

STUDIES ON FROGS OF THE GENUS *LEPTODACTYLUS*  
(AMPHIBIA, LEPTODACTYLIDAE). V. TAXONOMIC  
NOTES ON *L. LATINASUS*, *RHODONOTUS*,  
*ROMANI*, AND *WUCHERRERI*

W. RONALD HEYER

Examination of type specimens during an ongoing biosystematic study of the frog genus *Leptodactylus* indicates the need for nomenclatural changes. The larva of one of the involved species is described and illustrated for the first time.

MATERIALS AND METHODS

The nomenclatural changes indicated herein resulted from examination of the types involved. I examined all the types personally, with the exception of *Cystignathus rhodonotus*. The methods for examining the adults and larvae are the same as those given earlier (Heyer, in press).

ACKNOWLEDGMENTS

The following curators have loaned material for examination (Museum abbreviations as used in text in parentheses): Javier Castroviéjo, Instituto "José de Acosta" de Zoología, Museu Nacional de Ciencias Naturales, Madrid (Madrid); B. Hubendick, Naturhistoriska Museet, Göteborg (Göteborg); Ernest E. Williams, Museum of Comparative Zoology, Harvard University (MCZ); and John W. Wright, Los Angeles County Museum of Natural History (LACM). Richard E. Etheridge, San Diego State College, examined the type of *C. rhodonotus* for me at the British Museum (BMNH). I thank him and David B. Wake, University of Chicago, for allowing me to report on the larvae which they collected. Jay M. Savage, University of Southern California, read and commented on the manuscript. The research and report were completed while I was a National Science Foundation Graduate Trainee at the University of Southern California.

SPECIES ACCOUNTS

*Leptodactylus latinus*

*Leptodactylus latinus* was described on the basis of a single specimen from Montevideo, Uruguay, in 1875 by Jiménez de la

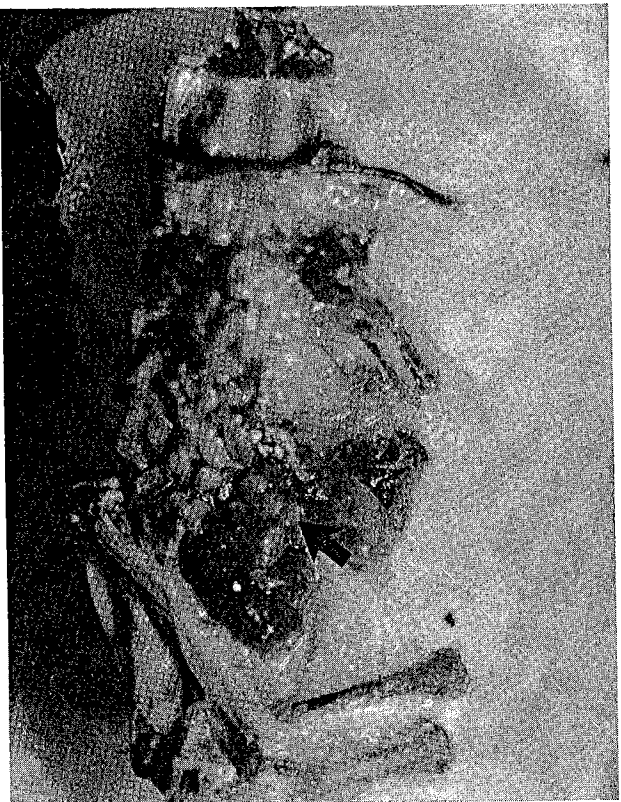


FIG. 1.—Holotype of *Leptodactylus latinus*. Arrow points to eggs.

