

Description of the tadpole of *Scinax auratus* (Wied-Neuwied) (Anura, Hylidae)

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ABSTRACT. *Scinax auratus* occurs in the Atlantic Rain Forest of northeastern Brazil. It is found inside the forest on outcrop rocks and in open areas along the forest border. The tadpoles are found in temporary ponds. Herein we describe the tadpole of *S. auratus* and compare it with those of other related species of the genus *Scinax*. The diagnostic characteristics of the tadpole of *S. auratus* include aspects of the general colour and forms of the body, tail, third posterior tooth row, and jaw sheaths.

KEY WORDS. Neotropical, *Scinax*, tadpole.

RESUMO. *Scinax auratus* (Wied-Neuwied, 1821) é uma espécie de anuro que ocorre na Mata Atlântica do nordeste do Brasil, sendo encontrada em afloramentos rochosos no interior da floresta e em áreas abertas nas bordas da floresta. Os girinos são encontrados em poças temporárias. Neste estudo o girino de *S. auratus* é descrito e comparado com aqueles de espécies relacionadas do gênero *Scinax*. As características diagnósticas do girino de *S. auratus* envolvem aspectos da coloração geral e da forma do corpo, da cauda, da terceira fileira posterior de denticulos e do bico córneo.

PALAVRAS CHAVE. Girino, Neotropical, *Scinax*.

The hylid genus *Scinax* Wagler, 1830 is widely distributed in the Neotropics, occurring from Mexico to Argentina, and currently is composed of more than 80 species grouped in five species groups (DUELLMAN & WIENS 1992, DUELLMAN 1993, FAIVOVICH 2002, FROST 2002). *Scinax auratus* (Wied-Neuwied, 1821) occurs in the Atlantic Rain Forest of northeastern Brazil. It is found inside the forest on outcrop rocks and in open areas along the forest border. Although FROST (2002) and DUELLMAN & WIENS (1992) did not include this species in any of the *Scinax*'s groups, it has been related to the *Scinax ruber* group by other authors (BOKERMANN 1969, POMBAL & GORDO 1991). *Scinax crospedospilus* (Lutz, 1925), *Scinax cuspidatus* (Lutz, 1925), and *Scinax alter* (Lutz, 1968), included in the *Scinax ruber* group (sensu FAIVOVICH 2002), are similar to *S. auratus* with respect to larval and adults morphological traits, osteology, vocalization, and breeding biology. Herein we describe the tadpole of *S. auratus* for the first time and compare it with the species above mentioned.

MATERIAL AND METHODS

Adults (ZUF RJ 7311-7319, 7453 - cleared and stained skeletal, 7562-7563, 7637) and tadpoles (ZUF RJ 7291) of *S. auratus* were collected from a population in Alagoas State, Município de Quebrangulo (9°19'S, 36°28'W), in November 1997. All speci-

mens examined in this study belong to the collection of the Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro (ZUF RJ).

Tadpoles were anaesthetised in 0.1% chloretone and stored in 5% formalin. Some tadpoles collected were reared through metamorphosis to confirm the identification, or until stages 36-37 for description. They were reared in plastic boxes (measurements: 262 x 77 x 147 mm) with about 1.5 liter of water from the collecting sites. Commercial fish food was regularly provided.

All tadpoles were staged according to GOSNER (1960). Tadpoles in stages 36-37 were used in the descriptions and measured. Both tadpoles preserved immediately after the capture and reared were used in the descriptions. No changes were observed in the oral morphology or general shape of reared tadpoles. The measurements, terminology, and labial tooth row formula follow ALTIG & McDIARMID (1999), except interorbital distance which was taken between the inner margins of eyes. All measurements were taken using an ocular micrometer in a stereomicroscope, except for total length, which was measured with calipers. The term "labial arm" follows McDIARMID & ALTIG (1990). The technique proposed by CARVALHO E SILVA & CARVALHO E SILVA (1994) was used for the study of the oral morphology. Drawings were made with the aid of a camera lucida attached to a stereomicroscope.

