12-2010

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Filipe Augusto C. do Nascimento

Barnagleison S. Lisboa

Gabriel O. Skuk

Rafael O. de Sá
University of Richmond, rdesa@richmond.edu

Recommended Citation

Nascimento, Filipe Augusto C. do, Barnagleison S. Lisboa, Gabriel O. Skuk, and Rafael O. de Sá. "Description of the Tadpole of *Proceratophrys renalis* (Miranda-Ribeiro, 1920) (Anura: Cycloramphidae)." *South American Journal of Herpetology* 5, no. 3 (December 2010): 241-48. doi:10.2994/057.005.0309.

South American Journal of Herpetology, 5(3), 2010, 241-248

DESCRIPTION OF THE TADPOLE OF *PROCERATOPHRYS RENALIS* (MIRANDA-RIBEIRO, 1920) (ANURA: CYCLORAMPHIDAE)

Filipe Augusto C. do Nascimento[1,4], Barnagleison S. Lisboa[1], Gabriel O. Skuk[1,2], and Rafael O. de Sá[3]

[1] *Setor de Zoologia, Museu de História Natural, Universidade Federal de Alagoas, 57051-090, Maceió, AL, Brasil. E-mails: filipe.bio@gmail.com; bslgleison@gmail.com*
[2] *Setor de Biodiversidade e Ecologia, Instituto de Ciências Biológicas e da Saúde, Universidade Federal de Alagoas, 57010-020, Maceió, AL, Brasil. E-mail: gabrielskuk@terra.com.br*
[3] *Department of Biology, University of Richmond, Richmond, Virginia, 23173, USA. E-mail: rdesa@richmond.edu*
[4] *Corresponding author.*

Abstract. The tadpole of *Proceratophrys renalis* is described based on specimens from Maceió, State of Alagoas, northeastern Brazil. At stage 35 the body is slightly dorso-ventrally depressed, ovoid in lateral, dorsal, and ventral views. Oral disc is ventral with lateral emarginations, surrounded by a single row of marginal papillae with a large gap on the upper labium. Labial tooth row formula is 2(2)/3(1). The analysis of internal oral anatomy revealed two possible characters that readily distinguish *P. renalis* from *P. boiei,* supporting the recent ressurection of *P. renalis.* Comparisons with available descriptions of the larvae for other species in the genus are provided.

Keywords. *Proceratophrys;* larvae comparison; SEM anatomy; Atlantic Rain Forest.

Introduction

The Neotropical frog genus *Proceratophrys* Miranda-Ribeiro, 1920 currently comprises 21 species whose combined distribution extends throughout Brazil, Argentina, and Paraguay (Prado and Pombal, 2008; Frost, 2010). This genus was created by Miranda-Ribeiro (1920) to include the species *Ceratophrys bigibbosa* (Peters, 1872). Lynch (1971) included in *Proceratophrys* those species previously belonging to the genus *Stombus* Gravenhorst, 1825, characterized by having hornlike palpebral appendages. Recently, Frost *et al.,* (2006) based on molecular and morphological evidence placed the genus *Proceratophrys,* formerly included in the family Leptodactylidae Werner, 1896, in the family Cycloramphidae Bonaparte, 1850.

Ananias *et al.* (2007), based on karyological data, suggested that populations of *Proceratophrys boiei* (Wied-Neuwied, 1824) occurring in northeastern Brazil were different from those occurring in the southeastern part of the distribution. Most recently, Prado and Pombal (2008) provided a detailed review of this genus, particularly focusing on the species of *Proceratophrys* with hornlike palpebral appendages (i.e., species of the *P. boiei* and *P. appendiculata* complexes). These authors also concluded that northern and southern populations were different; consequently they resurrected and applied the available name *P. renalis* (Miranda-Ribeiro, 1920) to the northeastern populations. The tadpole of *Proceratoprhys boiei* was described from southeastern Brazil (Izecksohn *et al.,* 1979). Herein we described the external morphology and the internal oral anatomy of the tadpole of *P. renalis* and compare it with that of *P. boiei* and with those of other described larvae in the genus.

Material and Methods

Tadpoles were collected at Serra da Saudinha, municipality of Maceió, State of Alagoas, Brazil (09°23'S; 35°43'W, 150 m a.s.l.), on 15 November 2006, by F. A. C. Nascimento and B. S. Lisboa. The tadpoles were collected with a dip net, most specimens were preserved in the field in 10% formalin (commercial grade), except two specimens that were kept alive through metamorphosis and compared with adult characteristics for species identification. *Proceratophrys renalis* is the only known species of the genus occurring in the area.