Espada. The species has been placed questionably in the synonymy of *Leptodactylus ocellatus* by workers beginning with Boulenger (1882:247). The name has never been associated with any specimens other than the holotype. No terminal phalanges are left in the type, the front of the skull is smashed, and the specimen is partially rotted (Fig. 1). The bony style of the sternum, the vomerine teeth, and the snout-vent are the same as given in the type description. The rest of the type specimens of *Leptodactylus* described by Jiménez de la Espada are in much better condition and are clearly the specimens that he described with one possible exception noted below. There is little reason to doubt that the specimen indicated is the type of *L. latinus*. Jiménez de la Espada's description of *L. latinus* is very complete. The combination of toes lacking a fringe, tarsus and sole of foot tuberculate, and a tuberculate-granulose dorsum with irregular folds as described for *L. latinus* is typical of only one species of frog occurring in Montevideo or its surroundings—*Leptodactylus prognathus*. One point of discrepancy between the description of *L. latinus* and specimens of *L. prognathus* (females to 40 mm standard length) might indicate that they are not identical. Jiménez de la Espada stated that his specimen was a juvenile female. The belly skin and muscle have rotted away on the holotype exposing several large, yellowish

eggs (Fig. 1), indicating that the holotype of *L. latinus* is an adult female. *Leptodactylus latinus* Jiménez de la Espada, therefore, is a senior synonym of *L. prognathus* Boulenger and should be used for the species.

#### *Leptodactylus rhodonotus*

Richard E. Etheridge and David B. Wake collected a series of amphibians and reptiles from the Iscozazin region, Departamento de Pasco, Peru. The specimens are in the Los Angeles County Museum of Natural History. Included is a series of specimens of a species representing life history stages from larvae to adults. There is ontogenetic change in the character of toe ridging in the series. The toes of juveniles have noticeable lateral ridges, which are lost during ontogeny. Such a change is typical of members of the *Pentadactylus* species group. The adults are clearly the same as *Leptodactylus rubido* (Cope), 1874, a member of the *Pentadactylus* group. The males have the characteristic two horny spines per thumb, chest spines, paired dark outlined dorsolateral folds, and relatively small size (70–80 mm) of *L. rubido*.

*Cystignathus rhodonotus* was described on the basis of a 40 mm specimen from Chyavetas, eastern Peru, by Günther (1868). The species name has never been associated with any specimens other than the type, but the species has been considered distinct and perpetuated in literature lists (Gorham, 1966). Etheridge compared the holotype of *Cystignathus rhodonotus* (BMNH 1947. 2.17.39) with a juvenile specimen (LACM 40626) from the recent series while he was at the British Museum (Natural History) in July 1967. He found both specimens shared the following diagnostic characters: (1) tibia with large conical apical teeth dorsally; (2) two dark outlined dorsolateral folds; (3) vomerine teeth in slightly arched series, extending posterior to the choanae; (4) toes with distinct lateral ridges; and (5) venter dark with light specks. The two names *rhodonotus* and *rubido* thus apply to the same species of *Leptodactylus*. *Cystignathus rhodonotus* is the oldest name, and must be used. Since Cope did not designate a holotype for *Gnathophrysa rubida* from the type series, I designate specimen MCZ 4780 (a syntype), an adult male, as the lectotype of *Gnathophrysa rubido* Cope.

A large series of tadpoles of *L. rhodonotus*, LACM 40646–49, collected by Etheridge and Wake is described as follows:

Larvae generalized; nostril almost always nearer tip of snout than eye, rarely median in position; distance between nares less than interorbital distance; eye moderate, diameter 9 (minimum)–10.3 (mean)–12 (maximum) % body length; mouthparts subterminal; oral papillae formula 1-2-3-2-1, 1-2-3-2, 1-2-1, or 1-2; oral disk entire; oral disk width 17–20.9–24% body length; oral papilla

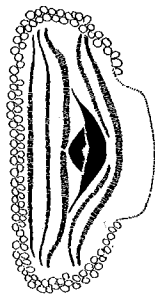


FIG. 2.—Mouthparts, dorsal and lateral views of the larva of *Leptodactylus rhodonotus*. Upper line equals 1 mm, lower line equals 10 mm.

