. — *E. gutturalis* is a member of the *E. fitzingeri* group (= group II of Cochran & Goin, 1970) by virtue of having the first finger longer than the second, skin of venter smooth, prevomerine odontophores triangular in outline, snout relatively long and subacuminate, and in having relatively long, slender limbs. Its closest relative is probably *E. fenestratus* (Steindachner), distributed allopatrically in Amazonian Brazil, Bolivia, and

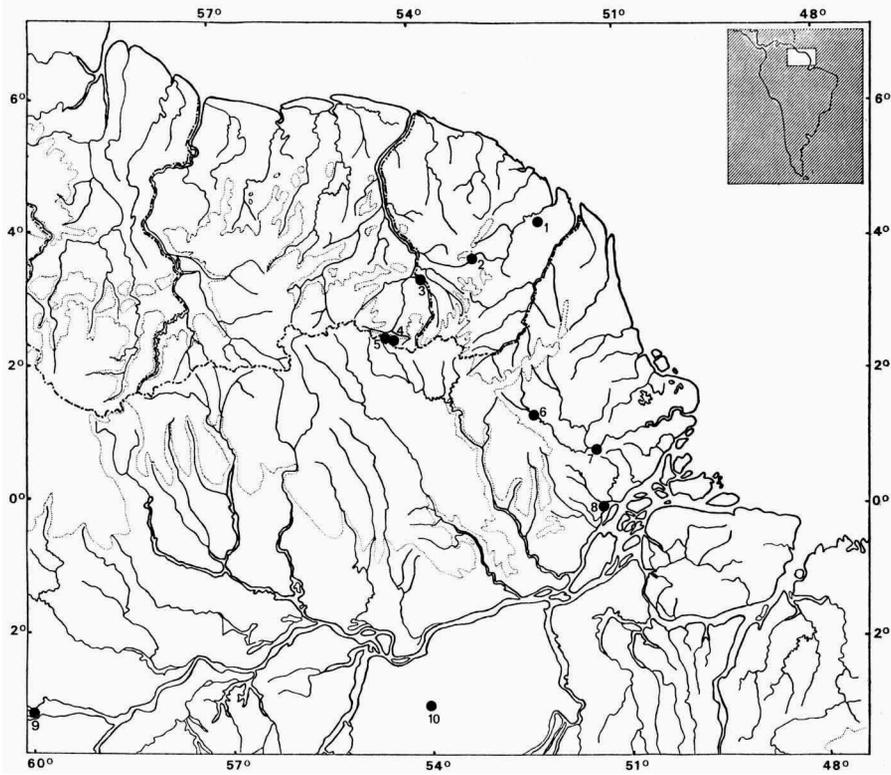


Fig. 2. Map showing the localities (1-8) from where *Eleutherodactylus gutturalis* nov. spec. is recorded. French Guiana: 1, Lower Matarony River; 2, Saül; 3, Antecumepata, Marouini River. Suriname: 4, Koulimapopane; 5, Mitaraca. Brasil: 6, Serra do Navio + Serra do Veado; 7, Porto Platon; 8, Mazagão; 9, Manaus, Ducke Reserve; 10, Sudam Floral Reserve. (The finely dotted line represents the 200 m contour line. The boundaries between countries are indicated by lines of alternating dots and dashes).

Peru. The two species resemble one another in proportions, the shagreened dorsum interspersed with larger tubercles, a lack of digital webbing, large digital pads, and uniform brown (in preservative) concealed thighs. The two differ in throat colouration. The dark gula with a white median stripe in *E. gutturalis* is paralleled in at least two other species of the group, *E. fitzingeri* (Schmidt) in lower Central America and *E. lanthanites* Lynch in upper Amazonian Ecuador. *E. fitzingeri* is readily distinguished by having an easily perceptible webbing of the toes and marbled posterior surfaces of the thighs. *E. lanthanites* is a short-legged species and differs from *E. gutturalis* by having an elongate heel tubercle, as well as in proportions.

Natural history. — Specimens of this diurnal frog on which data are available were collected during the morning and the afternoon (0730-1700 hr)

on trails or on banks of creeks in rainforest. Thus, the species seems to prefer dry forest-floor where some sunrays may penetrate.

Range and distribution. — Hitherto the species is only known from a limited area in north-eastern South America (fig. 2) covering the Brazilian territory of Amapá, the southern part of French Guiana and the extreme south-eastern part of Surinam. This area of distribution nowhere extends beyond the limits of the Guiana-shield and might very well indicate that this is a species endemic to the Guiana region and which developed in a forest-refugium located somewhere in central French Guiana (Lescure, 1975) and continued westward along the Tumuc Humac and Boundary Mountains (Hoogmoed, 1973). The species is known to occur at low elevations between 30 and 310 m.

Ethymology. — From the Latin *guttur* = throat, meaning pertaining to the throat, because of its conspicuous pattern.

