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First report on predation of adult anurans by Odonata larvae

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Analyses of feeding habits and strategies for resource exploitation are of great relevance for understanding species' natural history, community food web interaction, and energy flows through ecosystems (Falico et al. 2012). Field observations and quantifications of predatory events are difficult to accomplish and, despite their importance, studies about predation on amphibian communities are scarce and anecdotal (Pombal Jr. 2007). The eggs, larvae and adult amphibians, are commonly preyed upon by various predators, being important components of the diets of a wide variety of organisms, such as other amphibians, fish, reptiles, birds, mammals, a wide array of invertebrates and even a carnivorous plant (Duellman & Trueb 1994, Pough et al. 2004, Toledo et al. 2007). Predation of adult anurans by invertebrates is still insufficiently documented, because predatory events are by nature difficult to observe, in contrast to studies on vertebrates, where researchers can retrieve dietary information through gut content analysis (Pombal Jr. 2007). In a review concerning the current knowledge and perspectives about predation of juvenile and adult anurans by invertebrates, Toledo (2005) found 13 orders of invertebrates acting as predators of adult anurans, in which Odonata was not included. Although it is known that Odonata larvae and numerous other aquatic insects commonly predate upon anuran tadpoles (e.g., Caldwell et al. 1981, Sherratt & Harvey 1989, Duellman & Trueb 1994, Santos 2006, Fulan & Almeida 2010), there are no records in the literature, to our knowledge, of adult anurans becoming the prey of Odonata larvae. The opposite scenario has already been recorded though, with different adult anuran species predating upon Odonata larvae (e.g., Santos et al. 2004, Sabagh et al. 2012) and adult Odonata (e.g., Solé et al. 2009).

On 09 October 2009 at 20:25 h, we recorded three Odonata larvae of the genus *Anax* (family Aeshnidae) attacking and consuming two adult males of *Scinax rogerioi* Pugliesi, Baêta & Pombal, 2009 (Fig. 1) and an adult male of *Dendropsophus minutus* (Peters, 1872) (Fig. 2), respectively, at a permanent lake in an open disturbed area (Fig. 3) in the Municipality of Itabirito, Minas Gerais state, southeastern Brazil (20°15'21" S, 43°54'43" W, 1,319 m a.s.l.). The Odonata larvae were observed scaling submerse vegetation and then leaping out of the water to seize the anurans with their labium. They then began consuming the treefrogs alive, outside the water, while these unsuccessfully tried to escape. This predatory behaviour is referred to as "climber" behaviour, which consists of moving amongst aquatic vegetation, using their large compound eyes to detect prey at a distance, subsequently approaching it, and catching their prey by rapidly protracting their labium (Pritchard 1965). The whole process continued for about fifteen to twenty minutes and was photographed and recorded on video. We also discovered more than fifteen dead specimens on the bottom of the lake (see Fig. 2), all of which appeared to have been killed by the same kind of predator, since they presented similar lacerations on their bodies. Another 12 species of anurans were found in the same lake: *Hypsiboas albopunctatus* (Spix, 1824), *H. faber* (Wied-Neuwied, 1821), *Scinax fuscovarius* (A. Lutz, 1925), *S. maracaya* (Cardoso & Sazima, 1980), *S. squalirostris* (A. Lutz, 1925), *Physalaemus cuvieri* Fitzinger, 1826, *Pseudopaludicola serrana* Toledo, 2010, *Leptodactylus furnarius* Sazima & Bokermann, 1978, *L. jolyi* Sazima & Bokermann, 1978, *L. labyrinthicus* (Spix, 1824), *L. latrans* (Steffen, 1815), and *Elachistocleis cesarii* (Miranda-Ribeiro, 1920). Two

anurans killed by Odonata larvae (one *S. rogerioi;* SVL: 33 mm, and one *D. minutus*; SVL: 26 mm) were collected (permit 579/2009 NUFAS/MG) and deposited in the herpetological collection of the Museu de Ciências Naturais da Pontifícia Universidade Católica de Minas Gerais (*D. minutus* MCNAM 17.838, *S. rogerioi* MCNAM 17.839), and their Odonata larvae predators (SVL: 50 and 52 mm, respectively) were deposited in the Laboratório de Invertebrados do Museu de Ciências Naturais da PUC Minas (MCN-AQUA 120–121) in Belo Horizonte, Minas Gerais state, Brazil.

The observation described above represents the first published record of adult anurans being predated upon by Odonata larvae and highlights that there is still much to learn about amphibian/insect ecological interactions.

Figure 1. *Anax* sp. predating upon *Scinax rogerioi*. Photo: A. M. Linares.