Measurements and remarks on larval ontogenetic changes are based on 27 tadpoles ranging from stages 26 to 40 (Gosner, 1960); tadpole description is based on a specimen at stage 35. Terminology and measurements follow Altig (1970) and Altig and McDiarmid (1999), with the exception of the interorbital distance, which was taken between the inner edges of the eyes. Moreover, we use the term cloacal tube (instead of vent tube) considering that the term "cloaca" has unquestionable homology with the same term in the adult. All measurements were taken using an ocular micrometer installed on a Leica MZ6 stereomicroscope, except for total length, height, and

width of the body, that were measured with calipers (0.1 mm).

Two tadpoles, Gosner Stage 35 and 37 respectively, were dissected for analysis in the scanning electron microscope (SEM). The specimens were first ultrasonically cleaned for 15 min and subsequently fixed in a 3% glutaraldehyde solution for 2 h at room temperature (rt). The fixation was followed by three 15 min washes with 0.1 M phosphate buffer, post fixed for 2 h in a 1% osmium tetroxide solution at rt and followed again by three 15 min washes in 0.1 M phosphate buffer. Samples were then dehydrated using 15 min changes of the following graded ethanol series: 35%, 50%, 70%, 80%, 95%, and three 100% changes. Specimens were critical point dried in CO_2, mounted on aluminum stubs and sputter coated with gold/palladium, 22 nanometers thick, using a Hummer VII sputtering system. Internal oral anatomy was examined in a Hitachi S-2300 scanning electron microscope at 15 kV, 20 kV, and 25 kV. SEM methodology followed Wassersug (1976) and Wassersug and Heyer (1988); terminology follows that of de Sá and Langone (2002).

Five tadpoles of *Proceratophrys boiei* (stages 31 to 40) from Camanducaia, state of Minas Gerais, southeastern Brazil, collected on 12 January 2006 by C. F. B. Haddad, I. A. Martins, and M. M. A. Leme, were used for comparison. All specimens examined are deposited at the Museu de História Natural, Universidade Federal de Alagoas, Brazil (MUFAL 7503, 8335-36, *P. renalis;* MUFAL 7743, *P. boiei*).

Results

External Morphology (MUFAL 8335, Stage 35, Figs. 1A, B, C)

Body slightly dorso-ventrally depressed, ovoid in lateral, dorsal, and ventral views; body length about 40% of total length. Maximum body width on the middle third of the body and maximum body height on the posterior third. Snout rounded in lateral, dorsal, and ventral views. Interorbital distance about 35% of body width; internostril distance about 50% of interorbital distance. Eyes placed dorsolaterally, directed laterally, located posteriorly on the anterior third of the body; representing about 40% of interorbital distance and 9.5% of the total body length. Nostrils located and directed dorsolaterally, closer to the eyes than to the snout; external opening rounded but appears reniform due to the presence of a small cutaneous extension on its medial rim. Spiracle sinistral, lateral, found on the middle third and at the midline of the body, spiracular opening directed at an angle of 45 degrees with the horizontal axis of the body, inner wall free from body. Cloacal tube medial, with a dextral opening, representing about 52% of spiracle length, attached to the ventral fin on half its length. Caudal musculature relatively well developed (representing about 50% of the body height), becoming progressively thinner caudally; caudal tip acute. Myosepta partially visible. Tail and body approximately equal in height. Dorsal fin begins at the end of the body, extending upward on the anterior third of the tail and then continues downwardly to the end of the tail. Dorsal fin more curved and higher than ventral fin. Ventral fin beginning at the posterior edge of the body, extending almost straight to the end of the middle third of the tail, then converges upward to the end of the tail.

Oral disc ventral, representing about 31% of the body width, laterally emarginated, surrounded by a single row of marginal papillae with a large gap on the upper labium (Fig. 1D). Papillae large, conical, and distinct, aligned in various directions along the row. Several submarginal papillae present, aligned with the row of marginal papillae in such a way that they seem to form a second row of marginal papillae; few other papillae laterally located on the lower lip. Labial tooth row formula (LTRF) 2(2)/3(1). A-1 and A-2 of approximately equal length, A-2 with a medial gap about five teeth wide; P-3 slightly shorter than the other rows, P-1 with a short medial gap approximately two teeth wide. Both jaw sheaths with about half of their width pigmented and serrated; upper jaw sheath arch-shaped in its extremes and plane in its middle, lower jaw sheath concave, open "V"-shaped.

