Trachycephalus typhonius (Hylidae, Lophiohylini): Necrophilia and brief comments on amplectant behavior

Dagmar Lilian de Moura[1,*], Daniel Loebmann[1]

[1] *Universidade Federal do Rio Grande (FURG), Instituto de Ciências Biológicas, Laboratório de Vertebrados Ectotérmicos. Avenida Itália, km 8, Carreiros, CEP 96203-900, Rio Grande, RS, Brazil.*
[*] *Corresponding author: contato@danielloebmann.com*

As currently recognized the tribe Lophiohylini Miranda-Ribeiro, 1926 is composed of nine genera and 65 species (Frost, 2014). Among species of this tribe the Veined Treefrog *Trachycephalus typhonius* (Linnaeus, 1758) is widely distributed, occurring from southern Mexico to northern Argentina (La Marca *et al.,* 2010). The species is a typically explosive breeder, and it is common to observe many individuals aggregating at breeding sites after heavy rains (Prado *et al.,* 2005; Rodrigues *et al.,* 2005; Loebmann, 2013). Males and females can be found in lentic water bodies where they mate and lay eggs. Their exotrophic tadpoles develop at the same site (Haddad and Prado, 2005; Prado *et al.,* 2005, Vieira *et al.,* 2009).

Necrophilia, also known as Davian behavior or necrogamy, has been reported frequently for anurans in the recent years, generally during explosive reproductive events, when one or more males drowns a female accidentally during mating (e.g., Bettaso *et al.,* 2008; Sinovas, 2009; Brito *et al.,* 2012; Izzo *et al.,* 2012).

The amplexus, i.e. the behavior of males embracing females during mating, varies considerably among species both morphologically and phylogenetically (see review in Duellman &

