

The Lectotype of *Cystignathus hylodes* Reinhardt and Lütken, 1862

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Reinhardt and Lütken (1862) described *Cystignathus hylodes* on the basis of two specimens, one of which was lost by 1952 (Heyer, 1979:15; F. W. Braestrup, in litt.). The remaining specimen, ZMUC R 11105 (Fig. 1) was designated as the lectotype of *Cystignathus hylodes* (Heyer, 1979:15). The purpose of this note is to redescribe the lectotype and evaluate its taxonomic standing. Terminology follows Heyer et al. (1990).

The snout is nearly rounded in dorsal outline and rounded in profile. The canthus rostralis is indistinct. The loreal cross-section is convex. The tympanum is distinct, less than $\frac{1}{2}$ the eye diameter. The specimen lacks vocal slits and sac. The vomerine teeth are in two almost straight horizontal series between and posterior to the choanae. The vomerine tooth rows are separated by a distance much shorter than the length of a single vomerine tooth row. The first finger is much longer than the second; relative finger lengths are $II < I \cong IV < III$. Fingers I and II have rounded, non-expanded tips. Fingers III and IV are slightly but noticeably expanded into very small disks, lacking grooves. There are no secondary sexual characters (spines, asperities) on the thumb or chest. The dorsum has a fine shagreen texture with a scattering of white-tipped tubercles posteriorly. The supratympanic folds are barely evident. There are no visible longitudinal dorsal folds, but there are two dark bands, that in other *Leptodactylus*, are usually associated with dorsolateral folds. These dark bands extend from behind the eyes to just over halfway to the sacrum. There are no obvious glands. The venter is smooth except for the areolate seat-patch. No discoidal belly fold is evident. The toes have minimally expanded tips, formed into



FIG. 1. Dorsal and ventral views of lectotype (ZMUC R 11105) of *Cystignathus hylodes* Reinhardt and Lütken, 1862.

tiny rounded swellings, lacking grooves. The toes have well-developed lateral fringes joining to form basal webbing between the toes. The subarticular tubercles are moderately developed. The metatarsal fold is distinct. The tarsal fold is also distinct, extending about $\frac{1}{2}$ the length of the tarsus. The dorsal surface of the shank has scattered white-tipped tubercles. The outer face of the tarsus is finely shagreened. The sole of the foot is slightly more shagreened than the tarsus.

The specimen appears to be somewhat faded. The upper lip is faintly barred. The tip of the snout is lighter than the rest of the upper lip, the light tip bordered by narrow, short, darker stripes. The dorsum has a quadrangular interorbital dark mark, broader and better defined anteriorly. The longitudinal bands described above are dark brown. There are two short dark mid-dorsal pin stripes between the shoulders and sacrum. A light mid-dorsal pin stripe extends about $\frac{1}{2}$ the distance past the sacrum to the vent. There are darker blotches with white-tipped tubercles in the post-sacral region as well. The upper flanks have a series of elongate darker spots behind the shoulders to the groin. The dorsal surfaces of the arms are uniform tan. The dorsal thigh surfaces are faded, but have faint cross stripes (which may have been bars before the specimen faded). The dorsal shank surfaces have faint, incomplete cross-bars. The throat is noticeably darker than the rest of the venter, with an irregular light brown reticulum. The chest has very few

scattered melanophores anteriorly, the rest of the chest and belly lack melanophores. The posterior surfaces of the thighs also appear faded, but some bold mottling (i.e., the dark and light areas are large, see Heyer, 1994) is in evidence.

Measurements of the lectotype in millimeters are: snout-vent length (SVL), 25.3; head length, 11.0; head width, 8.7; eye-midnostril distance, 2.9; greatest tympanum diameter (including annulus), 2.2; thigh length, 11.0; shank length, 12.1; foot length, 13.8.

The SVL I measured (25.3 mm) is identical to the measurement given by Reinhardt and Lütken (25 mm), virtually assuring that the remaining specimen, now lectotype, is in fact the specimen they used for the species description. F. W. Braestrup (in litt., 28 May 1978) wrote: "The lost specimen was slightly smaller than the one you have [= lectotype]."

Overall, the lectotype of *Cystignathus hylodes* is a nondescript small brown frog that looks like a species of *Leptodactylus* (*Cystignathus* is a strict synonym of *Leptodactylus*), but without external characters that allocate it to subfamily. However, X-rays of the lectotype reveal that it has a bony sternal style, thus placing it unambiguously within the Subfamily Leptodactyliinae. Within the subfamily, the characters of the lectotype are consistent with those of the genus *Leptodactylus* (e.g., horizontal pupil, toes fringed or free, no antibrachial or tarsal tubercles, a distinct tarsal fold,

quadratojugal present, vomerine and maxillary teeth present).