Measurements of illustrated tadpole (in mm): total length 31.6, body length 12.6, body height 6.2, body width 8.6, tail length 19.0, tail height 6.2, dorsal fin height 2.0, ventral fin height 1.6, tail musculature height 3.1, snout-nostril distance 2.1, internostril distance 1.5, nostril-eye distance 0.9, eye diameter 1.2, interorbital distance 3.0, oral disc width 2.7, spiracle length 1.9, and cloacal tube lenght 1.0. A summary of larval measurements is provided in Table 1.

Coloration

In life, body dark brown, with snout and gular region slightly lighter; intestines not visible through the skin. Tail transparent, with visible blood vessels at the top of the caudal musculature and dorsal fin, giving

a pinkish appearance. Irregular black spots present throughout the body, except on the ventral surface, posterolateral region of body, and the anterior third of the ventral fin. In preservative, the body is light brown, with irregular brown spots; fins and caudal musculature remain transparent and intestines become partially visible.

Morphological Variation

Variation of external morphology was observed in the number and position of the submarginal papillae, some specimens having the submarginal papillae poorly aligned with the marginal row and others have them placed in various positions on the lower lip. Some specimens showed two folds on the lower lip independent of developmental stage (MUFAL 8336, Fig. 1E). In one individual (stage 26) the beginning of the dorsal fin occurred on the body-tail junction.

Ontogenetic Changes

At stage 26 the cloacal tube is less visible, being covered almost entirely by the ventral fin, and the oral disc already showed the characteristic LTRF. At stage 40 the internostril distance decreases considerably, the oral disc has disappeared, the eyes become laterally positioned, and the pattern of dorsal tubercles characteristic of the adult begin to show. The eyelid appendages begin to develop at stage 43.

SEM Internal Oral Anatomy

Oral roof overall circular, with a relatively narrow prenarial arena (Fig. 2A). A broad and overall triangular ridge is present in the prenarial arena, about half way between the internal nares and the anterior end of the prenarial arena. A small papilla is found at the base on each side of this ridge; the tip of the

