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The tadpole of *Amazophrynella manaos* Rojas, Carvalho, Gordo, Ávila, Farias and Hrbek, 2014 (Anura, Bufonidae) from the type locality and adjacent regions at Central Amazonia, Brazil

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The genus *Amazophrynella*, as currently recognized (Fouquet *et al.* 2012a, b), is represented by four nominal species (Frost 2014; Rojas *et al.* 2014) but the tadpoles of only one species, *Amazophrynella minuta* (Melin) from Ecuador, have been described (Duellman & Lynch 1969; Duellman 1978). *Amazophrynella manaos* Rojas, Carvalho, Gordo, Ávila, Farias and Hrbek, 2014 occurs in the leaf litter of terra firme forest in the southwestern part of the Brazilian Guiana region (Rojas *et al.* 2014). The tadpole of this species was briefly described in diagrammatic drawings by Hero (1990) as *Dendrophryniscus minutus*. Herein, we provide a detailed description of this tadpole based on individuals at 12 stages of development collected in five different sites, including the type locality, at Central Amazonia, Brazil.

We collected 23 tadpoles of *A. manaos* at the following terra firme forests from Central Amazonia: 1) Reserva Florestal Adolpho Ducke (RFAD: between 02°55' and 03°01'S, between 59°53' and 59°59'W) (Coleção Zoológica Paulo Bührnheim of the Universidade Federal do Amazonas—CZPB-UFAM 162; one individual), a 10,000 ha ecological reserve, 2) Fazenda Experimental of the Universidade Federal do Amazonas (Fazenda UFAM: between 02°37' and 02°39'S, between 60°03' and 60°07'W) (CZPB-UFAM 99, 109, 226, 230, 240; eight individuals), a 3,000 ha of terra firme forest, both located in the rural or suburban areas of Manaus city, Amazonas, Brazil, and 3) Reserva Biológica do Uatumã (ReBio Uatumã: between 0°50' and 1°55'S; between 58°50' and 60°10'W) (CZPB-UFAM 445, 446, 471, 484, 491, 523, 535; fourteen individuals), a 950,348 ha ecological reserve at Presidente Figueiredo municipality, Amazonas, Brazil. Tadpoles were anesthetized and killed in eugenol solution and preserved in formalin 10%. Another four individuals from RFAD (INPA-H 1598), one individual collected at campus of the Universidade Federal do Amazonas (campus UFAM: 03°04'S, 59°57'W) (INPA-H 7930), Manaus, and two individuals collected at Dimona Farm, Biological Dynamic of Forest Fragments Project (BDFFP), north of Manaus (INPA-H 8398), were obtained from the Herpetological Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA-H) and used in the description. Measurements were taken with an ocular micrometer. Descriptive terminology, morphometric variables and developmental stages follow Altig & McDiarmid (1999).

Description. The description is based on one tadpole at stage 36 (CZPB-UFAM 471). Body globular depressed in lateral view (Fig. 1A) and oval in dorsal view (Fig. 1B). Body and tail 41% and 59% of total length, respectively. Body wider than higher. Snout truncate in both lateral and dorsal views. Eyes located dorsally and directed dorsolaterally. Interorbital distance approximately 20% greater than eye diameter. Nostrils large, oval, dorsally positioned and intermediate between the eyes and the snout. Nostril opening directed dorsally. Spiracle single, sinistral, conical, posteriorly directed. Spiracular opening on the posterior third of the body; centripetal wall fused with the body wall and longer than the external wall. Vent tube medial, fused to ventral fin. Oral disc anteroventral, non-emarginated (Fig. 1C). Marginal papillae with a wide dorsal and ventral gaps. Submarginal papillae absent. Labial tooth row formulae 2/3. Anterior tooth rows of the same length. Posterior tooth rows P1 and P2 of the same length, P3 slightly shorter than others. Jaw sheaths finely serrated. Upper jaw sheath arch-shaped; lower jaw sheath V-shaped. Caudal musculature moderately weak, gradually tapering to the pointed tip. Dorsal fin originating on the tail-body junction, increasing in

