

Dendropsophus branneri (Cochran, 1948) (Anura: Hylidae) as prey to invertebrates in northeastern Brazil

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Dendropsophus branneri (Cochran, 1948) is a small hylid frog with males reaching 19 mm in snout-vent length; Lutz, 1973) widely distributed along the Brazilian coast from the states of Maranhão to Rio de Janeiro (Frost, 2013). As in most species of frogs, *D. branneri* aggregate in temporary and permanent ponds in open areas during the breeding season (Lutz, 1973), and thus become potential prey for several animal taxa (Wells, 2007). Anurans have been reported as prey to several invertebrates, particularly giant aquatic bugs and spiders (Menin, Rodrigues and Azevedo, 2005; Toledo, 2005), and vertebrates such as snakes, birds, and even other frogs (Santos, 2009; Heitor et al., 2012). Although predation events are not frequently seen in the field, such observations provide important information for the understanding of predator-prey relationships (Toledo, Ribeiro and Haddad, 2007; Wells, 2007), and of the role of predation on community structure (Glasser, 1979). Moreover, such field observations provide relevant data on feeding habits of invertebrates (Toledo, 2005). Herein, we report two predation events on *D. branneri* by aquatic invertebrates.

During field surveys at Escola Agrícola de Jundiá, Macaíba, Rio Grande do Norte, Brazil (5.8852°S, 35.3669°W; Datum WGS-84, 11 m above sea level), we observed two predation events on *Dendropsophus branneri*. During the first event, we found a fishing spider

(*Thaumasia* sp.; Pisauridae) preying upon an adult of *D. branneri* (SVL 14.8 mm). When first spotted, the spider was standing on a leaf of aquatic plant near the pond margin, holding the frog with its chelicerae (Fig. 1A). The spider remained still for about 10 minutes. We did not observe any escape attempt by the frog, suggesting that it was already dead. When collected, the spider still held the frog, but released it within a few minutes after being placed inside a plastic bag. Moreover, no attempt to consume the frog was observed after that. This event occurred on 24 May 2013 at approximately 8:35 pm. The anuran specimen was collected and deposited at Coleção do Laboratório de Anfíbios e Répteis da UFRN (CLAR-UFRN, AAGARDA 9377). The spider was photographed during the predation event for identification and released.

The second predation event occurred during a tadpole survey. A giant water bug (*Belostoma* sp.; Belostomatidae) was observed preying upon a metamorphic *D. branneri* on pond's surface, holding the frog with its anterior limbs (Fig. 1B). When captured, the bug tried to escape back to the pond without releasing the prey. The frog was mostly digested, as only the head and a small portion of the body remained. The water bug was photographed for identification and released. This event occurred on 19 September 2013 at approximately 9:00 pm. The anuran specimens were assigned to *D. branneri* based on the presence of white blotches below the eyes (Lutz, 1973). Such feature is not observed in any other *Dendropsophus* species that occurs in sympatry with *D. branneri* (Magalhães et al., 2013).

Dendropsophus branneri is one of the most abundant species within the studied site and is frequently observed calling on aquatic vegetation near the water surface during the breeding season (May to September). Additionally, this species usually lays its eggs on water surface. Such reproductive behavior and site preference

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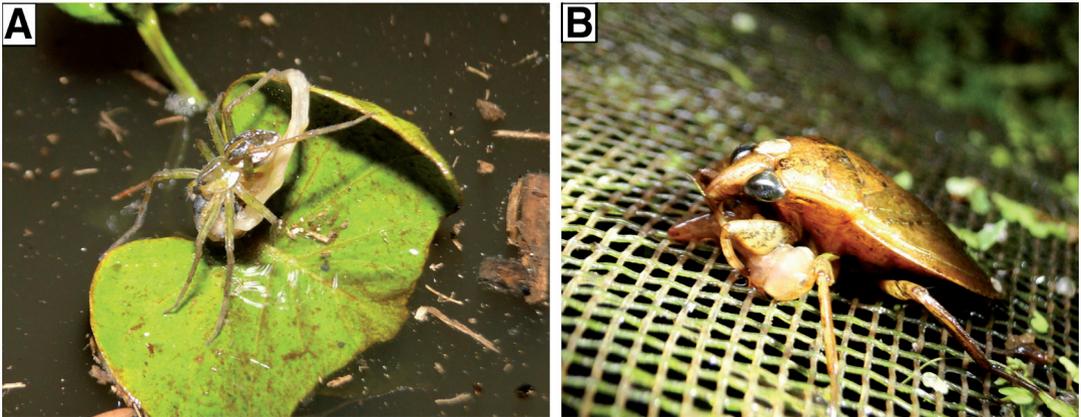


Figure 1. Predation events upon *Dendropsophus branneri*: (A) fishing spider (*Thaumasia* sp.) preying on an adult individual; and (B) giant water bug (*Belostoma* sp.) preying on a metamorphic individual, at Escola Agrícola de Jundiá, Macaíba municipality, Rio Grande do Norte State, Brazil. Photos by F. M. Magalhães.