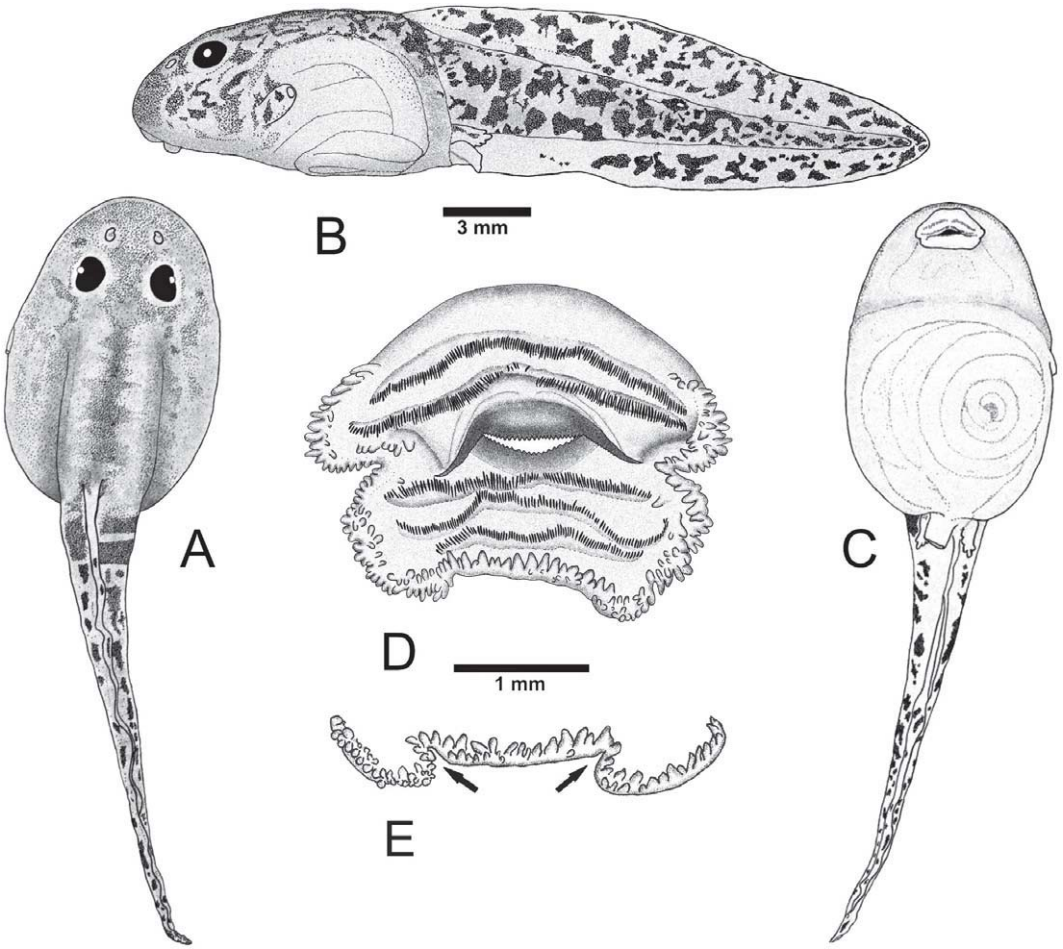

Figure 1. Tadpole of *Proceratophrys renalis* at stage 35 (Gosner, 1960) (MUFAL 8335). (A) dorsal view, (B) lateral view, (C) ventral view, and (D) oral disc; (E) detail of the oral disc of a tadpole at stage 34 (MUFAL 8336) showing the two folds on the lower lip (arrows).

Table 1. Measurements (in mm) of *Proceratophrys renalis* larvae (MUFAL 7503) (mean ± standard deviation).

Character	Stage 26 (N = 6)	Stage 28 (N = 3)	Stage 31 (N = 3)	Stage 35 (N = 5)	Stage 36 (N = 2)	Stage 38 (N = 6)	Stage 40 (N = 2)
Total length	20.7 ± 4.1	24.4 ± 2.4	31.2 ± 2.2	33.0 ± 2.1	33.8 ± 0.7	33.8 ± 1.7	33.6 ± 0.2
Body length	8.0 ± 1.6	11.0 ± 0.5	12.1 ± 0.3	13.3 ± 0.7	13.1 ± 1.0	13.8 ± 0.4	13.4 ± 0.4
Body height	4.1 ± 0.9	5.1 ± 0.5	6.1 ± 0.1	6.9 ± 0.8	7.2 ± 0.4	7.1 ± 0.6	6.9 ± 0.1
Body widht	5.2 ± 1.0	7.1 ± 0.3	8.0 ± 0.4	9.0 ± 0.9	9.0 ± 0.9	9.2 ± 0.8	7.3 ± 3.5
Tail lenght	12.7 ± 2.7	13.4 ± 2.4	19.1 ± 1.9	19.7 ± 1.8	20.7 ± 0.2	19.9 ± 1.5	20.2 ± 0.1
Tail height	4.3 ± 1.6	5.3 ± 0.2	5.2 ± 1.1	6.5 ± 0.4	6.6 ± 0.2	6.8 ± 0.4	7.0 ± 0.2
Dorsal fin height	1.2 ± 0.4	1.9 ± 0.1	2.1 ± 0.2	2.0 ± 0.3	3.1 ± 0.5	2.2 ± 0.2	2.2 ± 0.3
Ventral fin height	0.9 ± 0.2	1.1 ± 0.0	1.5 ± 0.5	1.5 ± 0.4	1.9 ± 0.1	1.6 ± 0.3	1.7 ± 0.2
Tail musculature height	2.1 ± 0.3	3.2 ± 0.1	3.5 ± 0.3	3.7 ± 0.5	3.3 ± 1.1	3.9 ± 0.3	3.9 ± 0.1
Snout-nostril distance	1.1 ± 0.1	1.5 ± 0.1	1.4 ± 0.2	1.8 ± 0.5	1.7 ± 0.3	2.0 ± 0.1	1.4 ± 0.5
Internostril distance	1.0 ± 0.1	1.3 ± 0.1	1.5 ± 0.1	1.6 ± 0.2	1.7 ± 0.1	1.6 ± 0.1	1.8 ± 0.1
Nostril-eye distance	0.6 ± 0.2	0.8 ± 0.1	0.8 ± 0.1	1.0 ± 0.1	0.7 ± 0.2	1.0 ± 0.1	1.4 ± 0.5
Eye diameter	0.9 ± 0.2	1.3 ± 0.2	1.6 ± 0.0	1.4 ± 0.3	1.8 ± 0.0	1.6 ± 0.2	1.7 ± 0.1
Interorbital distance	1.7 ± 0.3	2.6 ± 0.1	3.0 ± 0.1	2.8 ± 0.5	2.2 ± 0.0	2.8 ± 0.6	2.9 ± 0.9
Oral disc widht	1.8 ± 0.4	2.3 ± 0.3	2.8 ± 0.1	2.9 ± 0.2	2.9 ± 0.3	3.0 ± 0.1	2.9 ± 0.1
Spiracle length	0.9 ± 0.1	1.3 ± 0.4	1.4 ± 0.3	1.7 ± 0.4	1.8 ± 0.3	1.9 ± 0.1	1.5 ± 0.1
Cloacal tube length	0.5 ± 0.1	0.7 ± 0.2	1.0 ± 0.1	1.2 ± 0.2	1.1 ± 0.1	1.0 ± 0.1	1.0 ± 0.1