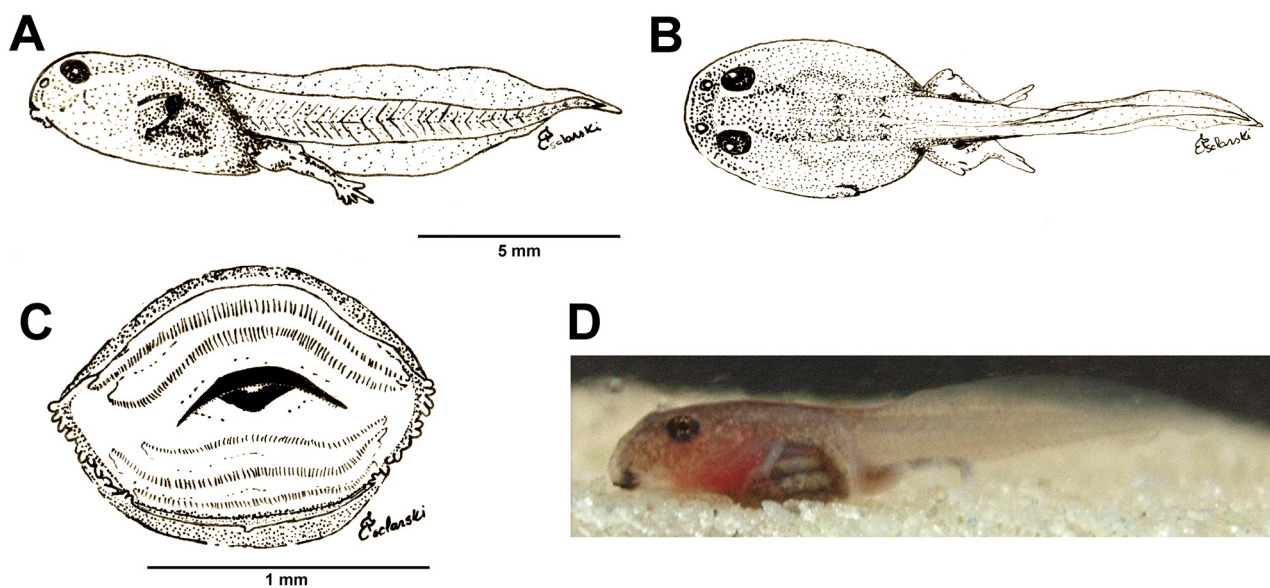


FIGURE 1. *Amazophrynella manaos* tadpole at stage 36: (A) lateral, (B) dorsal, and (C) oral disc of individual from CZPB-UFAM 471, collected at Reserva Biológica do Uatumã, Presidente Figueiredo, Brazil. (D) Alive tadpole at stage 35. Reserva Florestal Adolpho Ducke, Manaus, Brazil (Photo: Domingos J. Rodrigues).

The tadpoles of *A. manaos* are smaller than those of *A. minuta* reported from Sarayacu, Provincia Pastaza, Ecuador (5.8–6.5 mm of body length and 14.1–15.4 mm of total length in stage 31, as *Atelopus minutus* in Duellman & Lynch 1969, and as *Dendrophryniscus minutus* in Duellman 1978). The tadpole of *A. manaos* can also be distinguished from *A. minuta* by the body shape (ovoid, widest posteriorly and slightly wider than deep in *A. minuta*), snout shape (rounded in dorsal and ventral views in *A. minuta*), and coloration of fixed specimens (body and tail grayish tan with dark brown blotch between eyes and brown flecks scattered on body; transverse brown bands on dorsal part of caudal musculature; small brown flecks on caudal musculature, entire dorsal fin, and posterior third of ventral fin in *A. minuta*) (Duellman & Lynch 1969; Duellman 1978).

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References

- Altig, R. & McDiarmid, R.W. (1999) Body Plan: Development and Morphology. In: McDiarmid, R.W. & Altig, R. (Eds.), *Tadpoles: The biology of Anuran Larvae*. The University of Chicago Press, Chicago and London, pp. 24–51.
- Duellman, W.E. (1978) The biology of an equatorial herpetofauna in Amazonian Ecuador. *Miscellaneous Publication of the University of Kansas Museum of Natural History*, 65, 1–352.
- Duellman, W.E. & Lynch, J.D. (1969) Descriptions of *Atelopus* tadpoles and their relevance to atelopodid classification. *Herpetologica*, 25, 231–240.
- Fouquet, A., Recoder, R., Teixeira, M. Jr., Cassimiro, J., Amaro, R.C., Camacho, A., Damasceno, R., Carnaval, A.C., Moritz, C. & Rodrigues, M.T. (2012a) Molecular phylogeny and morphometric analyses reveal deep divergence between Amazonian and Atlantic Forest species of *Dendrophryniscus*. *Molecular Phylogenetics and Evolution*, 62, 826–838. <http://dx.doi.org/10.1016/j.ympev.2011.11.023>
- Fouquet, A., Recoder, R., Teixeira, M. Jr., Cassimiro, J., Amaro, R.C., Camacho, A., Damasceno, R., Carnaval, A.C., Moritz, C. & Rodrigues, M.T. (2012b) *Amazonella* Fouquet et al., 2012 (Anura: Bufonidae) junior homonym of *Amazonella* Lundblad, 1931 (Acari: Unionicolidae): proposed replacement by *Amazophrynella* nom. nov. *Zootaxa*, 3244, 68.
- Frost, D.R. (2014) *Amphibian Species of the World: An online reference*. Version 6.0, American Museum of Natural History, New York. Available from: <http://research.amnh.org/herpetology/amphibia/index.html> (Accessed 21 Jan. 2014).
- Gosner, K.L. (1960) A simplified table for staging anuran embryos and larvae with notes on identification. *Herpetologica*, 16, 183–190.

- Hero, J.-M. (1990) An illustrated key to tadpoles occurring in the Central Amazon rainforest, Manaus, Amazonas, Brasil. *Amazoniana*, 11, 201–262.
- Lima, A.P., Magnusson, W.E., Menin, M., Erdtmann, L.K., Rodrigues, D.J., Keller, C. & Hödl, W. (2012) *Guide to the frogs of Reserva Adolpho Ducke, Central Amazonia*. 2nd edition. Instituto Nacional de Pesquisas da Amazônia, Manaus, 187 pp.
- Rojas, R.R., Carvalho, V.T., Gordo, M., Ávila, R.W., Farias, I.P. & Hrbek, T. (2014) A new species of *Amazophrynella* (Anura: Bufonidae) from the southwestern part of the Brazilian Guiana Shield. *Zootaxa*, 3753, 79–95.
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