RESULTS

Scinax auratus (Wied-Neuwied, 1821)

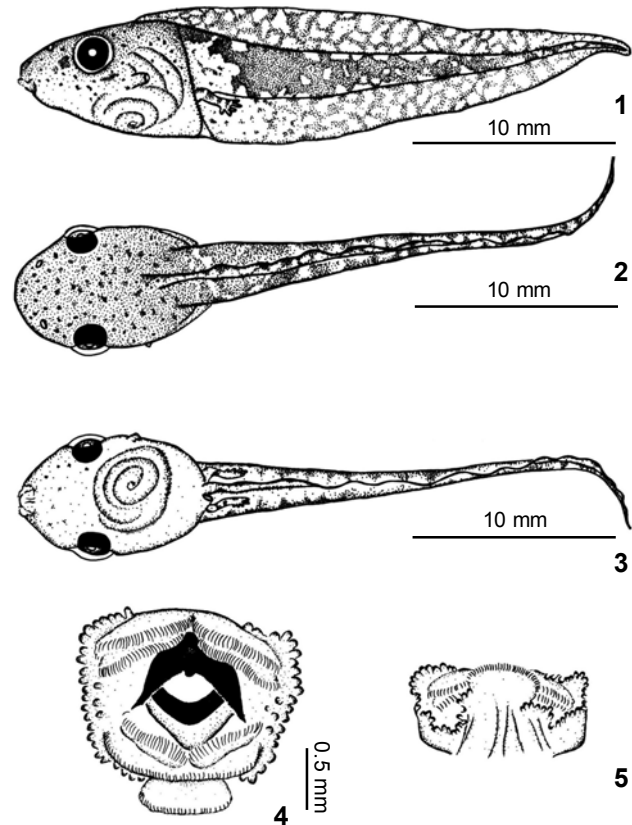
Description of the tadpole (Figs 1-5). Mean total length at stage 36-37, 30.1 ± 2.1 mm ($n = 7$, Tab. I). Body triangular in lateral view, maximum body height at the posterior third; body length 34% of total length. Body ovoid in dorsal view, approximately as wide as high. Snout rounded; external nares rounded, slightly closer to eyes than to snout; internarial distance 73% of interorbital distance. Eyes lateral with diameter 28% of body height, interorbital distance 65% of body width, and 2.3 times greater than eye diameter. Spiracle sinistral, short, located shortly after half of body. Vent tube dextral, short, attached to ventral fin. Tail approximately 27% higher than body, maximum tail height at the end of first third of tail length; tail tip narrowly rounded; tail musculature moderate. Tail fins heights equivalent; dorsal fin slightly arched, almost rectilinear, originating at posterior body third; ventral fin arched. Oral disc anteroventral, approximately 31% of body width, with single marginal papillae row, interrupted medially at upper and lower labia, few lateral submarginal papillae. Labial tooth row formula (LTRF) 2(2)/3(1); third posterior tooth row short, about 55% of second posterior tooth row and located at end of labial arm; strong jaw sheaths, upper jaw sheath with three medially positioned enlarged serrations, lower jaw sheath with pair spiniform, keratinized lateral processes located at extremities of arch.

Color in life. General color yellowish-green covered with dark brown spots and some golden spots. Eyes coppery-brown. Tail with irregular golden light markings. Tail fins translucent yellowish and dark brown marbled.

Notes on natural history. Tadpoles were collected in November in semi-permanent or temporary ponds in open areas inside the Atlantic Rain Forest on outcrop rocks and in open areas along the forest border. In captivity, these tadpoles float throughout the body of water with their bodies horizontal or inclined with the snout pointing upwards or downwards, and swim with quick movements of the tail tip.

DISCUSSION

The tadpoles of *S. auratus* are very similar in morphology and colour pattern to those of *S. crospedospilus*, *S. cuspidatus*, and *S. alter* (HEYER *et al.* 1990, ALVES & CARVALHO E SILVA 2002). Tadpoles of all these species are yellowish-green to yellowish-brown in life. The tadpoles of *S. auratus* have no lateral stripe extending from snout to eyes (Fig. 1), while those of *S. crospedospilus* and *S. cuspidatus* have a not very distinct and incomplete lateral stripe, and those of *S. alter* have a distinct lateral stripe and a marginal narrow brown stripe at the base of the ventral fin. In the studied sample, the tadpoles of *S. auratus* have an intermediary size (30.1 mm) between those of *S. crospedospilus* and *S. cuspidatus* (33.0 mm and 32.7 mm, re-



Figures 1-5. Tadpole of *Scinax auratus* (ZUFJR 7291): (1) lateral view; (2) dorsal view; (3) ventral view; (4) oral disc distended; (5) oral disc closed.

