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## A New Species of Toad (*Bufo*) From Sierra Leone

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Collections of amphibians made in Sierra Leone by Mr. Menzies and given to Chicago Natural History Museum (CNHM) contain a new species of *Bufo* similar to *B. regularis* and *B. latifrons*.

*Bufo maculatus* Hallowell was based on toads collected in Liberia. Hallowell's paper (1854) contains only one definite descriptive statement: ". . . the breadth [of the tympanum] is considerably larger than the length of the upper eyelid."

*Bufo regularis* has a larger tympanum than *latifrons* (Parker, 1936) or the new form. But not even in *regularis* does the tympanic diameter equal the length of the upper eyelid. In six *regularis* from Liberia (CNHM 57979-84) and one from Sierra Leone (CNHM 83189) the diameter of the tympanum varies between 0.53 and 0.66 (mean 0.60) of the length of the upper eyelid. In six *latifrons* from Liberia (CNHM 57970, 57973-4, 57976-8) and two from Sierra Leone (CNHM 83116, 83191) this ratio varies from 0.47 to 0.56 (mean 0.51), which is approximately the ratio in the new species (three specimens, 0.47-0.52). The tympanum is almost equal to the width of the upper eyelid in *regularis* and slightly narrower in the two other species.

In reference to the sharp dorsolateral edge of the parotoid, the new species is named

***Bufo cristiglans***, new species. Figure 106.

*Holotype*.—Chicago Natural History Museum No. 109741, an adult male collected in the Tingi Hills, Sierra Leone, on December 27, 1958, by J. I. Menzies.

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*Paratypes*.—CNHM 83198 from North Kambui Forest Reserve, Sierra Leone, and CNHM 121839 from South Kambui Forest Reserve, Sierra Leone. Adult males collected by J. I. Menzies.

*Diagnosis*.—A moderate-sized species of *Bufo*, adult males about 60 mm., snout to vent; tympanum distinct; a tarsal ridge; first finger longer than second; low, rounded warts on back and sides; parotoids elongate, reaching eye, with a distinct dorsolateral edge.

*Description*.—Habitus moderately stout; head without bony crests, triangular, slightly wider than long; snout pointed; head sloping downward in front of eyes; nostrils near tip of snout; canthus rostralis sharp; lores flat, almost vertical; eye large, diameter longer than snout; interorbital narrower than upper eyelid; tympanum conspicuous, diameter about half that of eye; parotoid elongate, 0.22–0.29 of snout-vent, connected with upper eyelid by a narrow isthmus, median edge indistinct, lateral edge conspicuous and raised slightly.

First finger longer than second; fourth and second equal; subarticular tubercles prominent, simple; many small supernumerary tubercles on palm. Third toe longer than fifth; toes about half-webbed; third and fifth toes with two phalanges free of web, fourth with four; subarticular tubercles like those of fingers; many small tubercles on sole; a compressed inner metatarsal tubercle, length about half the distance from tubercle to tip of first toe; outer metatarsal tubercle smaller, circular; a tarsal ridge running half the distance from inner metatarsal tubercle to heel; tibia 0.39–0.42 of snout-vent.

Back and sides of body with numerous low, rounded warts; each dorsal wart with numerous (ca. 10–20) small spinules tipped with melanin (fig. 107, A); eyelid with many conical warts; rictal glands conical, separate; dorsal surfaces of limbs with warts.

Color (in alcohol) clay above, darker on sides; two indefinite, transverse, light areas, one interorbital and one sacral; a dark bar on cheek below eye, another from eye to rictus covering tympanum; an interrupted interorbital dark bar; obscure dark markings on back; limbs with dark cross-bars dorsally; rear of thigh with 5–7 narrow, vertical, dark bars; throat with light dusting of melanophores; black vocal sac visible through gular skin; ventral surfaces otherwise cream-colored, unmarked. In life the whole ventral surface is yellow, deepening to orange laterally and to crimson on the thighs.

Measurements are given in Table 1.



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FIG. 106. Dorsal view of holotype of *Bufo cristiglans*, new sp. ( $\times 1\frac{1}{2}$ ).



TABLE 1.—Measurements (mm.) of *Bufo cristiglans*

	Holotype	Paratypes	
	109741 ♂	83198 ♂	121839 ♂
Snout-vent length.....	60.0	60.2	53.3
Length of tibia.....	25.2	23.7	21.3
Width of head.....	23.3	22.3	21.3
Length of parotoid.....	17.5	13.1	12.3
Diameter of tympanum.....	3.8	3.9	3.4
Length of upper eyelid.....	7.3	8.2	7.2

*Secondary sex characters.*—All three specimens have median sub-gular vocal sacs. The single slit-like opening is on the right side in the holotype and on the left in the paratypes. The sac and investing muscle are heavily pigmented in the holotype and larger paratype, weakly pigmented in two spots in the smaller paratype.

