

# FIELDIANA • ZOOLOGY

Published by

FIELD MUSEUM OF NATURAL HISTORY

Volume 51

SEPTEMBER 18, 1969

No. 11

## The Larva of the Frog *Leptodactylus hyalaedactylus* (Leptodactylidae)

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No larva has been described for any member of the Marmoratus species group in the genus *Leptodactylus*. Recently Silverstone collected the larvae of *Leptodactylus hyalaedactylus*, a member of the Marmoratus group. The purpose of this report is to describe these larvae, to discuss the habitat of the adults and larvae, and to comment on adaptations unique to this species within the genus.

### MATERIALS, METHODS, AND ACKNOWLEDGMENTS

The report is based upon larvae from two foam nests from Regina, French Guiana, now on deposit at the Los Angeles County Museum of Natural History (tadpole lots LACM 42082, 5 individuals; 42083, 7 individuals). Methods for examining the preserved material follow Heyer (in press).

Priscilla H. Starrett (University of Southern California) and Robert F. Inger (Field Museum of Natural History) shared their knowledge of tadpole adaptation and morphology with us and read over the manuscript. Hymen Marx (FMNH) and Jay M. Savage (USC) critically reviewed the manuscript.

Arden H. Brame, Jr. and John W. Wright (LACM) facilitated the use of the reported specimens. Marion Pahl (FMNH) illustrated the larvae. Betty Peyton (FMNH) typed the final copy.

Silverstone was a National Defense Education Act Fellow at the University of Southern California during the field work and the completion of the report.

We thank these individuals and institutions for their support.

#### NOMENCLATURE

The Marmoratus group is poorly known, and requires a revision before populations can be associated with proper names. Some workers indicate that there is but one species (e.g., Rivero, 1961). Specimens collected by Silverstone from northeastern Brazil and French Guiana indicate that at least two species are involved. One species is small (snout-vent length 31 specimens, 13.7–20.5 mm., mean 17.1), has a blunt snout, and very large toe disks. The other species is larger (97 specimens, 15.7–24.9 mm., mean 20.6), has a more pointed snout, and small to moderately large toe disks. We follow Bokermann (1966) in regarding the type locality of *Adenomera marmorata* as probably around Rio de Janeiro, Brasil. Recent specimens from the probable type locality compare exactly with the small, blunt-snouted, large-disked specimens from French Guiana (*L. marmoratus*). All of the specimens collected at Regina, French Guiana, (LACM 44282–44378) are of the second species. The oldest name that could apply to this more slender-toed species is *L. hylaedactylus* Cope, 1868, with a type locality of the Napo or Upper Marañón Rivers, probably in Perú. We provisionally apply *L. hylaedactylus* to these specimens.

#### DIAGNOSIS OF LARVA

*Leptodactylus hylaedactylus* is the only species within this genus known to lack both a spiracle and denticles in the tooth rows of the mouthparts.

#### SUMMARY OF CHARACTERISTICS OF LARVA

Nostril midway between eye and tip of snout or nearer snout; distance between nares equal to interorbital distance; eye large, diameter 12–17% body length, mean 15; mouthparts subterminal; oral papillae in single row; oral disk entire; oral disk width 16–21% body length, mean 18; anterior oral papilla gap 73–92% oral disk width, mean 82; no denticles on tooth rows; beak weakly developed; no spiracle; dorsal fin origin at body-tail juncture, or origin on tail, posterior to body-tail juncture; tail height less than, equal to, or greater than body height; tail tip elongate and rounded to pointed; anal tube median; dorsum with uniform pattern, grey to brown in preservative; venter with suffusion of melanophores on throat region,