gap 46–55.7–63% oral disk width; tooth row formula  $\frac{1}{1-1}$  or  $\frac{1-1}{3}$ , all three

tooth rows posterior to beak of equal length; fewer denticles in divided tooth row just anterior to beak (total 150–167) than in single or divided tooth row just posterior to beak (total 164–196); beak serrations small and blunt to moderate and blunt; dorsal fin origin on tail, just posterior to body-tail juncture, or origin on body, just anterior to body-tail juncture; tail height usually greater than body height, or rarely about the same as body height; tail tip bluntly rounded or more elongate and rounded; dorsum dark brown, with denser blotches of melanophores posteromedially to the nostrils and sometimes lateral to the tail musculature on the body; spiracle noticeably lighter than rest of lateral body surrounding the spiracle; the lateral line system clearly visible or indistinct; belly profusely, moderately, or lightly suffused with melanophores anteriorly, including oral papillae and disk; fewer melanophores on posterior belly, almost none on the anal tube; tail moderately or lightly suffused with melanophores, with distinct blotched pattern on entire tail; total length largest specimen, stage 40, 59 mm; body length 32–34.0–37% total length (Fig. 2).

*Leptodactylus rhodonotus* has a median anus and sinistral spiracle as do all *Leptodactylus* larvae.

Larvae are known of only 11 species of *Leptodactylus*, including *L. rhodonotus*. Of these, I have examined larval *L. bolivianus*, *L. labialis*, *melanonotus*, *mystaceus*, *ocellatus*, *pentadactylus*, *poecilochilus*, and *rhodonotus*. *Leptodactylus rhodonotus* has a distinctly patterned tail, distinguishing it from *L. bolivianus*, *melanonotus*, and *ocellatus* which have almost uniform dark tails. *Leptodactylus rhodonotus* has a higher total denticle count in the split tooth row anterior to the beak (150–167) than any *L. labialis* (46–101), *mystaceus* (92–157), *pentadactylus* (45–67), and *poecilochilus* (64–142) examined. *Leptodactylus rhodonotus* is further distinguished by its larger total length (maximum examined 59 mm) from *L. mystaceus* (stage 37, 38 mm). The only other larva described from northern South America with which *L. rhodonotus* might be confused is *L. rugosus*. The latter are stream-adapted, have long, narrow tails, and the dorsal fin originates about mid-tail.

#### *Leptodactylus romani*

*Leptodactylus romani* was described from five specimens from Taracua, Rio Vaupes, Brazil, by Melin (1941). The name has not been associated with specimens other than the types, but has been considered a distinct species (Gorham, 1966). The individual type specimens are not tagged, but are placed in numbered jars in the Göteborg Museum. There has been an apparent mixing of specimens. Bottle No. 499 contains a specimen of *Ateolopus minutus* Melin, presumably from the type series, although the bottle label clearly indicates it is a type of *L. romani*. Melin listed the sizes of all the specimens of *L. romani*, which agreed with the specimens examined, with the exception of the smallest. The specimen of *A. minutus* is much smaller (14 mm vs. 35 mm listed in Melin), indicating that someone mistakenly put a type of *A. minutus* in the *L. romani* jar and a type of *L. romani* in a different jar.

The remaining specimens, Ba. 499, 501 (two individuals), and 502, are the ones described by Melin. The largest, a 61.5 mm specimen (60 mm in Melin, p. 56), is a juvenile, not an adult male as stated by Melin. Melin states that the specimen, "has two small blackish, well separated, tooth-like protuberances on the medial side of the swollen base of the first finger." I am able to find black pigment on the side of the first finger only. In all male *Leptodactylus* I have examined that have thumb spines, the spines indicate sexual maturity and are not deciduous. In a few specimens that have been poorly preserved over a long period of time, the black horny covering of the spine is missing, but a bony spine remains. Further, the 61.5 mm specimen lacks vocal slits which are present in all adult male *Leptodactylus*. The diagnostic combination of toe fringes, paired dorsolateral folds from the eye to the sacrum,

a light stripe from under the eye extending under the tympanum to the angle of the jaw, and large juvenile size is shared with *Leptodactylus bolivianus* Boulenger. Thus *L. romani* Melin is a junior synonym of *L. bolivianus* Boulenger. I designate Göteborg Ba. 499, a 61.5 mm specimen, as the lectotype of *Leptodactylus romani* Melin.

