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NOTES ON THE TADPOLES AND BREEDING ECOLOGY OF *LEPIDOBATRACHUS* (AMPHIBIA: CERATOPHRYIDAE)

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NOTES ON THE TADPOLES AND BREEDING ECOLOGY OF *LEPIDOBATRACHUS* (AMPHIBIA: CERATOPHRYIDAE)

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Lepidobatrachus is a characteristic Chacoan genus of the Ceratophryidae, which we consider to be an independent Neotropical phyletic line of leptodactylids. Its earliest known representative is the Miocene *Wawelia* from Patagonia (Casamiquela, 1963). Since the discovery of the genus by Budgett (1899), *Lepidobatrachus* has received relatively little comment. Vellard (1948) redescribed the type-species, and the generic status has been confirmed by Cei (1958), Reig and Cei (1963), and Barrio (1967) utilizing various lines of investigation. The latter author proposes recognizing three species: *L. laevis* Budgett, *L. asper* Budgett (*L. salinicola* Reig and Cei is a synonym), and *L. llanensis* Reig and Cei, whose distributions are largely allopatric but in part sympatric (Fig. 1). Except for Parker's (1931) brief description and figures of the tadpole of *Lepidobatrachus asper* (= either *asper* or *laevis* by current concepts), the larvae of the genus have not been described. The tadpoles of *L. asper* and *L. llanensis* are described and figured in this paper. These species occur in the shrub-covered flats of the Argentine Central and Western Chacoan provinces.

These Chacoan frogs are characterized by a clear-cut seasonal rhythm which is correlated with the wet summers and dry winters of the semi-arid regions in which they live. During the cold dry season, they remain underground, not feeding or moulting. Mating and egg-laying occur during the rainy season (October to February). Breeding activity usually takes place in the temporary roadside pools on clay soil. The small, pigmented eggs lie on the muddy bottom. Early cleavage and development remain unknown.

After hatching, individual tadpoles in various developmental stages are found swimming in the shallow parts of temporary pools. Tadpoles of *L. llanensis* were collected in La Rioja Llanos, near Olta (Río Colorado), Chepes, Punta de los Llanos and Chamical, Argentina, 300–400 m in elevation. Tadpoles of *L. asper* were collected in the salt flats of Salares de Santiago del Estero, Argentina. All are preserved at the Instituto de Biología, Universidad Nacional de Cuyo, Mendoza, Argentina (IBM–UNC), and form the basis for the following descriptions.

Lepidobatrachus llanensis (Fig. 2)

Material.—IBM–UNC 588, Río Colorado, La Rioja, December 1, 1960 (3 individuals); IBM–UNC 589, Chepes, La Rioja, November 30, 1960; IBM–UNC 591, Punta de los Llanos, La Rioja, Octo-

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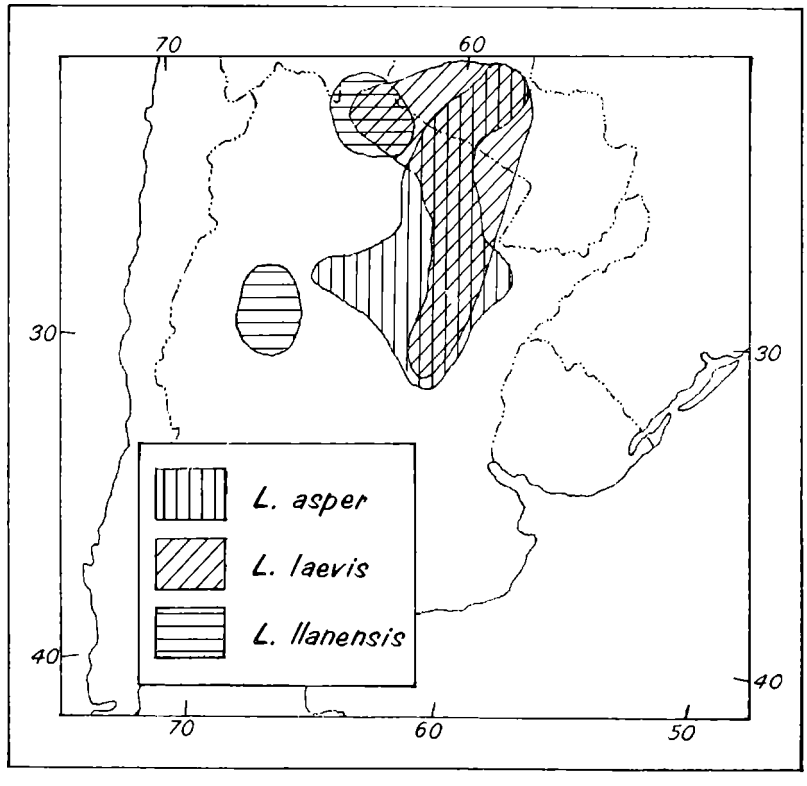

FIG. 1.—Geographical distribution of *Lepidobatrachus*.

ber 10, 1960 (3 individuals); IBM–UNC 1837, Olta, La Rioja, November 15, 1966 (11 individuals).