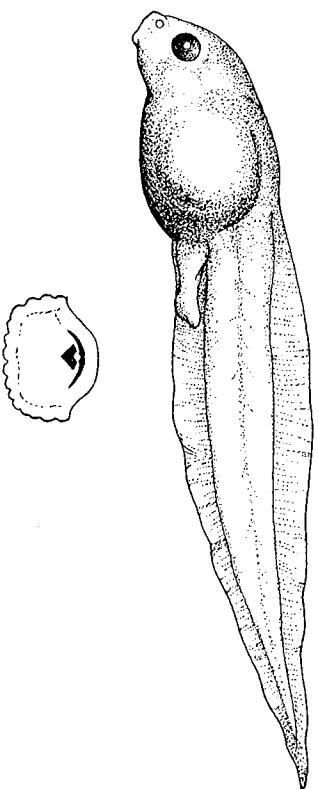


FIG. 1. Semi-diagrammatic representation of the larva of *Leptodactylus hylaedactylus*, stage 34. Upper figure: lateral view of larva, total length 12.5 mm. Lower figure: mouthparts, greatest width 0.8 mm.

few melanophores on belly, no melanophores on anal tube; no melanophores on tail fins, scattered melanophores on upper two-thirds of tail musculature; total length largest specimen, stage 34, 13.2 mm., stage 40, 12.6 mm.; body length 32–42% total length, mean 37 (fig. 1).

#### HABITAT

The town of Regina is located on the left bank of the lower Fleuve Approuague, one of the major rivers of French Guiana, at an altitude of 25 meters.

There is an airfield suitable for small planes immediately inland of the town. This unpaved field is partly bare ground and partly grass-covered, with the landing strip formed of metal plates laid upon the ground. The site was evidently formerly a marsh, and is bordered successively on the landward side by a ditch, a marsh, and a swamp. The field itself is dry land, but becomes quite muddy from rains.

The borders of the landing strip are marked by a series of metal and wooden markers. It was under one such marker that the tadpoles were found in two foam nests partially roofed over by soil. The nests were shallow circular cups, bearing a distinct raised rim. They were 35 mm. in diameter, and consisted of a thin layer of foam resting directly upon soil.

Large numbers of adult *L. hylaedactylus* were taken during the daylight hours beneath the runway markers. When the sheltering markers were lifted, these frogs attempted to escape into the surrounding grass. They shared their marker shelters with *Bufo marinus*, *Hyla rubra*, *Ameiva ameiva*, and *Mabuya mabouya*.

A much larger species, *Leptodactylus wagneri*, was taken in the neighbouring swamp calling at night, but *L. hyllaedactylus* was not taken here; nor was *L. wagneri* taken on the airfield. *L. marmoratus*, the small, large-disked species mentioned above, was not taken on the airfield, but was found to be one of the most abundant anurans on the low, forested hills fringing the tributaries of the middle reaches of the Approuague. *L. hyllaedactylus* and *L. wagneri* were not taken on these hills. All three species were distinct in their individual microhabitats.

The tadpole collection date was 25 July 1968, which is at the beginning of the principal French Guianan dry season.

#### DISCUSSION

*L. marmoratus* complete metamorphosis in the foam nest in the incubating chamber. That is, the eggs hatch into larvae, but the larvae have enough yolk stores to carry them through to metamorphosis without feeding in the usual manner (Lutz, 1947). The available evidence indicates that this is also true of *L. hyllaedactylus*. One of the foam nests contained five larvae at stage 40, with the forearms not quite protruding through the body wall. The yolk stores are noticeable even in these advanced-stage larvae. Eggs of members of the Marmoratus group are the largest within the genus *Leptodactylus*.

In forms which feed entirely upon yolk stores, such as *L. hyllaedactylus* and *marmoratus*, natural selection apparently favors the reduction of mouthparts. *L. hyllaedactylus* has no tooth row denticles, and the beak is not as well developed as in other *Leptodactylus* larvae examined.

The lack of a spiracle indicates that the larvae do not use gill respiration. This is consistent with the fact that the larvae are never in a truly aquatic environment. The forelimbs in the more advanced larvae are clearly underneath a sheet of skin indicating that an operculum has developed. It would be most interesting to have a series of very young larvae in order to determine whether a spiracle is ever formed while the operculum develops.

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