



The tadpole of *Pleurodema cordobae* Valetti, Salas & Martino, 2009 (Anura: Leiuperidae) from Córdoba, Argentina

MANUEL A. OTERO¹, PABLO R. GRENAT^{1,2}, JULIAN A. VALETTI¹,
NANCY E. SALAS¹ & ADOLFO L. MARTINO^{1,3}

¹Ecología, Departamento de Ciencias Naturales, Facultad de Ciencias Exactas, Físico-Químicas y Naturales, Universidad Nacional de Río Cuarto. Ruta Nacional N° 36 - km 601, (X5804BYA) Río Cuarto, Argentina. E-mails: manuelalejandrootero@gmail.com, pgrenat@exa.unrc.edu.ar, jvaletti@exa.unrc.edu.ar, nsalas@exa.unrc.edu.ar, amartino@exa.unrc.edu.ar

²CONICET Fellowships

³Corresponding author. E-mail: amartino@exa.unrc.edu.ar, adolfomartino@gmail.com

The frog genus *Pleurodema* Tschudi, 1838 is distributed from Panama throughout South America to southern Chile and Argentina and currently is represented by 15 species, of which 10 have been recorded in Argentina (Faivovich *et al.* 2012). Recently, Valetti *et al.* (2009) re-described the tetraploid species *P. kriegi* and described a related cryptic species, the octoploid *Pleurodema cordobae*. These species are endemic of the Sierra Grande of Córdoba (Ferraro & Casagrande 2009; Valetti *et al.* 2009; Valetti *et al.* 2011) and together with the tetraploid *P. bibrioni* comprise a clade of polyploid cryptic species within the genus (Faivovich *et al.* 2012). The external morphology has been described for the tadpoles of *P. bibrioni* and *P. kriegi* by Kolenc *et al.* (2009), but the tadpole of *P. cordobae* remains undescribed. The aim of this work is to describe the larval external morphology and oral disc of new species *P. cordobae*.

Tadpoles were collected in December 2007 from semi-permanent ponds in Estancia los Tabaquillos, Córdoba province (32°23'58.4"S, 64°55'35.1" W, altitude: 2105 m). In this site its cryptic counterpart *P. kriegi* is not present. They were anesthetized with a 2 % chloroethane solution after capture and later fixed in 10 % buffered formalin. The description was based on 15 specimens at stage 35–38 of development (following Gosner 1960). We measured 18 morphometrical variables: Total length (TL); Body length (BL); Tail length (TAL); Maximum tail height (MTH); Upper fin height (UF); Lower fin height (LF); Tail muscle height (TMH); Tail muscle width (TMW); Body maximum width (BMW); Body maximum height (BMH); Interocular distance (IO, measured between the internal edges of eyes); Internarial distance (IN, measured between the internal edges of narial apertures); Eye diameter (ED); Rostro-spiracular distance (RS, measured horizontally from the tip of the snout to the posterior edge of the spiracular tube); Rostronarial distance (RN); Eye-narial distance (END); Oral disc width (OD) and dorsal gap (DG). Morphometric measurements were taken on all specimens using a Zeiss SR stereomicroscope with a micrometer to nearest 0.1 mm. Terminology and measurements follows Altig & McDiarmid (1999), Grenat *et al.* (2009), Kolenc *et al.* (2009) and Galvani *et al.* (2012). Specimens were deposited in the herpetological collection of Fundación Miguel Lillo (FML 25039), Tucumán, Argentina.