Description.—Maximum length of illustrated specimen, 56 mm; body strongly depressed; "ray"-shaped in dorsal view; laterally, thin protuberant processes cover the gill region; body twice as wide as greatest depth; width of body four-fifths its length; tail one and three-fourths as long as body; tail pointed, three times as long as its greatest depth, musculature extends to tip of tail; dorsal fin of tail transparent, high, extending onto posterior one-fourth of body; vent median; anal tube long, medial.

Eyes heavily pigmented, situated dorsally, oriented anteriad; interorbital distance about one-fourth as wide as width of body; nostrils much closer to eyes than to tip of snout; internarial distance one-half interorbital distance; peribranchial chamber expanded ventrally, open posteriorly in younger individuals, and closing medially before metamorphosis.

Mouth ventral, nearly terminal, very large; lips broad; buccal papillae scattered in single row around mouth; horny beak present at no time during development; faint tooth rows on anterior lip; a weaker row on posterior lip.

Body pale with weakly pigmented blotches; tail pale with dorsal stripe of scattered spots.

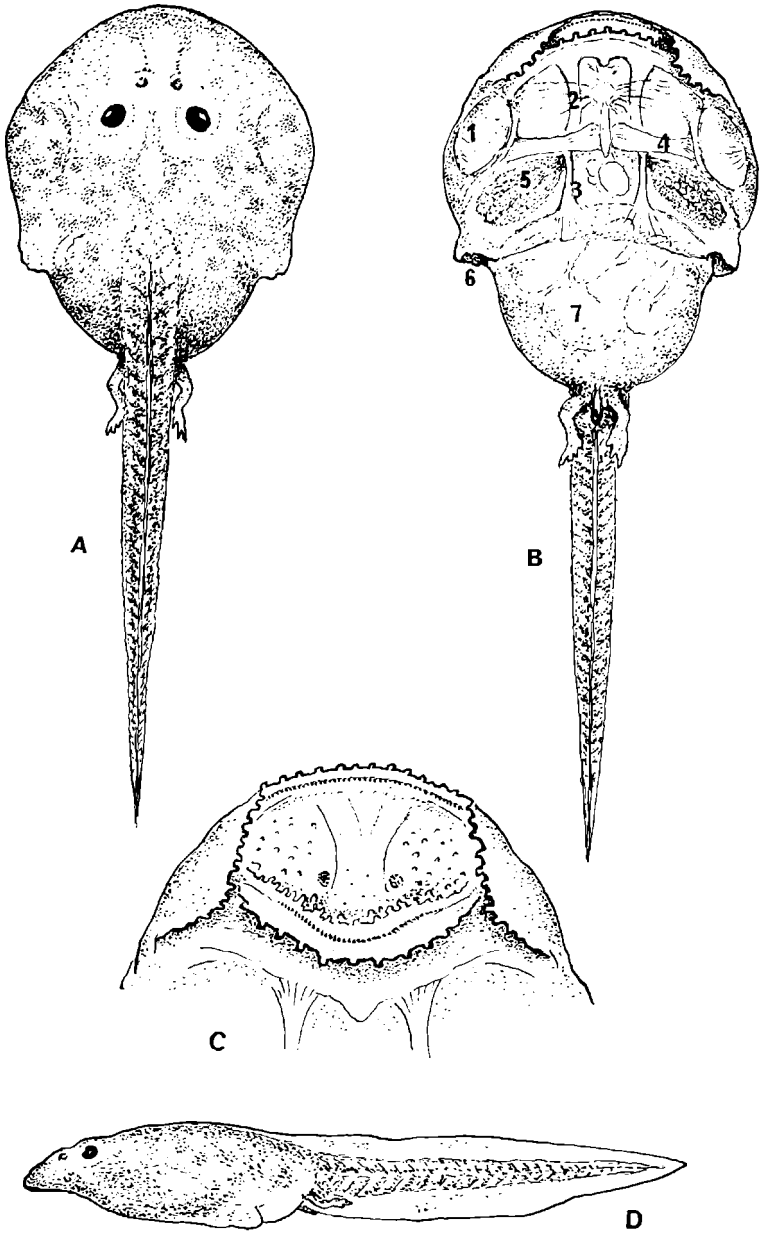

FIG. 2.—Tadpole of *Lepidobatrachus llanensis*: A. dorsal view; B. ventral view. (1- chondro-muscular mass; 2- anterior longitudinal muscles; 3- posterior longitudinal muscles; 4- transversal muscles; 5- internal gills; 6- opening of the peribranchial chamber; 7- visceral bulk); C. larval mouth (opened); D. lateral view.

