

DESCRIPTIONS OF EGGS AND REPRODUCTIVE
PATTERNS OF *LEPTODACTYLUS PENTADACTYLUS*
(AMPHIBIA: LEPTODACTYLIDAE)

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DESCRIPTIONS of *Leptodactylus pentadactylus* nests, eggs, and larvae are important to the understanding of the species' reproductive and adaptive biology. This paper provides information, that was previously unreported, concerning egg pigmentation, egg size, approximate numbers of eggs in nest, and larval and egg co-occurrence in incubating chambers.

Specimens were collected in July 1975 on Barro Colorado Island, Canal Zone, Panama and by a pond near the Canal Zone penitentiary at Gamboa, Canal Zone, Panama. Foam nests were found in apparently excavated potholes under palm roots about 2 m from the grassy edge of the dry Barro Colorado pond and in a pothole isolated from the filled Gamboa pond. An entire

foam nest from Gamboa and individual eggs and a larva from the Barro Colorado nest were placed in plastic bags and preserved. Eggs and larvae were measured, staged (according to Gosner, 1960) and counted at the laboratory.

The eggs are light gray. The mean diameter of 40 eggs ranging from stage 10 (dorsal lip) through 16 (neural tube) is 2.9 mm. The mean diameter is approximate as some eggs appeared to be no longer viable, some were flattened, some were encased in jelly so thick and adherent to the egg that it was difficult to locate the borders of the two substances.

All eggs from the Gamboa nest were counted and 30 were chosen to stage. There were 952 eggs at stages 10 and 11. The bottom of the Gamboa nest contained 18 *Leptodactylus pentadactylus* larvae (stages 28-30, 39.1-51.9 mm total length) swimming in water which barely covered them under the eggs and foam that had been laid on top of them. The Barro Colorado nest contained a lone stage 27, 25.3 mm total length *L. pentadactylus* larva when sampled. Fourteen stage 13-16 eggs were removed from a nest that was in the same pothole as the larva.

DISCUSSION

The gray pigmentation of the *Leptodactylus pentadactylus* eggs is intermediate to the dark melanophores of the eggs of the *Melanonotus* and *Ocellatus* groups and the unpigmented eggs of the *Fuscus* group of the genus *Leptodactylus* (Heyer, 1969).

The larvae from both potholes had yolk colored guts. The evidence strongly suggests that the larval *L. pentadactylus* were eating *L. pentadactylus* eggs.

Modes of survival for *L. pentadactylus* tadpoles encompass just about all types of feeding possibilities. Vinton (1951) observed the tadpoles feeding on algae. Heyer et al. (1975) demonstrated that *L. pentadactylus* larvae are facultative carnivores and feed on other species of tadpoles

in certain pond situations. The *L. pentadactylus* larvae on Barro Colorado and at Gamboa, existing in potholes away from the food resources of the pond, probably fed on *L. pentadactylus* eggs placed above them.

Rivero and Esteves (1969) observed agonistic behavior among males of *L. pentadactylus* during breeding activities at a pond in Venezuela. The males called from or near depressions and aggressively jumped on male intruders. We interpret this as territorial behavior. Territoriality would explain how cannibalism could have a selective advantage in certain stressful situations. We assume that the normal pattern is for water to flood the incubating chamber potholes, releasing the larvae to pond or puddle habitats. However, if rains did not flood the pothole after the larvae had hatched and additional eggs were placed in the pothole on which the already present larvae could feed, the larvae could possibly metamorphose from the pothole using the egg food resources. There would be strong selection against a completely different mating pair laying their eggs over already present predaceous larvae. There would be a selective advantage to the parent male of the first larval brood to provide another source of food for them, however. The reproductive biology of *L. pentadactylus* thus seems to integrate foam nests, facultatively carnivorous and cannibalistic larvae, and territoriality into a flexible, several-optioned pattern.

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