Descriptions of tadpole: At stages 35–38 mean total length is 38.98 ± 3.56 mm, the body length is about 40% of total length (mean BL/TL = 0.418 ± 0.02). The body is ovoid in dorsal view with a constriction behind the cephalic region and depressed in lateral view (mean BMH/BMW = 0.83 ± 0.037) (Fig. 1A). The maximum width is placed at the posterior portion of the head, behind the eyes. Maximum height is at the last third of the body. Tail length 3.2 times tail height. Dorsal fin is slightly higher than ventral fin (mean UF/LF = 1.106 ± 0.04). The tail musculature is robust and does not reach the tail end. The snout is trapezoidal in dorsal and ventral view. In lateral view, the end of the snout is truncated and rounded. Eyes are small (mean ED/BMW = 0.178 ± 0.012), directed dorsolaterally, and are visible in dorsal and lateral view. Internal borders of the nares slightly elevated. Narinal openings are rounded and located dorsolaterally, more visible dorsally than laterally. Internarial distance are about half between of interocular distance (mean IN/IO = 0.533 ± 0.025) and slightly closer to the eyes than to the tip of the snout (mean RN/END = 1.204 ± 0.140). Spiracle tube is single, lateral, sinistral, short and posterodorsally directed. The spiracle is placed in the third quarter of the body (mean RS/BL = 0.565 ± 0.019). Spiracular opening is positioned medially. The vent tube starts in the mid-posterior region of the abdomen; it is attached to ventral fin, opening medially.

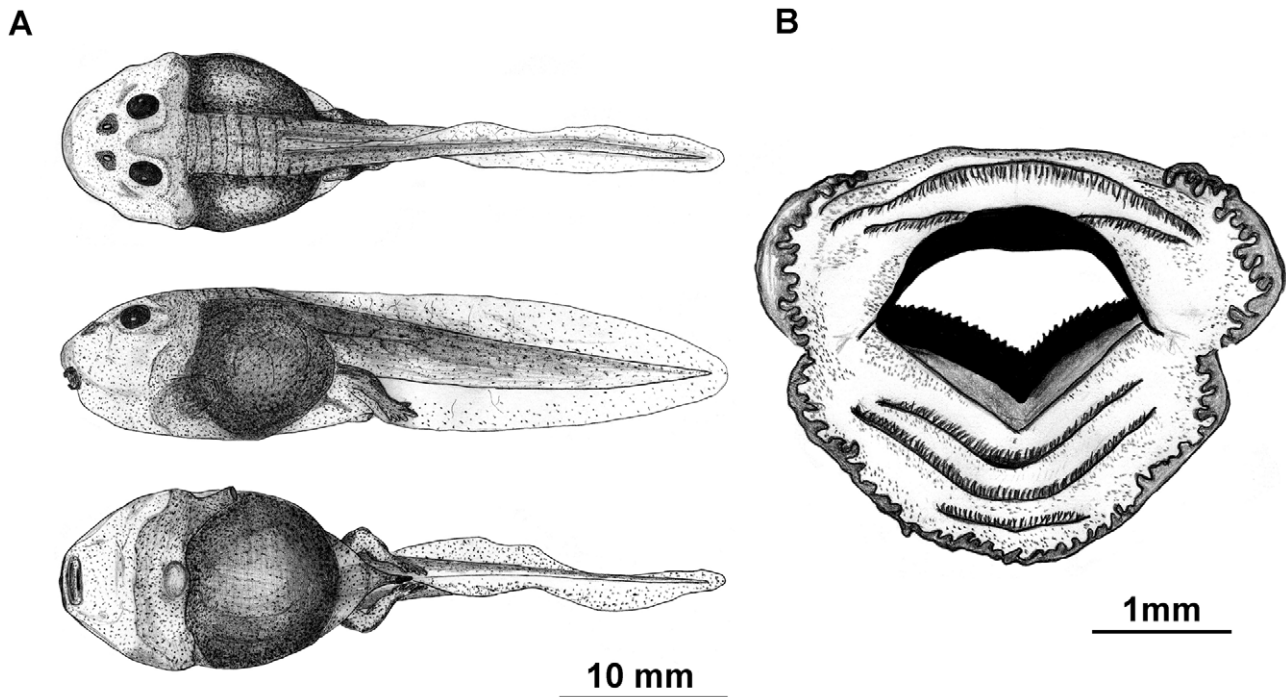


FIGURE 1. Tadpole of *Pleurodema cordobae* (FML 25039); A) Dorsal, lateral and ventral view of the tadpole; B) Oral disc. Drawings were performed by Otero M. A. and Grenat P. R.

