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THE TADPOLE OF *BATRACHOPHRYNUS PATAGONICUS*
GALLARDO

José M. CEI

In the course of his study on Argentinian batrachians, Gallardo (1962) described a new leptodactylid frog inhabiting the isolated sub-Andean Laguna Blanca (Neuquen Province: 70°20' W. 30°03' S.). He designated the frog *Batrachophrynus patagonicus*, and believed it to be closely related to the specialized Telmatobiinae from the Peruvian plateau. The frogs of this group are of special biogeographical interest, since the newly recognized Patagonian species is from a locality about 2,000 miles south of *B. macrostomus* and *brachydactylus* from the Junin lagoons of Peru. The tadpoles of *patagonicus* are still undescribed, and little is known concerning diagnostic characters and variation of the larval stages of the related Peruvian species. Our recent collections (January, 1964) at the isolated type-locality of *patagonicus* provided an opportunity for a preliminary study of larval characters of this species. Some ecological notes on the adults and larvae are reported in the present paper.

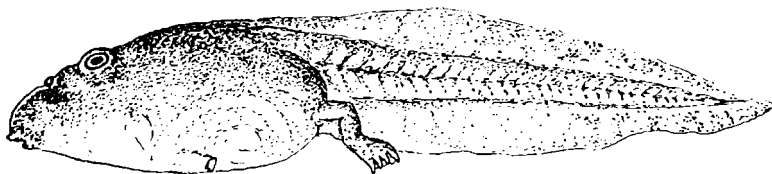


FIG. 1.—Tadpole of *Batrachophrynus patagonicus* ($\times 1.5$).

Specimens examined.—The specimens referred to are as follows: *Batrachophrynus patagonicus* IBM-UNC 1587, seven specimens, collected January 18, 1964, and IBM-UNC 1628, three specimens, collected January 19, 1964, Laguna Blanca, Neuquen, Argentina. *Batrachophrynus macrostomus* IBM-UNC 1321, one specimen, collected February 6, 1963, Junin Lake, Peru.

Diagnosis.—A leptodactylid-like tadpole, body somewhat flattened, caudal muscle well developed; fins rather high, tip of tail rounded, eyes and nostrils prominent and dorsal in position, spiracle sinistral, anus dextral, tooth row formula $2/3$, lips laterally folded, dorsum and tail with irregular, scarce brown pigmentation, venter transparent, maximum observed total length 57 mm.

Description (Fig. 1).—Body and head somewhat less than twice as wide; head not wider than body; body rather large, somewhat depressed; ventral profile moderately convex, no abdominal bulge; snout slightly truncate, sucker-like in the youngest specimens (35–39 mm.); eyes large, dorsal; distance between eyes less than their distance from tip of snout, about equal to width of anterior dorsal musculature; nostrils evident, dorsal, slightly salient; distance between nostrils about equal to their distance from eyes; interorbital distance equal to internasal distance; spiracle sinistral, opening ventrolaterally, nearer to ventral base of tail than to tip of snout; spiracular tube inconspicuous, slightly narrower than diameter of eye; anal tube dextral, extending above an evident fold in ventral fin. Tail musculature moderate, longer than head and body, dorsal and ventral fins well developed, lowest near body, becoming higher posteriorly as musculature narrows; tip of tail slightly rounded; dorsal and ventral fins end at base of tail. Skin largely transparent; in lateral and ventral view viscera visible; width of mouth little greater than interorbital distance; lips thickened, protruding slightly, folded laterally, edges (except upper lip) bordered by numerous small marginal papillae subequal in size (Fig. 2a–b). Mouthparts leptodactylid; tooth rows $2/3$; upper rows about equal in length, longer than upper beak; second upper row and first lower row narrowly interrupted; other rows continuous; third lower row



FIG. 2.—Mouthparts of tadpoles: A. *Batrachophrynus patagonicus*, 39 mm. total length ($\times 6$); B. *B. patagonicus*, 57 mm. total length ($\times 6$); C. *B. macrostomus*, 151 mm. total length ($\times 2$).

slightly shorter than second lower row. Horny brown-black beaks well developed, sharply serrated.