ridge is bifurcated. An edge of few conical, pointed papillae extend laterally on the prenarial arena from the lateral tips of the prenarial ridge towards the nares. Nares are wide, slightly triangular, oriented in an angle of about 60 degrees with the anteroposterior axis of the buccal roof, and placed in the anterior one-quarter of the buccal roof. Narial walls are thick and the anterior edge of each naris bears low papillae that surround the medial edge of the nare; the posterior edge is smooth and projects ventrally forming a flap that could represent a narial valve. Postnarial arena complex. Behind, and almost parallel, to the posterior edge of the nares there is a row of six postnarial papillae. These papillae gradually decrease in size from the most posterior to the anterior ones. The posterior four are well-developed, large, and elongated. The anterior edge of these papillae are serrated and their attenuated tips lie behind and between the internal nares. The most anterior two are small, not serrated, and with blunt tips. No pustulations are found on the postnarial arena between the postnarial papillae and the median ridge. The median ridge is broad and well

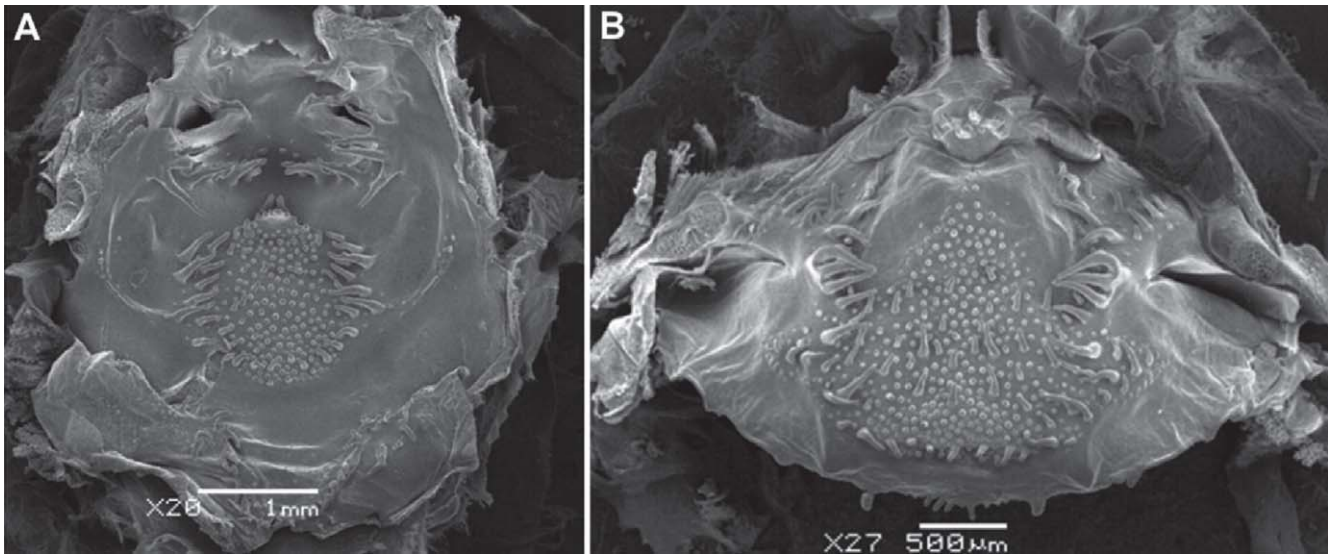

Figure 2. Internal oral anatomy of the tadpole of *Proceratophrys renalis* (MUFAL 7503). (A) bucal roof and (B) bucal floor.

defined; it rises from the buccal roof and about ¼ of its edge on either side is smooth, whereas the medial edge bears 5-6 well-defined papillae. Immediately in front of the medial ridge there are 2-3 large, blunt papillae. A pair of large, bifurcated, and elongated lateral ridge papillae project medially with their tips lying between the nares and the medial ridge; they overlap the postnarial papillae. The buccal roof arena (BRA) is circular, bounded anteriorly by the median ridge and laterally by about a dozen pairs of elongated and pointed papillae, with medial papillae being the largest. The BRA is evenly and densely covered with pustulations; these pustulations extend over half of the posterior surface of the median ridge. Posterior to the BRA, the oral surface is smooth and continues with a long dorsal velum, curving gradually towards the midline; margin of velum bears papillae. Glandular zone of velum is developed, not very broad, and well defined.