The nuptial pad is typically bufonid, consisting of dense clusters of minute melanic spinules. In the holotype and larger paratype the pad covers the dorsal and medial surfaces of the distal half of the metacarpal and the entire basal phalanx of the first finger and the medial surface of the metacarpal and basal phalanx of the second finger.

The smaller paratype lacks nuptial pads. The size, absence of nuptial pads, and incomplete pigmentation of the vocal sac all indicate that this specimen is not fully mature.

*Ecological notes.*—The Tingi Hills, the type locality, form an isolated plateau of granite rising from 1,500 to 5,000 feet, with some peaks reaching 6,000 feet above sea level. The slopes and valleys are covered with high forest, which is probably old secondary growth. The holotype was found buried in sand beside a stream in one of these forests at about 2,500 feet.

The Kambui Hills, where the paratypes were caught, are a schistaceous ridge reaching 2,000 feet and covered with advanced secondary forest that has been partly logged and replanted. According to the Forestry Department, Sierra Leone, the flora is similar to that of the Tingi Hills 100 miles away.

*Bufo cristiglans* thus appears to be an inhabitant of high forest at moderate elevations. *B. latifrons* occurs in similar situations in Sierra Leone but also in cultivated areas and in the lowlands. *B. regularis*, the most abundant and largest toad of Sierra Leone, does not live in well-developed forests.

*Comparisons.*—*Bufo cristiglans* is probably sympatric with *B. latifrons*; at least, one specimen of *latifrons* (CNHM 109742) was col-



lected in the Tingi Hills, the type locality of *cristiglans*. The latter differs from *latifrons* in the form of the parotoid, in the pigmentation of the gular skin, and in the spinulation of the dorsal warts. In *latifrons* the parotoid begins above the rear edge of the tympanum, whereas it reaches the eyelid in *cristiglans*. The parotoid of *latifrons* is low and rounded and lacks the sharp dorsolateral edge of the parotoid in *cristiglans*. The gular skin in adult males of *latifrons* is as densely pigmented with melanin as is the vocal sac; as a result the entire throat appears to be a uniform dark color. In *cristiglans*, on the other hand, the gular skin is so lightly pigmented that the dark vocal sac appears as a conspicuous black band across the rear of the

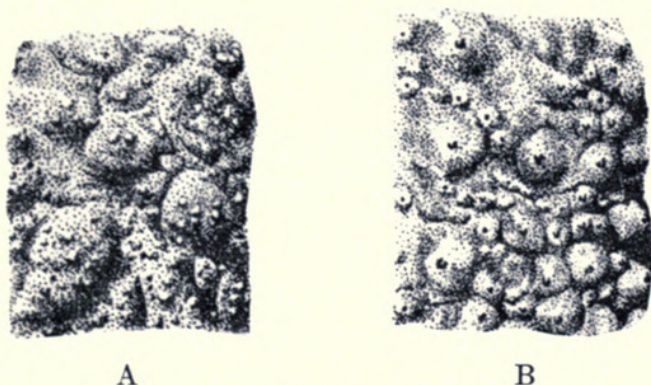


FIG. 107. Section of dorsolateral skin immediately behind parotoids of *Bufo cristiglans* (A) and *B. latifrons* (B).

throat. The dorsal warts of male *latifrons*, especially those in the dorsolateral region behind the parotoids, have single melanic spinules (fig. 107, B), whereas the warts of *cristiglans* have many spinules (fig. 107, A).

*Bufo cristiglans* differs from *regularis* in having a smaller tympanum (see above, p. 589), males with lighter throats (those of *regularis* with black gular skin), the rictal gland formed of separate conical warts (instead of a long, smooth-edged gland), dorsolateral warts with many instead of 1 to 5 spinules, and parotoids with a sharp dorsolateral edge.

Of the other species of *Bufo* from central and western Africa having tarsal ridges and tympanums, *funereus* differs from *cristiglans* in having a smooth dorsal skin instead of spinose warts in breeding males, no vocal sacs, and lateral warts that are higher than the dorsal ones; *camerunensis* differs from *cristiglans* in having large, erect, conical, lateral warts and an almost smooth dorsum; *lemairei* differs from *cristiglans* in having the tympanum as large as the eye, an



elongate, smooth-edged rectal gland, and a much narrower parotoid. *Bufo villiersi*, *pentoni*, *gracilipes*, and *tuberosus* differ from *cristiglans* in a number of characters, in addition to absence of tarsal ridges and the form of the parotoids.

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The illustrations were prepared by Miss Janet Wright, Chicago Natural History Museum.

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