

The tadpole of *Atelopus pulcher* Boulenger (Annura, Bufonidae)
from Manaus, Amazonas.

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ABSTRACT

The tadpole of Atelopus pulcher is described for the first time. Tadpoles of this species were encountered in large streams where reproduction occurs. Tadpoles of this species conform to the genus characteristics in exhibiting an enlarged ventral disc and a 2/3 tooth row formula. One characteristic, however, distinguishes this species from other Atelopodids in that the upper beak is shorter than the lower beak.

Few tadpoles of the genus *Atelopus* have been described. This gap in our knowledge is attributable to the difficulty of obtaining the tadpoles, which inhabit streams and mountain torrents in tropical forests (DUELLMAN and TRUEB, 1986). The extant descriptions of tadpoles include *Atelopus varius* (Starrett, 1967), *A. spumarius spumarius*, *A. certus* and *A. ignescens ignescens* (Duellman and Lynch, 1969), *A. peruensis* (Gray and Cannatella, 1985), *A. subornatus* (Lynch, 1986) and *A. flavescens* (Lescure, 1981). In this paper I describe the tadpoles of *Atelopus pulcher* Boulenger for the first time from samples collected near Manaus, Amazonas.

There is confusion in the literature over the tadpoles of this species. PETERS (1973) suggests that the lone specimen of *Atelopus spumarius spumarius* described by DUELLMAN and LYNCH (1969) is in fact that of *A. pulcher* because those authors placed *A. spumarius* in synonymy with *A. pulcher*. There are significant differences between the tadpole described by DUELLMAN and LYNCH (1969) and those described here. Furthermore, *A. spumarius* has recently been described as a valid species by LESCURE (1981 b). The adults of *Atelopus pulcher* found in our study sites correspond to the description of that species as given by BOULENGER (1882) for Peru and by PETERS (1973) for Ecuador.

Material: MZUSP 66327. Brazil: Estado Amazonas, 90 km N Manaus. January-May 1988.

Description- Developmental stage 25 through 42 (Table I). Developmental stage 35 (figure 1), body length 6.2 mm, total length 13.7 mm. Body flattened

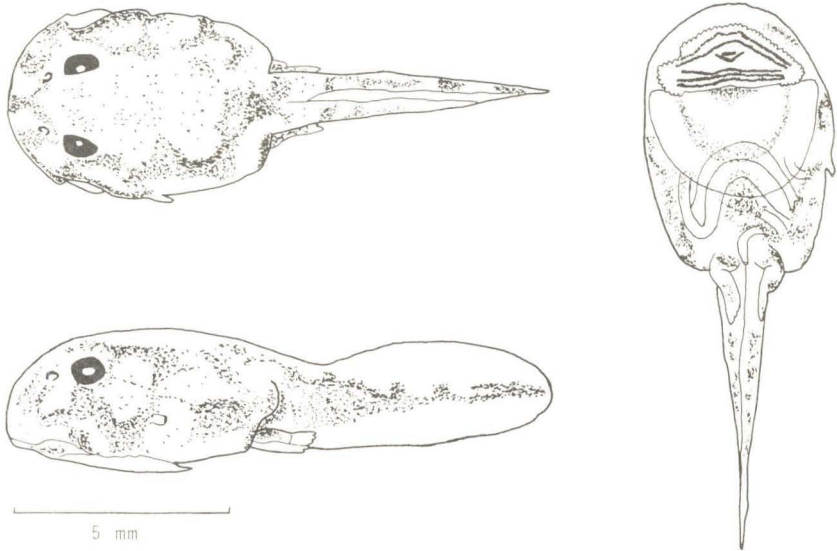


FIG. 1. Dorsal, ventral and side views of *Atelopus pulcher* tadpole.

dorso-ventrally, dorsal countour slightly curved until eye level where it curves straight down to tip of snout. In dorsal view snout rounded, body with more or less even width to start of tail. Eyes moderately large, antero-dorsally located, black and separated by about 2.5 times diameter of eye. Nostrils small, located close to eyes at about one-third distance between eyes and snout, in lateral view located at the height of the base of the eyes. Spiracle sinistral, below midline located about three-fifths of body length. Anal tube median. Strong caudal musculature extending throughout anterior half of tail, narrowing at mid point and extending to tip of tail. Caudal fins deepest at half the tail length, ventral fin with level edge, dorsal fin arched but not extending anteriorly onto body.