Buccal floor overall triangular and broad (Fig. 2B). A large pair of infralabial papillae is present. Lingual bud rounded and bearing three pairs of lingual papillae; distal tips of lingual papillae widely bifurcated, with blunt tips (Fig. 3).

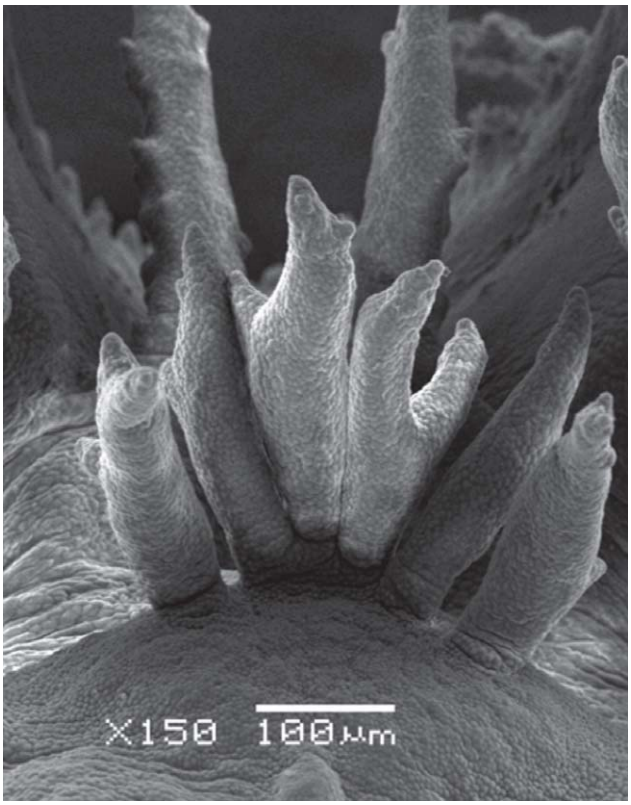

Figure 3. Detail of the oral floor showing the three pairs of lingual papillae on the tadpole of *Proceratophrys renalis* (MUFAL 7503).

Buccal floor arena (BFA) is U-shaped and bounded laterally by about 13-14 pairs of medium to long, attenuate, papillae; posteriorly the BFA is bounded by about 8-9 medium papillae. Within the BFA a triangular-shaped field of densely and homogenously scattered pustulations is found; the apex of this triangular field rests almost at the base of the lingual bud, whereas its base is at the level of the posterior edge of the BFA. Within the field of pustulations, there are 20-25 medium sized and elongated papillae. Two clusters of medium sized and elongated papillae, with some pustulations intersparsed between them, are found outside and on each side of the BFA, one anteriorly and one posteriorly; between them the surface lacks papillae and pustulations. Velar surface free, long, and with a continuous slightly jagged posterior margin. Median notch found medially and secretory pits are present on the edge of the velum. Gill filters of moderate size with an average filter mesh.

Natural History

Serra da Saudinha is a remnant of the Atlantic Rain Forest situated in a region with zero to ninety days dry period (Assis, 2000). The tadpoles of *Proceratophrys renalis* were found in a small permanent stream (about 30 cm in depth) inside the forest. The stream had many rocky outcrops and a sandy substrate. The tadpoles were observed moving around on the sandy substrate and no larval schooling or clustering was observed; their coloration is cryptic with the substrate. Other larvae observed in the same stream belong to species of *Scinax* and *Leptodactylus* genera.

Discussion

Only 10 of the 21 currently recognized species of *Proceratophrys* have their larvae described; these are: *P. appendiculata* (Peixoto and Cruz, 1980), *P. avelinoi* (de Sá and Langone, 2002), *P. boiei* (Izecksohn *et al.,* 1979), *P. concavitimpanum* (Giaretta *et al.,* 2000), *P. cristiceps* (Vieira *et al.,* 2007), *P. cururu* (Eterovik and Sazima, 1998), *P. laticeps* (Peixoto *et al.,* 1981), *P. moehringi* (Weygoldt and Peixoto, 1985), *P. palustris* (Giaretta and Sazima, 1993), and *P. schirchi* (Peixoto *et al.,* 1984, as *P. precrenulata,* see Caramashi and Velosa, 1997). Moreover Brandão and Batista (2000) provided some information (i.e., LTRF, length, and body shape) for the tadpole of *P. goyana.*

TABLE 2. Comparison of larval characters among species of *Proceratophrys.* Characters followed by the word "supposition" in parentheses were inferred from the illustrations, but not stated in the text by the authors.