*Leptodactylus wuchneri*

*Leptodactylus wuchneri* was described on the basis of a single specimen from Argentina by Jiménez de la Espada in 1875. The name is presently considered a synonym of *L. mystacinus* (Gorham, 1966). The piece of paper with the specimen from jar No. 163 in the National Museum in Madrid states that the specimen is *Leptodactylus wuchneri*, as identified by Espada. There are certain discrepancies between the description and the specimen:

<i>Description</i>	<i>Specimen</i>
No tarsal fold	Tarsal fold present
Snout vent—58.0 mm	Snout vent—48.7 mm
Head width—23.0 mm	Head width—19.1 mm
No dermal margins on the toe	Toe ridges present
Female	Juvenile

From Espada's description (. . . in the parts which the alcohol has deteriorated and macerated a bit . . . , p. 70, free translation) it is obvious that the specimen was not in excellent condition when described. Poor preservation could account for the different interpretations of tarsal fold and toe ridge characters. The difference in snout-vent length could be a typographical error since the difference is 10 mm. Other measurements, such as the femur and foot length correspond in the description and the specimen. Other types I have examined (*L. goliath*, *labrosus*, and *stenodema*) match a point for point with their descriptions. Even though there are discrepancies between the description and the specimen, the specimen in jar 163 is apparently the holotype of *L. wuchneri*. The combination of toe ridges in a juvenile specimen, palatine ridges, smooth tarsus and sole of foot is characteristic of only one species in Argentina: *L. pentadactylus*. *Leptodactylus mystacinus* is a bulky-legged frog, different from the comparatively slender-legged type (Fig. 3). The slenderness of the legs of the type is consistent with juvenile *L. pentadactylus*. *Leptodactylus mystacinus* has large white tubercles profused over the tarsus and sole of the foot, evident in all stages of preservation. The tarsus and sole of the foot are smooth in the holotype of *L. wuchneri*, as stated in the description. The systematics of *L. pentadactylus* is confused. Several names have been proposed for *L. pentadactylus*-like populations which are currently regarded as full species or as subspecies of *L.*

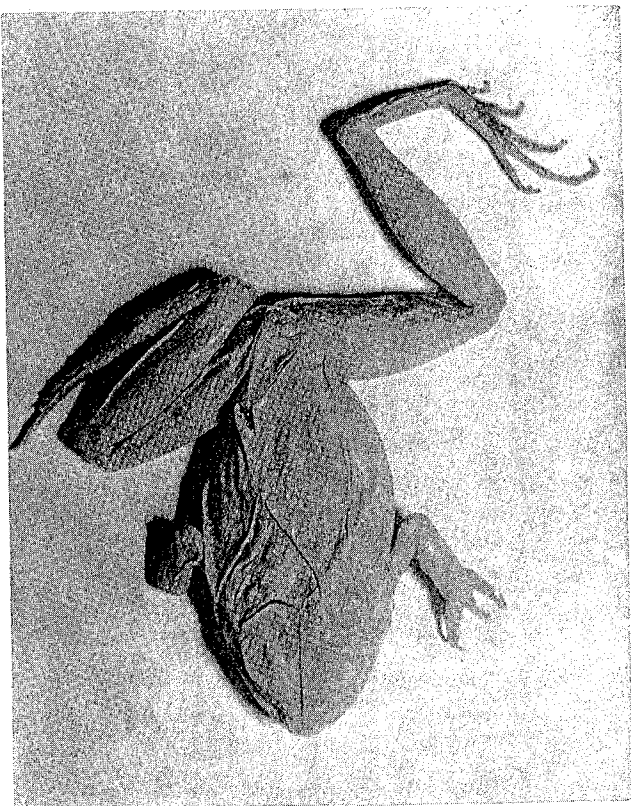


FIG. 3.—Holotype of *Leptodactylus wuchneri*.