Remarks. — Nine specimens from Brazil, three from Ducke Reserve, Manaus, Estado Amazonas (2 ♀♀, 1 juv. ♀, KU 129926-28, 20-VI-1970, leg. M. Crump) and six from Sudam Floral Reserve, 75 km SE of Santarem, Estado Para (2 ♂♂, 2 juv. ♀♀, 2 juv., KU 129920-25, 2-4 July 1970, leg. M. Crump) were studied in connection with the description of the new species described here. The specimens showed resemblance with *E. gutturalis*, but upon closer examination there turned out to be a number of differences which are listed below:

Specimens of Sudam and Ducke

1. No light gular stripe, throat with grey blotches.
2. Dark spots on lower lip 5, very distinct in specimens from Ducke, less so in those from Sudam.
3. Upper lip with 3 dark bars radiating from the eye to the mouth.
4. Distinct supratympanic dark stripe.
5. Supra-anal warts absent.
6. Enlarged tubercle on heel absent.
7. Toes with indistinct lateral fringes.

Guiana specimens

1. Invariably a midgular light stripe present.
2. Dark spots on lower lip 3, anterior one sometimes divided into 2, thus making a total of 4 spots.
3. Upper lip with 2 dark bars radiating from the eye to the mouth.
4. Indistinct supratympanic dark stripe.
5. Small supra-anal warts usually present.
6. Slightly enlarged tubercle on heel present.
7. Toes without lateral fringes.

Initially we considered the Sudam and Ducke specimens identical with *gutturalis*, but at second thought we deemed it better to withdraw these specimens from the type-series, because the differences observed invoked prudence. The material available to us is too small to decide whether the Sudam and

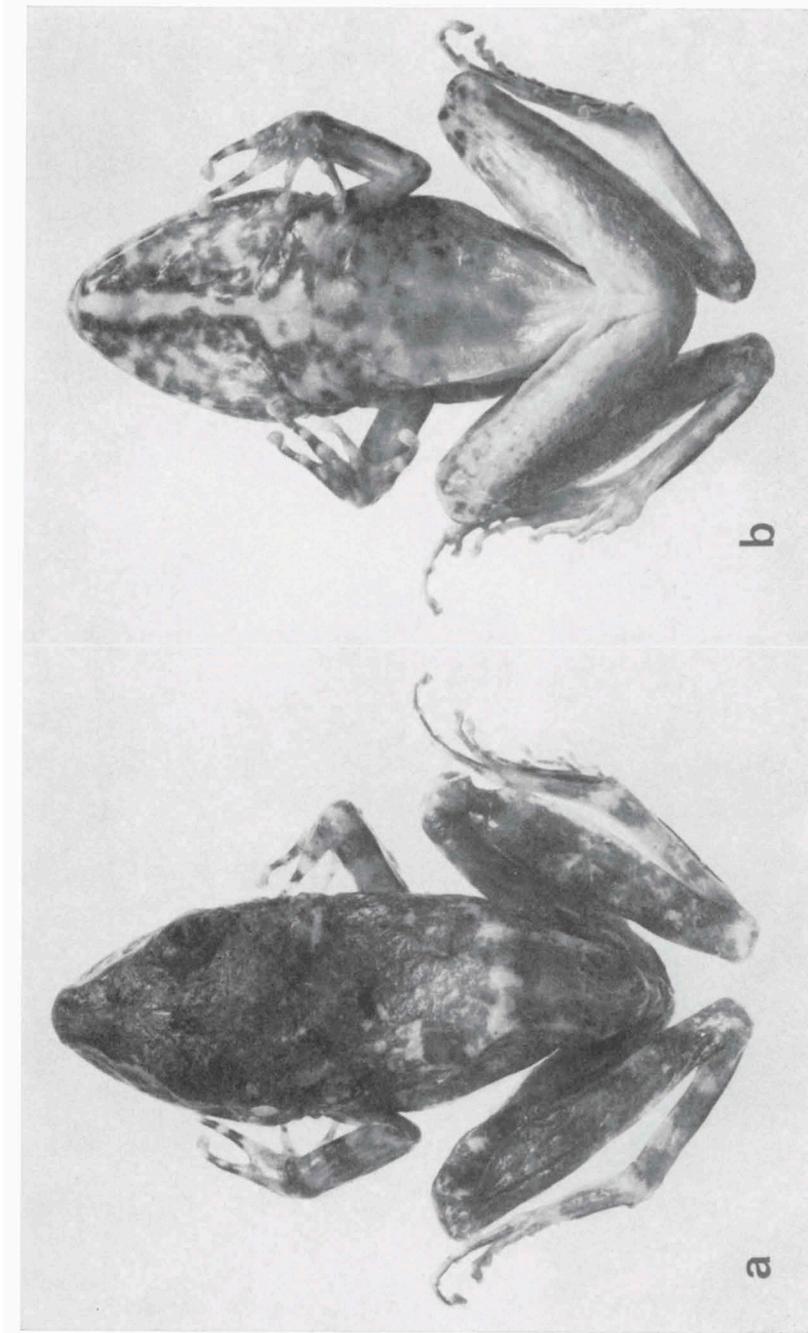
Ducke specimens represent aberrant populations, a different subspecies or even a different species. Future research in the lower Amazon area should present us with material from intermediate localities to facilitate a decision.

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Figure 1 was drawn by Mr. W. C. G. Gertenaar of the Rijksmuseum van Natuurlijke Historie, the photographs were made by Mr. C. Hoorn of the same institution.

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*Eleutherodactylus gutturalis* nov. spec. a, dorsal aspect of young ♀ LACM 44651 (holotype) ; b, ventral aspect of the same specimen.