Species	Nostril appearance	Spiracle	Origin of dorsal fin	Caudal end	LTRF/presence of submarginal papillae	Source
P. appendiculata	Reniform	fused to the body	Posterior third of the body	Rounded	2/3(1)/yes	Peixoto and Cruz (1980)
P. avelinoi	Reniform	—	tail-body junction	Rounded	2(2)/3(1)/yes	de Sá and Langone (2002)
P. boiei	Reniform	inner wall free from body	Posterior third of the body	Rounded	2(2)/3(1)/yes	Our observations; Izecksohn *et al.* (1979)
P. concavitimpanum	Rounded	inner wall free from body	tail-body junction	Acute	2(2)/3(1)/yes (supposition)	Giaretta *et al.* (2000)
P. cristiceps	Rounded	fused to the body	Posterior third of the body	Rounded	2(2)/3(1)/yes	Vieira *et al.* (2007)
P. cururu	—	—	Posterior third of the body (supposition)	Acute (supposition)	2(2)/3(1)[3]/yes	Eterovik and Sazima (1998)
P. laticeps	Reniform	inner wall free from body	Posterior third of the body	Acute	2(2)/3(1)/no (supposition)	Peixoto *et al.* (1981)
P. moehringi	—	—	tail-body junction (supposition)	Rounded (supposition)	2(2)/3(1)/yes	Weygoldt and Peixoto (1985)
P. palustris	—	fused to the body	tail-body junction (supposition)	Acute	2(2)/3(1)/no (supposition)	Giaretta and Sazima (1993)
P. renalis	Reniform	inner wall free from body	Posterior third of the body	Acute	2(2)/3(1)/yes	This study
P. schirchi	Reniform	inner wall free from body	Posterior third of the body	Acute	2(2)/3(1)/yes	Peixoto *et al.* (1984)

The external larval morphology of *Proceratophrys renalis* is similar to most other species of the genus. These common characteristics include oval body, low caudal fins, sinistral spiracle, and LTRF 2(2)/3(1) (de Sá and Langone, 2002; Table 2); characteristics common to benthic forms living in both lentic and lotic environments (Altig and Johnston, 1989). Except *Proceratophrys avelinoi* and *P. cristiceps* that inhabit pools, all other known *Proceratophrys* larvae inhabit streams or occur in side pools on the shore of the streams with constant flow of water. *Proceratophrys appendiculata, P. avelinoi, P. boiei, P. laticeps, P. renalis,* and *P. schirchi* have overall reniform nostrils (rounded in *P. cristiceps* and *P. concavitimpanum;* not reported for *P. cururu, P. moehringi,* and *P. palustris*). The spiracle of *P. concavitimpanum, P. laticeps, P. renalis,* and *P. schirchi* has the inner wall free from body (fused to the body in *P. appendiculata, P. cristiceps,* and *P. palustris;* not reported for *P. avelinoi, P. boiei, P. cururu,* and *P. moehringi*). We examined larvae of *P. boiei* from Camanducaia, MG, and found a spiracle with an inner wall free from the body. *Proceratophrys avelinoi, P. concavitimpanum, P. moehringi,* and *P. palustris* have the beginning of the dorsal fin at the tail-body junction (on the body in other species).

With the exception of *Proceratophrys cururu,* all other species have laterally emarginated oral discs. The two folds on the lower lip are found in some individuals of *P. renalis* and similar folds have been reported for *P. avelinoi, P. laticeps, P. palustris, P. moehringi, P. appendiculata,* and *P. schirchi.* Although there is no reference in the descriptions of *P. boiei* and *P. palustris,* these folds can be clearly seen in the illustrations as a slight double indentation on the lower lip of *P. palustris* (Giaretta and Sazima, 1993, fig. 3) and a small indentation on the left side of the lower lip of *P. boiei* (Izecksohn *et al.,* 1979, fig. 4). We consider the condition in the latter species as individual variation given that the examined specimens of *P. boiei* from Camanducaia range in possessing a clear indentation to an almost complete absence of the structure (similar to that found in *P. renalis*). In *P. renalis* the marginal papillae are not aligned, but arranged in different directions; this arrangement can also be seen in the illustrations of the larvae of *P. concavitimpanum, P. cristiceps, P. cururu,* and *P. boiei* from Camanducaia. A similar case was described in *P. avelinoi,* with two sets of three slightly larger papillae projecting from the lower labium at the tips of labial fold (de Sá and Langone, 2002). Furthermore, these authors suggested that a closer look at the

TABLE 3. Measurements (in mm) of *Proceratophrys boiei* larvae (MUFAL 7743) (mean ± standard deviation).