*pentadactylus*. A revision of the *pentadactylus*-complex is needed to determine the exact taxonomic position of *L. wuchneri*. For the present, *L. wuchneri* should be considered a junior synonym of *L. pentadactylus* and is definitely not *L. mystacinus*.

SUMMARY OF PROPOSED NOMENCLATURAL CHANGES

1. *Leptodactylus latinus* Espada  
*Leptodactylus latinus* Espada, 1875:40-43. Type Locality—Montevideo. Holotype—Madrid Jar No. 335, an adult female.
2. *Leptodactylus prognathus* Boulenger, 1888:187. Type Locality—Brazil: Rio Grande do Sul. Holotype—BMNH 88.11.30.2, a juvenile male.  
*Leptodactylus rhodonotus* (Günther)  
*Cystignathus rhodonotus* Günther, 1868:481-482. Pl. 37, Fig. 1. Type Locality—Peru: Chyavetas. Holotype—BMNH 1947.2.17.39, a juvenile.  
*Gnathophrysa rubido* Cope, 1874:128-129. Type Locality—Peru: San Martin; Moyabamba. Lectotype—MCZ 4780, an adult male.
3. *Leptodactylus bolivianus* Boulenger  
*Leptodactylus romani* Melin, 1941:54-56. Fig. 30. Type Lo-

- cality—Brasil: Rio Uaupes, Taracua. Lectotype—Côteborg Ba. 499, a juvenile.
4. *Leptodactylus pentadactylus* (Laurenti)  
*Leptodactylus wuchereri* Espada, 1875:68-72. Type Locality—Argentina. Holotype—Madrid Jar. No. 163, a juvenile.

## LITERATURE CITED

- BOULENGER, G. A. 1882. Catalogue of the Batrachia Salientia s. Ecaudata in the collection of the British Museum. 2nd ed. London. 503 p.
- . 1888. Descriptions of new Brazilian batrachians. Ann. Mag. Natur. Hist. Ser. 6, Vol. 1:187-189.
- COPE, E. D. 1874. On some Batrachia and Nematognathi brought from the upper Amazon by Prof. Orton. Proc. Acad. Natur. Sci. Philadelphia 26: 120-137.
- ESPADÁ, JIMÉNEZ DE LA, M. 1875. Vertebrados del viaje al Pacífico verificado de 1862 a 1865 por una comisión de naturalistas enviada por el gobierno Español. Batracios. Madrid. 208 p.
- GORNHAM, S. W. 1966. Liste der rezenten Amphibien und Reptilien. Ascaphidae, Leiopelmatidae, Pipidae, Discoglossidae, Pelobatidae, Leptodactylidae, Rhinophrynidae. Das Tierreich 85:1-222.
- GÜNTHER, A. 1868. First account of species of tailless batrachians added to the collection of the British Museum. Proc. Zool. Soc. London 1868: 478-490.
- HEYER, W. R. 1969. Studies on the genus *Leptodactylus* (Amphibia, Leptodactylidae). II. Diagnosis and distribution of the *Leptodactylus* of Costa Rica. Rev. de Biol. Trop., in press.
- MELIN, D. 1941. Contributions to the knowledge of the Amphibia of South America. Göteborgs Vetensk. Samh. Handl. (6) 1B(4):1-71.

*Division of Reptiles and Amphibians, Field Museum of Natural History, Chicago, Illinois 60605*