Cystignathus hylodes has been considered a synonym of *Leptodactylus labyrinthicus* for most of its recent taxonomic history. Miranda-Ribeiro (1927:115) placed *C. hylodes* in the synonymy of *L. pentadactylus* (he considered *L. labyrinthicus* to be a synonym of *L. pentadactylus*). Cochran (1955) recognized *labyrinthicus* as a subspecies of *L. pentadactylus* and placed *C. hylodes* in synonymy with it. In 1979, I examined the specimen in association with a revision of the *Leptodactylus pentadactylus* species group and concluded (Heyer, 1979: 15): "One of the two specimens is still extant and matches the description [that of Reinhardt and Lütken for *C. hylodes*] well except for the presence of toe fringing, which the description stated was absent. The extant specimen is a member of the species currently referred to as *Leptodactylus wagneri* Peters, 1862, a member of the *L. melanonotus* group." In this revision, *L. labyrinthicus* was recognized as a full species. Cei (1980) in his influential "Amphibians of Argentina" placed *C. hylodes* in the synonymy of *Leptodactylus labyrinthicus*. When I re-evaluated the *Leptodactylus wagneri* complex, I overlooked my own previous writings and did not re-examine the status of *C. hylodes* (Heyer, 1994). My previous treatment of *L. wagneri* as a species with a broad geographic distribution (Heyer, 1970) was shown to be in error (Heyer, 1994) and the member of that complex that occurs in the region of the type locality of *C. hylodes* is *Leptodactylus natalensis* Lutz, 1930.

The lectotype appears to be a juvenile. At this time, I do not think dissection of the specimen to verify sex and maturity would resolve its taxonomic status (see below).

Cystignathus hylodes was reported to be collected from Maruim, Brazil by Captain Hygom (Reinhardt and Lütken, 1862). The previous curator at the Zoologisk Museum, Denmark, Dr. F. Braestrup, informed me that the actual type locality was Cotinguiba (now Nossa Senhora do Socorro, 10°52'S, 37°07'W), but Reinhardt and Lütken used the nearby locality of Maruim (10°45'S, 37°05'W) as it could be found on maps (Heyer, 1979:15). The Cotinguiba-Maruum area has a complex of vegetation types including small patches of degraded Atlantic Forest, restingas (coastal white sands with open vegetation of shrubs, small sparse trees, and palm trees), and mangroves (also see Vanzolini and Gomes, 1979:250-251, for further descriptions of habitats near Maruum). At the time Hygom collected, the Atlantic Forests were certainly more extensive and in better condition than at present.

There are three species of *Leptodactylus* that have toe fringe at the same size of the lectotype (25 mm SVL) known from the general Maruum region: *L. natalensis*, *L. labyrinthicus*, and the local representative of the *L. ocellatus* complex (the *L. ocellatus* complex has never been revised in its entirety and the species involved and their distributions are very unclear at present). The lectotype of *Cystignathus hylodes* is identical with none of them, as detailed below.

The local representative of the *Leptodactylus ocellatus* complex has a series of dark spots on the dorsum and at least six complete dorsolateral folds. The lectotype of *Cystignathus hylodes* lacks dorsal spots and if it had dorsolateral folds in life probably had only two incom-

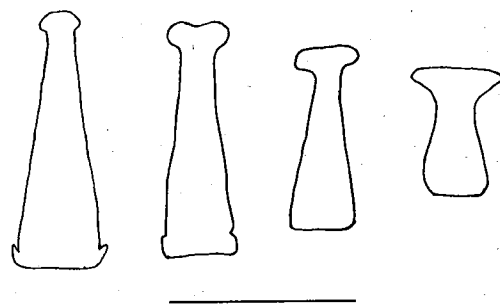


FIG. 2. Camera lucida tracings of terminal phalanges of fourth toes of four taxa. Left to right, *Leptodactylus melanonotus*, USNM 227592, 34.3 SVL, cleared and stained specimen; *Leptodactylus natalensis*, USNM 209621, 34.5 mm SVL, from x-ray; lectotype of *Cystignathus hylodes*, ZMUC R 11105, 25.3 mm SVL, from x-ray; *Vanzolinus discodactylus*, USNM 196877, 28.6 mm SVL, cleared and stained specimen. Scale line = 1 mm.

plete folds (as indicated by the dark longitudinal dorsolateral bands).