Character	Stage 31 (N = 1)	Stage 36 (N = 3)	Stage 40 (N = 1)
Total length	29.6	34.5 ± 2.1	41.8
Body length	12.1	12.8 ± 0.3	14.1
Body height	6.2	6.8 ± 0.5	6.6
Body widht	7.7	8.9 ± 0.5	9.3
Tail lenght	17.5	22.1 ± 2.2	28.4
Tail height	5.1	6.3 ± 0.5	7.3
Dorsal fin height	2.0	3.2 ± 0.2	3.4
Ventral fin height	1.6	2.8 ± 0.1	2.1
Tail musculature height	2.4	1.8 ± 0.1	4.2
Snout-nostril distance	1.6	1.6 ± 0.1	1.7
Internostril distance	1.5	1.8 ± 0.0	2.2
Nostril-eye distance	0.9	1.5 ± 0.1	1.1
Eye diameter	1.2	1.7 ± 0.1	1.7
Interorbital distance	1.6	0.9 ± 0.1	2.2
Oral disc widht	2.3	2.6 ± 0.1	3.1
Spiracle length	1.3	1.7 ± 0.4	1.6
Cloacal tube length	1.2	1.2 ± 0.1	1.1

illustrations of the larvae of *P. boiei* and *P. laticeps* show similar conditions.

Several submarginal papillae found on the lower lip, and seeming to form a second row of marginal papillae, is also a characteristic shared by *Proceratophrys renalis* and *P. boiei* from Camanducaia. This feature was not described or illustrated in the original description of the larvae of *P. boiei* (Izecksohn *et al.,* 1979). This is likely due to individual variation as individuals with few submarginal papillae also occurred in the tadpoles from Camanducaia.

Despite chromosomal and morphological differences observed between the adults of *P. boiei* and *P. renalis* (Ananias *et al.,* 2007; Prado and Pombal, 2008), we found no external morphological characters that differentiate the larvae of these two species.

In terms of morphometrics, the tadpoles of *Proceratophrys boiei* analyzed differed in some body proportions in relation to *P. renalis* (Table 3). At stage 31, interorbital distance of *P. renalis* is almost twice that of *P. boiei* (for individuals with equal body length); at stage 36, *P. boiei* showed eye-nostril distance about 12% of body length whereas it is 5% in *P. renalis;* at stage 40, *P. boiei* has a tail length 2X body length whereas it is 1.5X in *P. renalis.*

Descriptions of internal oral anatomy were reported for the larvae of *Proceratophrys appendiculata* (Wassersug and Heyer, 1988), *P. avelinoi* (Langone and de Sá, 2002), *P. boiei* (Wassersug and Heyer, 1988), and *P. cristiceps* (Vieira *et al.,* 2007). *Proceratophrys renalis* is the only known species of the genus with a single pair of infralabial papillae (two pairs in other species) and three pairs of lingual papillae (two pairs in *P. appendiculata, P. avelinoi,* and *P. boiei* and three papillae in *P. cristiceps*).

Despite the absence of diagnostic external morphological characters to differentiate the larvae of *P. renalis* from those of *P. boiei,* the analysis of internal oral anatomy showed two possible characters (i.e., a single pair of infralabial papillae and three pairs of lingual papillae) that readily distinguish *P. renalis* from *P. boiei,* suggesting the validity of two separate taxa.

RESUMO

O girino de *Proceratophrys renalis* é descrito a partir de espécimes provenientes de Maceió, estado de Alagoas, nordeste do Brasil. No estágio 35 o corpo é ligeiramente deprimido dorso-ventralmente e ovóide em vistas lateral, dorsal e ventral. O disco oral é ventral com emarginações laterais, rodeado por uma única fileira de papilas marginais a qual é ausente anteriormente. A fórmula oral é 2(2)/3(1). A análise da anatomia oral interna revelou a existência de dois possíveis caracteres que de pronto distingue *P. renalis* de *P. boiei,* apoiando a recente revalidação de *P. renalis.* Comparações com outras espécies do gênero com girinos descritos são apresentadas.

ACKNOWLEDGMENTS

We are grateful to Renato Feio and an anonymous reviewer for helpful contributions on the manuscript; George Sena and Marcos Bonfim for the help in the field; Célio F. B. Haddad (UNESP – Rio Claro) for donation of the *Proceratophrys boiei* larvae; and the Usina Caeté S/A – Unidade Cachoeira for logistic support. This work was partially supported by Fundação de Amparo à Pesquisa do Estado de Alagoas (FAPEAL) (# 2004.04.29864-02) and was done under the Brazilian Government permit provided by IBAMA/RAN (# 184/05).

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Submitted 26 May 2010
Accepted 30 August 2010