Measurements in mm: Mean and Standard Deviation (range given in parentheses): TL= 38.98 ± 3.56 (34.61–44.4); BL= 16.25 ± 1.33 (14.04–18.44); TAL= 24.0 ± 2.91 (20.52–29.87); MTH= 7.44 ± 0.58 (6.08–8.16); UF= 2.66 ± 0.23 (2.16–2.98); LF= 2.41 ± 0.18 (2.04–2.69); TMH= 3.55 ± 0.37 (3.06–4.20); TMW= 3.34 ± 0.48 (2.53–3.69); BMW= 10.37 ± 0.89 (8.90–11.76); BMH= 8.60 ± 0.65 (7.76–9.88); IO= 2.54 ± 0.09 (2.38–2.70); IN= 1.35 ± 0.04 (1.25–1.43); ED= 1.85 ± 0.23 (1.53–2.18); RS= 9.17 ± 0.62 (8.04–10.41); RN= 1.73 ± 0.23 (1.30–2.03); END= 1.44 ± 0.10 (1.25–1.60); OD= 3.67 ± 0.21 (3.35–4.10); DG= 0.99 ± 0.10 (0.85–1.21).

Oral disc: The oral disc is anteroventral, medium-sized (mean OD/BMW = 0.355 ± 0.022) and laterally emarginated (Fig. 1B). The oral disc has a single alternated or double row of marginal papillae, except in the ventral region in which the row is single. Papillae are simple, small and sub-conical. Sub-marginal papillae are absent. A single large dorsal gap is present (mean DG/OD = 0.562 ± 0.069); mental gap is absent. Tooth row formula is 2(2)/3(1). Labial teeth single, with one cusp. Jaw sheaths keratinized, serrated and heavily pigmented; the free margin of the upper jaw sheath widely arch-shaped, whereas that of the lower jaw sheath is V-shaped.

Color in life: The cephalic region and snout are light brown in dorsal view, whit increased pigmentation area around the nostrils and less pigmentation around the eyes; visible yellowish shines. In dorsal view, the abdominal region is darker than cephalic region, with green and yellowish shines. In ventral view, the body is bright copper, the gut is not visible and the branchial region is transparent. In dorsal view, tail musculature is brownish, getting lighter towards its distal portion. Laterally, the tail is light brown with irregular brown spots disappearing in its distal portion. The caudal musculature in ventral view is whitish.

Color in preservative: In dorsal view, the body is dark brown, with perinasal regions heavily pigmented. In ventral view, abdominal region is darker than rest of body. The gut is visible. Branchial region transparent. Caudal musculature is light brown with grouped chromatophores forming a reticulate. Fins are pale irregularly pigmented.

Habitat: Typical habitat is represented by temporary and semi-permanent ponds, at the high grassland, with vegetation at the edges and a depth of 20 to 30 cm.

The tadpole of *P. cordobae* has many features in common with other tadpole of the genus *Pleurodema*, with small variations characteristic of each species: Tadpoles type IV (Altig & McDiarmid 1999); LTFR 2(2)/3(1); depressed in lateral view and ovoid and elongated in dorsal view; dorsolaterally nostril; Internarial distance is less than the interocular distance and slightly closer to the eyes than to the tip of the snout; a single row of conical marginal papillae with a wide rostral gap; exotrophic, lentic and benthic larvae (León-Ochoa & Donoso-Barros 1970; Cei 1980; Weigandt *et al.* 2004; Kolenc *et al.* 2009; Galvani *et al.* 2012; Barrasso *et al.* 2012).

The amazing similarity in external morphology between adult of *Pleurodema cordobae*, *P. bibrioni* and *P. kriegi* is also present among the tadpoles of these species, but some differences can be observed in the *P. cordobae* tadpole. The tadpole of *P. bibrioni* (average TL = 35.4 mm) and *P. kriegi* (36.4 mm) (Kolenc *et al.* 2009) are somewhat smaller than *P. cordobae* (38.98 mm). Furthermore, *P. cordobae* has a vent tube with an opening medially, this configuration was also reported for *P. thaul* by Úbeda (1998) and Barrasso *et al.* (2012). However, *P. bibrioni* and *P. kriegi* show an opening variably directed to the right or to the left (Kolenc *et al.* 2009).

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