Month large, ventral followed by a large suctorial disc that forms a near-perfect half circle extending to two-thirds of the body length. Lower lip bare, upper lip with single row of small papillae. Two upper and three lower teeth rows, all complete and equal in length. Beaks thin and unserrated with upper beak shorter than lower beak.

Body light in color with scattered pigmentation. Edge of suctorial disc lacking pigment. Scattered pigment in the middle of the disc. Caudal musculature strongly pigmented and fins clear.

Table I.

Average body and total lengths by developmental stage (Gosner 1960).

Stage	n	Body length (mm)	Total length (mm)
25	3	4.0 (3.8-4.1)	8.3 (8.1-8.4)
26	3	3.8 (3.5-4.0)	8.6 (8.4-9.0)
27	4	4.5 (4.2-5.0)	9.2 (8.1-10.6)
28	4	4.6 (4.3-4.8)	9.7 (9.2-10.4)
29	4	5.2 (5.1-5.3)	11.0 (10.3-11.5)
30	2	5.4 (5.3-5.5)	10.8 (10.2-11.3)
31	3	5.3 (4.9-6.0)	10.9 (9.5-12.2)
32	4	5.8 (5.6-6.0)	11.8 (9.8-13.0)
35	2	6.0 (5.8-6.2)	13.3 (12.8-13.7)
36	1	6.2	13.6
37	3	6.2 (5.8-6.4)	12.9 (12.5-13.3)
38	1	6.0	12.5
39	1	6.5	13.8
42*	1	5.8	9.1

*tail resorption had started.

Notes – Tadpoles were collected from non-isolated forest reserves of the “Projeto Dinâmica Biológica de Fragmentos Florestais” located 80 km northeast of the city of Manaus, AM. A total of 36 tadpoles were collected for descriptive purpose in three independent moderately large forest streams (> 2 meters width and > 30 cm depth). Two of these streams are located in reserve 1401 whereas the third is located in reserve 1501 approximately 14 kilometers from the former. Tadpoles were collected by sweep netting along the sandy bottom of the streams where water current was the strongest. They were usually found where there was only a little leaf litter or a few broken twigs on the bottom of the stream. No rocks occur in these streams.

Tadpoles started to appear in the streams in the middle of January 1988, became much more abundant at the start of March and were found until the end of May when sampling was stopped. Sampling resumed in September 1988 and tadpoles were again encountered until December 1988 indicating a possible year long breeding activity. Adults of *Atelopus pulcher* are regularly encountered along the stream banks and it is the only frog of this genus that lives in these reserves (ZIMMERMAN and BIERREGAARD, 1986). Adults were often heard calling during the sampling period from stream banks or up to 10 meters away from the stream. Juveniles were observed coming out of the stream on one occasion. Although no eggs were found, 10-15 egg capsules (eggs that have

already hatched) were found in a shallow pool of water connected to the stream. One of the tadpoles was successfully reared to the juvenile stage and exhibited similar color patterns as the adult.

Discussion – Virtually all characteristics of this tadpole concord with previous descriptions of other tadpoles of this genus. It has the characteristic 2/3 entire tooth formula, enlarged oral disc, and median anal tube. Tadpoles described here have one clear distinction from that described by DUELLMAN and LYNCH (1969). In lateral view the nostrills are located at the height of the base of the eyes (vs. much lower in the tadpole described by DUELLMAN and LYNCH, 1969). Also, the oral disc forms a perfect half circle in these specimens whereas it does not in theirs. Perhaps the most obvious distinguishing character is that the tadpole has an unusual shorter upper beak, the lower beak being longer. This was observed in all 36 tadpoles caught and examined. This feature distinguishes this species from all other Atelopodid species (see descriptions by DUELLMAN and LYNCH, 1969; see others cited in the introduction). While this is a useful characteristic for species identification it may also represent a novelty among all anuran aquatic larvae possessing a keratinized beak.

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