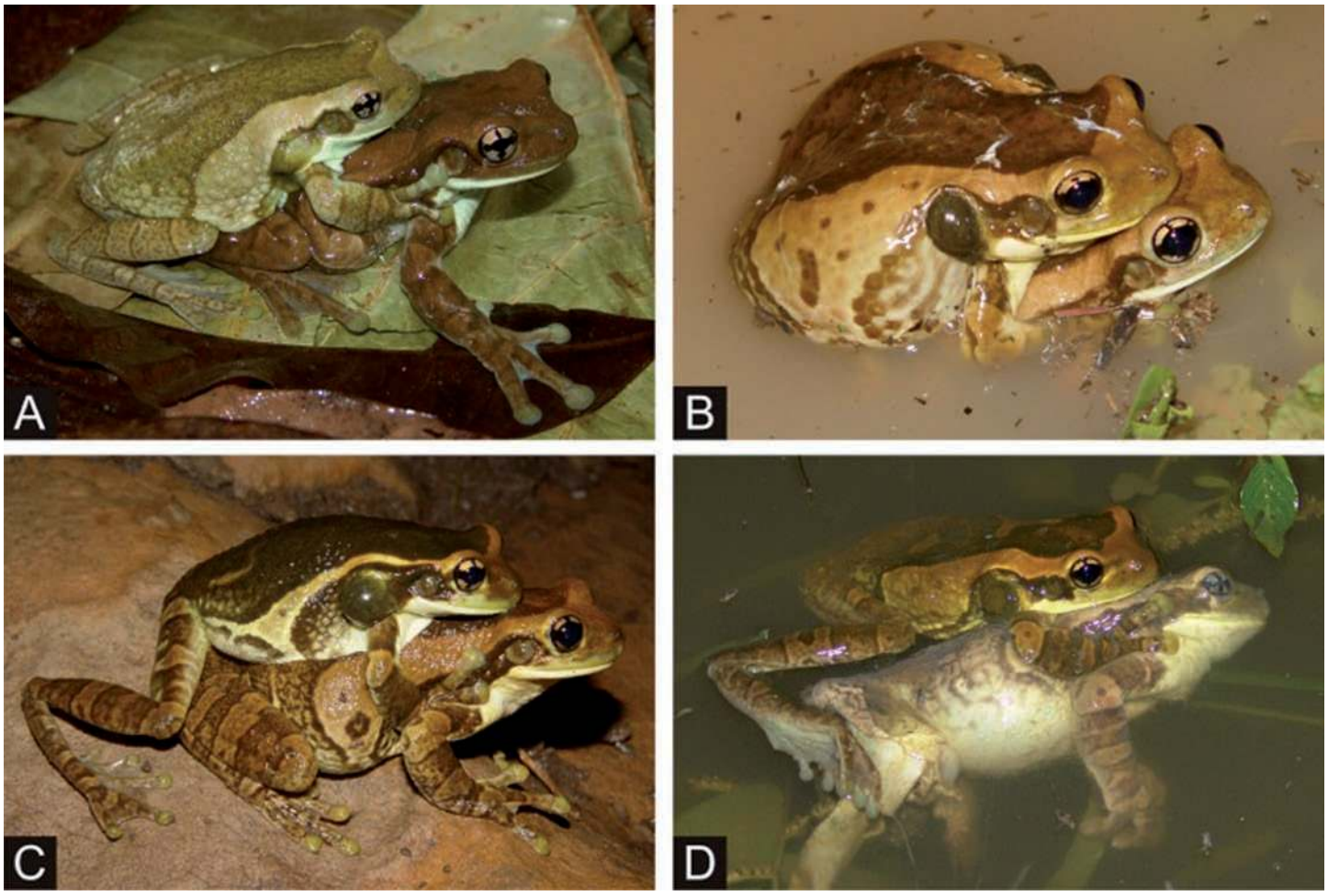


Figure 1. A-C) Three amplected pairs of *Trachycephalus typhonius.* **In all situations, note males in axillary amplexus with two fingers on the forelimbs. D) A male of** *T. typhonius* **amplected with a dead female, characterizing a case of necrophilia. All observations were conducted at the municipality of Ubajara, state of Ceará, northeastern Brazil.**

Trueb, 1994). Axillary amplexus is clearly the most common mating position in anurans (Haddad *et al.,* 2013). Therefore, it is reasonable to expect variation of this behavior among distinct lineages. Herein, we report a case of necrophilia in *T. typhonius,* after an event of explosive reproduction in the Caatinga domain in Brazil. Additionally, we provide brief comments on axillary amplexus behavior.

On 22 January 2008 at 22:00 h, one of us (D. Loebmann) observed a multi-species explosive breeding event in a temporary pond in Ubajara, state of Ceará, northeastern Brazil (03º51'08.2"S; 40º56'16.7"W; 845 m above sea level; DATUM= WGS84). Besides *T. typhonius,* five other species were breeding simultaneously: *Leptodactylus macrosternum, Dendropsophus soaresi, Physalaemus cuvieri, Rhinella granulosa,* and *Dendropsophus minutus*.

Among mating individuals of *T. typhonius* it was possible to observe that all males used axillary amplexus. The individuals observed (n = 5) positioned only two fingers in the axillary region and the other two on the forelimbs (Figure 1A-C). Similar behavior was previously observed in other genera, such as *Litoria* (Hylidae), *Chiromantis* (Rhacophoridae), and *Pristimantis* (Craugastoridae) (Duellman and Trueb, 1994). Although no phylogenetic pattern is associated with this behavior, all cases correspond to taxa with expanded digital discs on the fingers, suggesting that this behavior may be related to this morphological constraint.

On the same night, a male *T. typhonius* was found amplexing a dead female (Figure 1D), characterizing a Davian behavior. The female was already presenting some degree of putrefaction, suggesting that its death occurred on the previous night.

To our knowledge, this is the first report of necrophilia for a species of Lophiohylini. Necrophilia has been considered a behavioral mistake (Costa *et al.,* 2010). However, Davian behavior may be surprisingly functional in anurans (Izzo *et al.,* 2012), since most species have external fertilization. Unfortunately, we are unable to confirm that the male of *T. typhonius* that embraced the dead female had successfully fertilized her oocytes. This report contributes to the knowledge on the reproductive behavior of *T. typhonius*.