Table I. Measurements in millimeters of tadpoles of *Scinax auratus* (N = 7) in stage 36-37.

	Median \pm SD	Minimum – maximum
Total length	30.1 ± 2.1	27.5 – 33.2
Body length	10.2 ± 0.3	9.5 – 11.1
Body height	5.9 ± 0.1	5.4 – 6.3
Body width	5.8 ± 0.1	5.1 – 6.2
Tail height	7.2 ± 0.6	6.5 – 8.3
Dorsal fin height	2.3 ± 0.2	2.2 – 2.6
Ventral fin height	2.5 ± 0.2	2.2 – 2.9
Eye diameter	1.6 ± 0.1	1.6 – 1.7
Nostril diameter	0.4 ± 0.0	0.4 – 0.5
Interorbital distance	3.7 ± 0.3	3.3 – 4.1
Internarial distance	2.7 ± 0.2	2.6 – 2.9
Eye-nostril distance	1.3 ± 0.1	1.3 – 1.5
Eye-snout distance	2.8 ± 0.1	3.0 – 2.6
Nostril-snout distance	1.4 ± 0.0	1.3 – 1.6
Oral disc width	1.8 ± 0.3	1.7 – 2.1

spectively), and those of *S. alter* (26.5 mm) (see table I, HEYER *et al.* 1990, ALVES & CARVALHO E SILVA 2002). The oral disc is almost terminal in *S. auratus*, *S. crospedospilus* and *S. cuspidatus*, while it is directed more ventrally in *S. alter*. The single row of marginal papillae is interrupted medially in the anterior and posterior labia in *S. auratus* (Figs 4 and 5), *S. crospedospilus* and *S. cuspidatus*, while it is interrupted medially only in the anterior labium in *S. alter*. The posterior labium forms a labial arm in *S. auratus*, *S. crospedospilus*, and *S. cuspidatus*, while it is just prominent in *S. alter*. The third posterior tooth row is shorter than the second one, representing about 55% of length of the second posterior tooth row in *S. auratus* (see Tab. II), about 47% in *S. cuspidatus* and about 53% in *S. alter* (see ALVES & CARVALHO E SILVA 2002). Only in *S. auratus* the upper jaw sheath presents three enlarged serrations located medially. The lower jaw sheath of *S. auratus* and *S. cuspidatus* has a pair of spiniform, keratinized lateral processes located at the ends of the arch (unknown in *S. crospedospilus*, and not observed in *S. alter*).

Table II. Measurements in millimeters and rate (%) of the length of the third and second posterior tooth rows of the oral disc of the tadpoles of *Scinax auratus* (N = 15). (TPR) Third posterior tooth row, (SPR) second posterior tooth row.

	Median ± SD	Minimum – maximum
TPR	0.6 ± 0.1	0.4 – 0.8
SPR	1.1 ± 0.3	0.7 – 1.5
TPR/SPR (%)	55.3 ± 4.5	47.8 – 62.5

BOKERMANN (1969) mentioned the similarity of *S. auratus* to small species of the *S. ruber* group. He considered the following species as “allied” to *S. auratus*: *S. fuscomarginatus* (Lutz, 1925), *S. parkeri* (= *S. fuscomarginatus*, J. P. Pombal Jr., pers. comm.), *S. similis* (Cochran, 1952), and *S. fuscovarius* (Lutz, 1925). The first two species listed by Bokermann are both grouped in the *S. staufferi* group by DUELLMAN & WIENS (1992), and the former appeared as a member of this group in the morphological cladistic analysis of FAIVOVICH (2002). The results of the present study show that *S. auratus*, *S. crospedospilus*, *S. cuspidatus*, and *S. alter* share a set of larval characteristics, suggesting that the first species could really be related to the *S. ruber* group (sensu FAIVOVICH 2002).

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