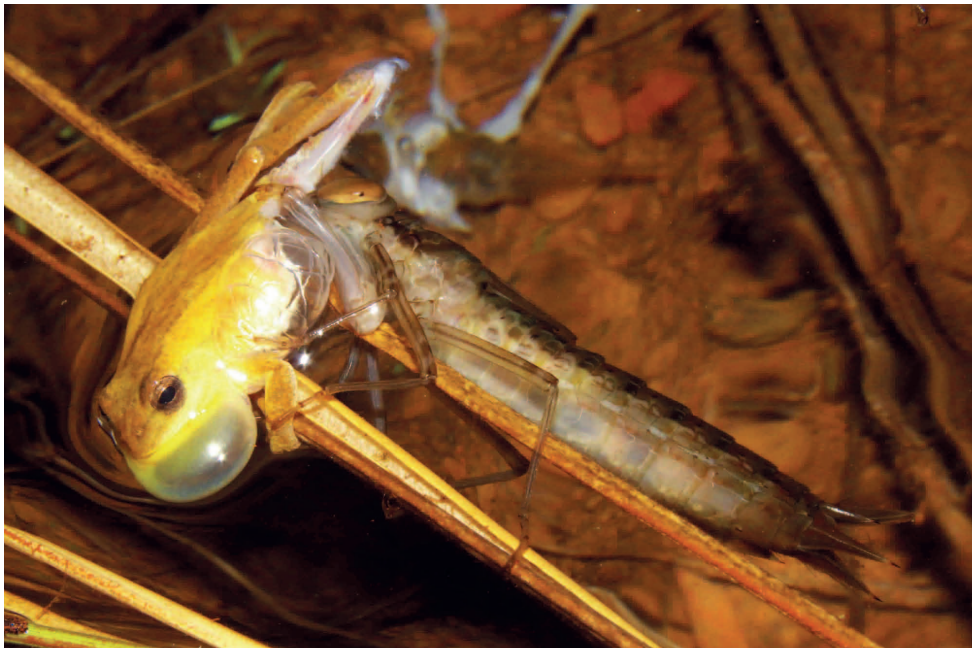

Figure 2. *Anax* sp. predating upon *Dendropsophus minutus*. Photo: A. M. Linares.

Figure 3. Study area in the Itabirito municipality. Photo: A. M. Linares.

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References

Caldwell, J. P., J. H. Thorp & T. O. Jervey (1981): Predator-prey relationships among larval dragonflies, salamanders, and anurans. – Oecologia, **46**: 285–289.

Duellman, W. E. & L. Trueb (1994): Biology of Amphibians. – Baltimore and London, The Johns Hopkins University Press, 670 p.

Falico, D. A., J. A. López & C. E. Antoniazzi (2012): Opportunistic predation upon dragonflies by *Pseudis limellum* and *Pseudis paradoxa* (Anura: Hylidae) in the Gran Chaco region, Argentina. – Herpetology Notes, **5**: 215–217.

Fulan, J. A. & S. C. Almeida (2010): Effect of the spacial heterogeneity on the predation of *Scinax fuscovarius* and *Physalaemus cuvieri* tadpoles by Odonata larvae. – Acta Scientiarum, Biological Sciences, **32**: 121–124.

Pombal Jr, J. P. (2007): Notas sobre predação em uma taxocenose de anfíbios anuros no sudeste do Brasil. – Revista Brasileira de Zoologia, **24**: 841–843.

Pough, F. H., R. M. Andrews, J. E. Cadle, M. L. Crump, A. H. Savitzky & K. D. Wells (2004): Herpetology 3rd ed. – Upper Saddle River, NJ, Pearson Prentice Hall, 726 p.

Pritchard, G. (1965): Prey capture by dragonfly larvae (Odonata; Anisoptera). – Canadian Journal of Zoology, **43**: 271–289.

Sabagh, L. T., A. M. P. T. Carvalho-e-Silva & C. F. D. Rocha (2012): Diet of the toad *Rhinella icterica* (Anura: Bufonidae) from Atlantic Forest Highlands of southeastern Brazil. – Biota Neotropica, **12**: 258–262.

Santos, E. M. (2006): Notas sobre predação de anuros em uma poça temporária no nordeste do Brasil. – Boletim Museu Biologia Mello Leitão (Nova Série), **25**: 77–82.

Santos, E. M., A. V. Almeida & S. D. Vasconcelos (2004): Feeding habits of six anuran (Amphibia: Anura) species in a rainforest fragment in Northeastern Brazil. – Iheringia, Série Zoologia, Porto Alegre, **94**: 433–438.

Sherratt, T. N. & I. F. Harvey (1989): Predation by larvae of *Pantala flavescens* (Odonata) on tadpoles of *Phyllomedusa trinitatis* and *Physalaemus pustulosus*: the influence of absolute and relative density of prey on predator choice. – Oikos, **56**: 170–176.

Solé, M., I. R. Dias, E. A. S. Rodrigues, E. Marciano-Jr, S. M. J. Branco, K. P. Cavalcante & D. Rödder (2009): Diet of *Leptodactylus ocellatus* (Anura: Leptodactylidae) from a cacao plantation in southern Bahia, Brazil. – Herpetology Notes, **2**: 9–15.

Toledo, L. F. (2005): Predation of Juvenile and Adult Anurans by Invertebrates: Current Knowledge and Perspectives. – Herpetological Review **36**: 395–400.

Toledo, L. F., R. S. Ribeiro & C. F. B. Haddad (2007): Anurans as prey: an exploratory analysis and size relationships between predators and their prey. – Journal of Zoology **271**: 170–177.