In life, pale golden-brown above; skin of abdomen transparent; coiled intestine, respiratory organs, heart, and other organs readily visible; dorsum irregularly mottled with small brown spots; caudal musculature golden-yellow, dorsolaterally marked with small, rounded brownish melanophores; caudal fin transparent with scattered brown markings, least abundant in ventral fin. In formalin, dorsum brown, melanophores most densely crowded on posterior part of body and on dorsal caudal musculature, marking course of lateral segmental blood vessels; snout slightly pigmented; belly and fins transparent; dorsal fin marked by scattered small melanophores, especially posteriorly.

Largest larva, with hind legs well developed, has a head and body length of 25 mm. and a total length of 57 mm.; larvae having a total length of 25 mm. and head-body length of 16 mm. have hind limb buds about 3 mm. in length.

Remarks.—Adults, partly transformed young, and free-swimming tadpoles were found along the rocky and volcanic borders of Laguna Blanca (Jan. 14–20, 1964). *Batrachophrynus patagonicus* is a typical aquatic inhabitant of an isolated montane lake at an elevation of 1,200 meters. Its characteristic adaptative features (loose skin, vascularization, and dilated webs) were pointed out and compared with the Peruvian species (Vellard, 1951; Gallardo, 1962). The voice is very deep and unusual; mating or release calls were not heard. Egg laying probably takes place in early January; some gelatinous clutches surely belonging to this species were found. The heavily pigmented eggs, 1.8–2.0 mm. in diameter, were irregularly attached to submerged stalks of the most common plants in the lake. The adults were observed swimming slowly or floating on the open water. They fed on the numerous amphipods covering the abundant littoral cerebroid blue-green algae (*Nostoc* sp.) and other plants. Daily littoral temperatures at a depth of 30 cm. at Laguna Blanca were 13°C. at 8 a.m., 20°C. at 4 p.m., and 17°C. at

9 p.m. Due to a limited tidal oscillation, vegetation and animal remains were washed upon the shores of the lake during the night. Also adult *Batrachophrynus patagonicus* apparently are unable to cope with the tide, for dying individuals were found on the shores in the early morning.

The larvae are not gregarious. They were observed swimming individually in the shallow waters; at night, they were seen on the flat stones of the shallow water. The omnivorous tadpoles feed on a variety of small animals and algae. The stomach contents of a tadpole having a total length of 57 mm. included 10 amphipods, 1 leach, 2 dipterous larvae, and green algae residues. Other tadpoles were observed in a glass container feeding on dead *Eupsophus* and *Batrachophrynus* tadpoles.

Due to the climate and environmental conditions, the rate of development of *Batrachophrynus patagonicus* probably is slow. Tadpoles with hind limb buds (55–57 mm. total length) have been observed in a spacious aquarium since January 18, 1964, at temperatures between 20°–30°C. Some of these tadpoles metamorphosed since February 15, 1964, probably later than those in the natural environment.

In addition to *Batrachophrynus patagonicus*, *Bufo spinulosus* and *Pleurodema bufonina* were found on the shores and in the water at Laguna Blanca. Three species of *Liolaemus*, one species of *Liosaurus*, and an unknown gekkonid lizard have been collected there.

Summary.—The nongregarious tadpoles of the aquatic and relict *Batrachophrynus patagonicus* show general leptodactylid features, resembling in some aspects those of the giant forms from the Peruvian plateau (Figs. 1–2). The enlarged lips and general characters of the mouthparts are in agreement with the life history and point out the omnivorous and probably suctorial habits of the tadpoles. The eggs indicate a possible relationship between *Batrachophrynus patagonicus* and *Telmatobius* from the cordilleran streams (Pisano, 1955).

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