REFERENCES

Bettaso, J., A. Haggarty and E. Russel. 2008. *Rana boylii* (Foothill Yellow-legged Frog). Necrogamy. Herpetological Review, 39: 462.

Brito, L.B.M., I. R. Joventino, S. C. Ribeiro and P. Gascon. 2012. Necrophiliac behavior in the "cururu" toad, *Rhinella jimi* Steuvax, 2002, (Anura, Bufonidae) from Northeastern Brazil. North-Western Journal of Zoology, 8: 365-366.

Costa, H.C., E. T. Silva, P. S. Campos, M. P. C. Oliveira, A. V. Nunes and P. S. Santos. 2010. The Corpse Bride: a case of Davian Behavior in the Green Ameiva (*Ameiva ameiva*) in southeastern Brazil. Herpetology Notes, 3: 79-83.

Duellman, W.E. and L. Trueb. 1994. Biology of Amphibians. The Johns Hopkins University Press. Baltimore.

Frost, D. R. 2014. Amphibian Species of the World: an Online Reference, v. 6.0. July 05, 2014, http://research.amnh.org/herpetology/amphibia/index.html.

Haddad, C.F.B. and C. P. A. Prado. 2005. Reproductive modes in frogs and their unexpected diversity in the Atlantic forest of Brazil. Bioscience, 55: 207-217.

Haddad, C.F.B., L. F. Toledo, C. A. P. Prado, D. Loebmann, J. L. Gasparini and I. Sazima. 2013. Guia dos Anfíbios da Mata Atlântica: Diversidade e Biologia / Guide to the Amphibians of the Atlantic Forest: Diversity and Biology. Anolis Books. São Paulo.

Izzo, T.J., D. J. Rodrigues, M. Menin, A. P. Lima and W. E. Magnusson. 2012. Functional necrophilia: a profitable anuran reproductive strategy? Journal of Natural History, 46: 2961–2967.

La Marca, E., C. Azevedo-Ramos, N. Scott, L. Aquino, D. Silvano, L. A. Coloma, S. Ron, J. Faivovich, G. Santos-Barrera, F. Solís, R. Ibáñez, F. Bolaños, L. D. Wilson and J. Hardy. 2010. *Trachycephalus venulosus*. IUCN Red List of Threatened Species. International Union for the Conservation of Nature. June, 29th, 2014. www.iucnredlist.org/details/55824/0.

Loebmann, D. 2013. A record of *Trachycephalus typhonius* (Linnaeus, 1758) preying upon *Dendropsophus soaresi* (Caramaschi and Jim, 1983) (Anura, Hylidae). Herpetology Notes, 6: 275-276.

Prado, C.P.A., M. Uetanabaro and C. F. B. Haddad. 2005. Breeding activity patterns, reproductive modes, and habitat use by anurans (Amphibia) in a seasonal environment in the Pantanal, Brazil. Amphibia-Reptilia, 26: 211-221.

Rodrigues, D.J., M. Uetanabaro and F. S. Lopes. 2005. Reproductive patterns of *Trachycephalus venulosus* (Laurenti, 1768) and *Scinax fuscovarius* (Lutz, 1925) from the Cerrado, Central Brazil. Journal of Natural History, 39: 3217–3226.

Sinovas, P. 2009. *Bombina variegata* (Yellow Fire-bellied Toad). Mating behavior. Herpetological Review, 40: 199.

Vieira, W.L.S., G. G. Santana and C. Arzabe. 2009. Diversity of reproductive modes in anurans communities in the Caatinga (dryland) of northeastern Brazil. Biodiversity and Conservation, 18: 55-66.



Micrurus surinamensis, Porto Velho, RO. Foto: Diego Meneghelli.