

Tadpole cannibalism in *Leptodactylus cunicularius* Sazima & Bokermann, 1978 (Anura, Leptodactylidae) at a temporary stream in South-eastern Brazil

Renata Magalhães Pirani*, Emanuel Teixeira da Silva and Renato Neves Feio

Cannibalism is widespread among anurans, and appears to play an important role in the biology of many species. Younger individuals (tadpoles and juveniles) are the most frequent cannibalistic life stages (Polis & Myers, 1985). Some species of the Neotropical frog genus *Leptodactylus* (Thin-toed frogs) are cannibalistic at the adult stage, like *L. latrans* (referred as *L. ocellatus* by Kokobum and Rodrigues, 2005). The tadpoles of some species feed on conspecifics eggs or tadpoles (Muedeking and Heyer, 1976; Hero and Galatti, 1990; Silva *et al.*, 2005), and others prey upon heterospecific tadpoles (Heyer *et al.*, 1975; Cardoso and Sazima, 1977).

Leptodactylus cunicularius Sazima and Bokermann, 1978 is a small frog species typically found in areas of Cerrado (savanna-like vegetation) and highland rocky meadows of the Serra do Espinhaço mountain range, in the state of Minas Gerais, South-eastern Brazil (Eterovick and Sazima, 2004; Frost, 2009). This species lays its eggs in foam nests built in chambers under rocks. After heavy rains the exotrophic tadpoles are released from the chambers and reach small streams formed among the rocky outcrops (Sazima and Bokermann, 1978; Eterovick and Sazima, 2004). Once in streams, the tadpoles remain in backwaters or at shallow sites, on sandy bottom with no aquatic vegetation. The tadpole development takes about two months (Eterovick and Sazima, 2004), with total length at Gosner (1960) stages 36-40 ranging from 38.5-41.5 mm (Heyer *et al.*, 2008). There are no records available on its feeding behaviour. Herein we report the occurrence of cannibalism among tadpoles of this species, observed in a temporary stream

in the South-east of Brazil.

The observation was made at Floresta Estadual do Uaimií (20° 29' 66" S and 43° 57' 47" W, 1021m a.s.l.), a conservation unit belonging to municipality of Ouro Preto, central region of state Minas Gerais. This area is part of an ecotone between the Atlantic Rainforest and Cerrado vegetational domains (Ab'Saber, 1977). The stream is inserted in a highland meadow environment, and flows from October to February, over sedimentary soil among quartzite rocks, with some calcareous outcrops in the upper portion.

On 14 November 2009, at about 17:50 h, we observed one tadpole of *Leptodactylus cunicularius* feeding on another individual of the same species, which was already dead when we found them (Fig. 1). The water temperature was around 20.5 °C, and only tadpoles of *L. cunicularius* were found in that part of the stream. Both specimens, along with others found nearby were collected and housed at the collection of Amphibians of the Museu de Zoologia João Moojen, at Universidade Federal de Viçosa, Viçosa, Minas Gerais (MZUFV lot 138). The tadpoles collected were at the developmental stages 26-30 according to Gosner (1960).

The cannibalism among tadpoles can be common in species that breed in temporary water bodies, where this behavior allows them to obtain high protein resources and accelerate the metamorphosis, decreasing the risk of death by desiccation (Crump, 1983; Caldwell & Araújo, 1998). Thus, the predation on conspecific tadpoles related here for *L. cunicularius* may not be occasional for this anuran, as also for other frog species that inhabit temporary streams in South-eastern Brazil.

Acknowledgments. We are grateful to Lilian G. Afonso for suggestions and English revision of the manuscript. Breno de Assis assisted in field work. The Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) and the Instituto Estadual de Florestas (IEF) provided collection permits.

Programa de Pós-graduação em Biologia Animal, Departamento de Biologia Animal, Universidade Federal de Viçosa, Viçosa, MG CEP: 36570-000, Brazil;

e-mail: renatampirani@gmail.com

* corresponding author:



Figure 1. Cannibalism in tadpoles of *Leptodactylus cunicularius* (specimens of MZUFV lot 138 in life). Photo by E. T. da Silva.

References

- Ab'Saber, A. (1977): Os domínios morfoclimáticos na América do Sul. Primeira aproximação. *Geomorfologia* **52**: 1-21.
- Caldwell, J.P., Araújo, M.C. (1998): Cannibalistic interactions resulting from indiscriminate predatory behaviour in tadpoles of poison frogs (Anura: Dendrobatidae). *Biotropica* **30**: 92-103.
- Cardoso, A.J., Sazima I. (1977): Batracofagia na fase adulta e larvária da rã-pimenta *Leptodactylus labyrinthicus* - Anura, Leptodactylidae. *Ciência e Cultura* **29**: 1130-1132.
- Crump, M.L. (1983): Opportunistic cannibalism by amphibian larvae in temporary aquatic environments. *Am. Nat.* **121**: 281-287.
- Eterovick, P.C., Sazima, I. (2004): Anfíbios da Serra do Cipó. Belo Horizonte, Editora PUC Minas.
- Frost, D. (2009): *Amphibian Species of the World: an Online Reference*. Version 5.3 (12 February, 2009). Electronic Database accessible at <http://research.amnh.org/herpetology/amphibian>. Accessed on 22 Mar. 2009.
- Gosner, K.L. (1960): A simplified table for staging anuran embryos and larvae with notes on identification. *Herpetologica* **16**: 183-190.
- Kokobum, M.N.C., Rodrigues, A.P. (2005): *Leptodactylus ocellatus* (Rã-manteiga). *Cannibalism. Herpetol. Rev.* **36**: 303.
- Hero, J.M., Galatti, U. (1990): Characteristics distinguishing *Leptodactylus pentadactylus* and *Leptodactylus knudseni* in the Central Amazon rainforest. *J. Herpetol.* **24**: 227-228.
- Heyer, W.R., McDiarmid, R.W., Weigmann, D.L. (1975): Tadpoles, predation, and pond habitats in the tropics. *Biotropica* **7**: 100-111.
- Heyer, W.R., Heyer, M.M., de Sá, R.O. (2008): *Leptodactylus cunicularius* Sazima and *Bokermann Rabbit-burrow Frog*. *Cat. Am. Amp. Rep.* **845**: 1-5.
- Muedeking, M.H., Heyer, W.R. (1976): Descriptions of eggs and reproductive patterns of *Leptodactylus pentadactylus* (Amphibia: Leptodactylidae). *Herpetologica* **32**: 137-139.
- Polis, G.A., Myers, C.A. (1985): A survey of intraspecific predation among reptiles and amphibians. *J. Herpetol.* **19**: 99-107.
- Sazima, I., Bokermann, W.C.A. (1978): Cinco novas espécies de *Leptodactylus* do Centro e Sudeste Brasileiro (Amphibia, Anura, Leptodactylidae). *Rev. Brasil. Biol.* **38**: 899-912.
- Silva, W.R., Giaretta, A.A. & Facure, K.G. (2005): On the natural history of the South American pepper frog, *Leptodactylus labyrinthicus* (Spix, 1824) (Anura: Leptodactylidae). *J. Nat. Hist.* **39**: 555-566.