Juvenile *Leptodactylus labyrinthicus* have toe fringing, which is lost with maturity. Comparison of juvenile *L. labyrinthicus* with the *Cystignathus hylodes* lectotype confirms that they are not synonymous. The finger lengths of juvenile *L. labyrinthicus* and the lectotype are similar, but the tips are rounded in juvenile *L. labyrinthicus* (small disks on fingers III and IV in *C. hylodes*). More dramatically, however, the broad head characteristic of adult *L. labyrinthicus* is already evident in the smallest juvenile at hand (head width/SVL of the lectotype is 34% SVL, whereas in USNM 98787, 32.2 mm SVL, it is 44%) and is much different than the narrower head of the lectotype.

At the time I borrowed the lectotype for this study, I was ready to find that it was identical with *Leptodactylus natalensis*, but they differ in several significant details. The throat of *L. natalensis* usually has light spots on a darker field (irregularly patterned, but without obvious light spots in the lectotype). Only 1% of 211 *L. natalensis* examined lack a belly pattern (Heyer, 1994:91) as in the lectotype. The toe tips of *L. natalensis* range from narrow to expanded, which would include the condition observed in the lectotype. However, there are differences in the structure of the fingertips. To my knowledge, no other species of *Leptodactylus* has the heterogeneous fingertip development of the lectotype (Fingers I and II with rounded, non-expanded tips, Fingers III and IV with small ungrooved disks). (Heterogeneous fingertips are relatively common in some other leptodactylid genera such as *Eleutherodactylus* and *Thoropa*, however.) The terminal phalanges of the lectotype are bluntly T-shaped, in contrast to the knobbed tips seen in *L. melanonotus* or the bifurcate condition found in *L. natalensis* (Fig. 2). This character in the lectotype is intermediate (for the specimens examined) between the condition found in *L. natalensis* and the *Vanzolinus* clade (Fig. 2, also see Heyer, 1998, that some data suggest that the *Vanzolinus* clade is embedded within *Leptodactylus*). Variation in terminal phalangeal condition has not been evaluated for *L. natalensis*, however. Of the three potential conspecific species of *Leptodactylus* from

Sergipe, the lectotype is most similar to *L. natalensis*. Should further data indicate that the two species are synonymous, Reinhardt and Lütken's name has priority.

I conclude that the lectotype of *Cystignathus hylodes* (1) is a member of the genus *Leptodactylus*, and (2) because certain details differ between the lectotype and *Leptodactylus natalensis*, the two taxa should not be synonymized. Consequently, *Leptodactylus hylodes* (Reinhardt and Lütken, 1862) should be considered a valid species of *Leptodactylus*, known at this time only from the lectotype.

If Captain Hygom collected the types from the Atlantic Forest biome the species may yet be rediscovered in remnant forests in northeastern Brazil, which are poorly sampled for amphibians.

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LITERATURE CITED

- CEL, J. M. 1980. Amphibians of Argentina. *Monitore Zool. Ital. (N.S.) Monogr.* 2:1-609 + xii.
- COCHRAN, D. M. 1955. Frogs of southeastern Brazil. *U.S. Nat. Mus. Bull.* 206:1-423.
- HEYER, W. R. 1970. Studies on frogs of the genus *Leptodactylus* (Amphibia, Leptodactylidae). VI. Biosystematics of the Melanonotus group. *Contr. Sci. Nat. Hist. Mus. Los Angeles Co.* 191:1-48.
- . 1979. Systematics of the *pentadactylus* species group of the frog genus *Leptodactylus* (Amphibia: Leptodactylidae). *Smithsonian Contr. Zool.* 301:1-43.
- . 1994. Variation within the *Leptodactylus podicipinus-wagneri* complex of frogs (Amphibia: Leptodactylidae). *Smithsonian Contr. Zool.* 546:1-124.
- . 1998. The relationships of *Leptodactylus diedrus* (Anura, Leptodactylidae). *Alytes* 16:1-24.
- , A. S. RAND, C. A. G. CRUZ, O. L. PEIXOTO, AND C. E. NELSON. 1990. Frogs of Boracéia. *Arq. Zool.* 31:231-410.
- MIRANDA-RIBEIRO, A. 1927. Os Leptodactylidae do Museu Paulista. *Rev. Mus. Paulista*, 15:113-134 + 3 plates.
- REINHARDT, J., AND C. LÜTKEN. 1862. Bidrag til kundskab om Brasiliens padder og krybdyr. Første afdeling: Padderne og øglerne. *Vidensk. Meddr. Naturhist. Foren.*, 13:143-242 + 4 plates.
- VANZOLINI, P. E., AND N. GOMES. 1979. On *Tropidurus hygomi*: Redescription, ecological notes, distribution and history (Sauria, Iguanidae). *Papéis Avulsos Zool.* 32:243-260.

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