likely exposes individuals to both terrestrial and aquatic predators (Toledo, 2005). Likewise, the metamorphic stage is a critical life cycle period, since froglets are leaving the water and become susceptible to both terrestrial and aquatic predators. Because individuals are moving between terrestrial and aquatic environments, predation risk upon anuran species is greatest during these two periods of their life cycle and a greater variety of predators are able to prey upon them (Toledo, 2005). This hypothesis is reinforced by our observations and by other predation events by fishing spiders and water bugs upon several adults of *Dendropsophus* species reported during their breeding activity (*D. elegans* in Santana, Silva and Oliveira, 2009; *D. wernerii* in Oliveira *et al.*, 2010; *D. melanargyreus* in Moura and Azevedo, 2011; *D. soaresi* in Santos-Silva and Ferrari, 2012) and froglet individuals (*D. branneri* and *D. minutus*; Santos, 2009). Other smaller species that co-occur with *D. branneri*, such as *D. minutus*, *D. nanus*, *D. oliveirai*, and *D. soaresi* share the same reproductive behavior and may also be potential prey for such invertebrates that are associated with aquatic habitats. Moreover, *Dendropsophus* species are usually equal or smaller in size compared to their predators (Menin, Rodrigues and Azevedo, 2005; Oliveira *et al.*, 2010), which may be related to the energetic cost of predation (Toledo, Ribeiro and Haddad, 2007); our findings also corroborates this tendency.

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References

- Frost, D. R. (2013): Amphibian Species of the World: an Online Reference. Version 5.6 (20 November 2013). Electronic Database accessible at <http://research.amnh.org/herpetology/amphibia/index.html>. American Museum of Natural History, New York, USA.
- Glasser, J.W. (1979): The role of predation in shaping and maintaining the structure of communities. *The American Naturalist* **113**: 631–641.
- Heitor, R.C., Lacerda, J.V.A., Silva, E.T., Peixoto, M.A., Eloi, R.G. (2012): Predation of *Hypsiboas pardalis* (Anura, Hylidae) by the butter frog *Leptodactylus cf. latrans* (Anura, Leptodactylidae), in municipality of Espera Feliz, State of Minas Gerais, southeastern Brazil. *Herpetology Notes* **5**: 23–25.
- Lutz, B. (1973): Brazilian species of *Hyla*. University of Texas Press.
- Magalhães, F.M., Dantas, A.K.B.P., Brito, M.R.M., Medeiros, P.H.S., Oliveira, A.F., Pereira, T.C.S.O., Queiroz, M.H.C., Santana, D.J., Silva, W.P., Garda, A.A. (2013): Anurans from an Atlantic Forest-Caatinga ecotone in Rio Grande do Norte State, Brazil. *Herpetology Notes* **6**: 1–10.
- Menin, M., Rodrigues, D.J., Azevedo, C.S. (2005): Predation on amphibians by spiders (Arachnida, Araneae) in the neotropical region. *Phyllomedusa* **4**: 39–47.
- Moura, M.R., Azevedo, L.P. (2011): Observation of predation of the giant fishing spider *Ancylometes rufus* (Walckenaer, 1837) (Araneae, Ctenidae) on *Dendropsophus melanargyreus* Cope, 1877 (Anura, Hylidae). *Biota Neotropica* **11**: 349–352.
- Oliveira, I.S., Oliveira, A.K.C., Cestari, M.M., Toledo, L.F. (2010): Predation on *Dendropsophus wernerii* (Anura: Hylidae) by a lycosid in the Atlantic Forest, southern Brazil. *Herpetology Notes* **3**: 299–300.
- Santana, D.J., Silva, E.T., Oliveira, E.F. (2009): Predação de *Dendropsophus elegans* (Anura, Hylidae) por *Phoneutria nigriventer* (Araneae, Ctenidae) em Viçosa, Minas Gerais, Brasil. *Boletim do Museu de Biologia Mello Leitão* **26**: 59–65.

- Santos, E.M. (2009): Notas sobre predação de anuros em uma poça temporária no nordeste do Brasil. Boletim do Museu de Biologia Mello Leitão **25**: 77–82.
- Santos-Silva, C.R., Ferrari, S.F. (2012): Predation on *Dendropsophus soaresi* (Anura: Hylidae) by a diving beetle (Coleoptera: Dytiscidae) in Raso da Catarina, north-eastern Brazil. Herpetology Notes **5**: 11–12.
- Toledo, L.F. (2005): Predation of juvenile and adult anurans by invertebrates: current knowledge and perspectives. Herpetological Review **36**: 395–400.
- Toledo, L.F., Ribeiro, R.S., Haddad, C.F.B. (2007): Anurans as prey: an exploratory analysis and size relationships between predators and their prey. Journal of Zoology **271**: 170–177.
- Wells, K.D. (2007): The Ecology and Behavior of Amphibians, 1st Edition. University of Chicago Press.