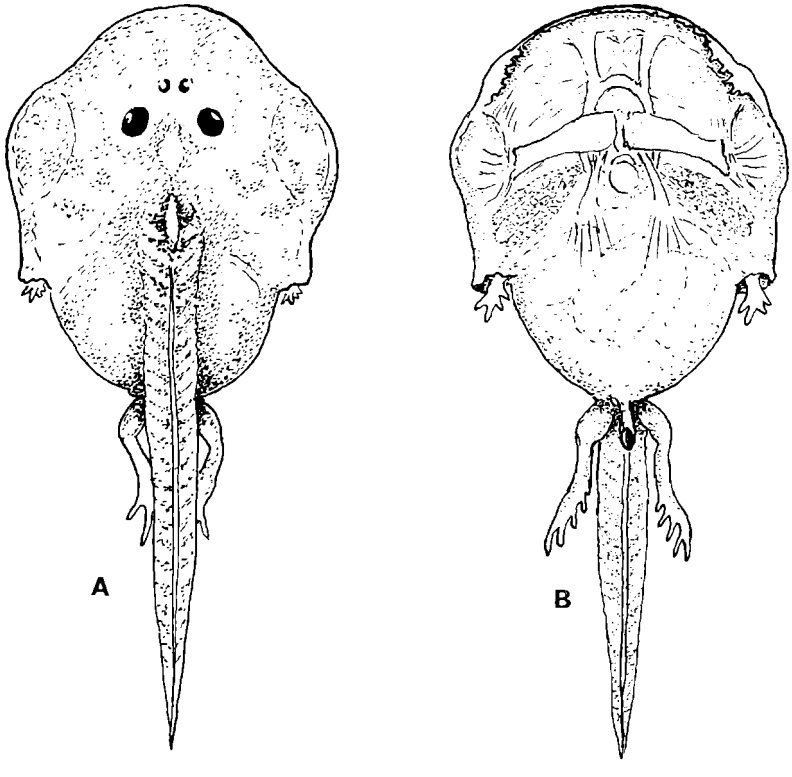

FIG. 3.—Tadpole of *Lepidobatrachus asper* (*salinicola* form); A. dorsal view; B. ventral view.

Remarks.—The hind limbs are poorly differentiated in individuals 25–27 mm in total length. In specimens 45–56 mm total length (Fig. 2) the hind limbs are well developed and the toes moderately differentiated. The internal gills are clearly visible through the integument overlying the peribranchial chamber which opens posteriorly lateral to the median fusion of the chambers. The larval palate is densely papillate (Fig. 2c). The esophagus is continuous with the large stomach and coiled intestine. The large mouth is supported laterally (Fig. 2b) by two strong chondromuscular masses (the antagonistic muscles of maxillary motion apply there). Stomachs contained entomostracans (such as *Apus* sp.), hemipteran larvae, and clay, confirming the largely carnivorous habits reported for *Lepidobatrachus* tadpoles. The data available do not confirm the cannibalistic tendencies reported for *Lepidobatrachus* by Parker (1931). His specimens were at a later stage of development (forelimbs fully developed).

Lepidobatrachus asper (Fig. 3)

Material.—IBM–UNC 590, Salares, Santiago del Estero, 22 October 1960 (2 individuals).

Description.—Maximum length of illustrated specimen, 46 mm; similar to tadpole of *L. llanensis* but at slightly more advanced stage of development (forelimbs emerged); body strongly depressed; interorbital distance one-sixth greatest body width; internarial distance one-fourth interorbital distance.

Tail reduced; hind limbs fully developed; forelimbs emerging from lateral openings of regressive peribranchial chamber. Body pale with only scattered pigmentation.

Remarks.—The recognition of *Lepidobatrachus* as generically distinct from *Ceratophrys* is further supported by tadpole morphology. The loss of the horny beak and denticles and reduction of buccal papillae in *Lepidobatrachus* yield a superficial resemblance of the tadpole mouth to that of the adult. In contrast, the mouths of the tadpoles of *Ceratophrys* (Fernández and Fernández, 1921) and *Odontophrynus* (Savage and Cei, 1965) bear little or no resemblance to the mouths of the adult since the beak, denticles, and buccal papillae are well developed.

The successful adaptations of adult *Lepidobatrachus* to the harsh heterosaline Gran Chaco have been pointed out by Pisanó and Paz (1954) and Ruibal (1962). The larval organization does not especially reflect distinctive adaptations to the highly selective semi-arid environment of western Argentina unless the carnivorous habits reflect an arid adaptation.

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