



Scientific Note

Predation on *Eupemphix nattereri* Steindachner, 1863 (Anura, Leiuperidae) by giant water bugs, *Lethocerus delpontei* De Carlo, 1930 and *L. annulipes* (Herrich-Schäffer, 1845) (Hemiptera, Belostomatidae)

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Abstract. Here we report two cases of predation on *Eupemphix nattereri* by *Lethocerus delpontei* and *L. annulipes* in farm ponds.

Key words: adult males, aquatic insect, amphibians, preys

Resumo. Predação de *Eupemphix nattereri* Steindachner, 1863 (Anura, Leiuperidae) por *Lethocerus delpontei* De Carlo, 1930 e *L. annulipes* (Herrich-Schäffer, 1845) (Heteroptera, Belostomatidae). Registramos dois casos de predação de *Eupemphix nattereri* por *Lethocerus delpontei* e *L. annulipes* em poças de paisagens agrícolas.

Palavras chave: machos adultos, inseto aquático, anfíbios, presas

Eupemphix nattereri is a medium to large-sized frog (29.8 to 50.6 mm; Nascimento *et al.* 2005), widely distributed in central and southeastern Brazil, Argentina, Paraguay, and Bolivia (Nascimento *et al.* 2005, Frost 2013). One of the most conspicuous features of this species is a pair of large inguinal glands with dark eyespots, bordered by a white thin outline (Vizotto 1964, Lynch 1970, Sazima & Caramaschi 1986, Nascimento *et al.* 2005), resembling two large black eyes (Bezerra 1998, Rodrigues & Oliveira Filho 2004, Lenzi-Mattos *et al.* 2005). Males form choruses in temporary ponds or flooded areas during the breeding season, in which they vocalize and swim on the water surface in search for females. They usually deposit egg masses on the margins of water bodies (Rodrigues *et al.* 2004).

Amphibians are common preys for a wide

variety of vertebrates (Toledo *et al.* 2007), invertebrates (Toledo 2005), and even carnivorous plants (Duellman & Trueb 1994). Among the most important invertebrate predators are giant water bugs from the family Belostomatidae (Heteroptera). Those aquatic insects are medium to large size predators and occur in many tropical and temperate habitats (Lauck & Menke 1961). There are several reported cases of predation by giant water bugs on adult frogs (Bastos *et al.* 1994, Oda *et al.* 2006, Nenda *et al.* 2008, Figueiredo-de-Andrade *et al.* 2010, Pereira *et al.* 2011, Zaracho 2012), and the knowledge of new cases may help understanding predator-prey relationships between them (Toledo 2005). Here, we report two cases of predation on *Eupemphix nattereri* by the giant water bugs, *Lethocerus delpontei* and *L. annulipes*.

The first predation recorded in the

surroundings of Jataí, state of Goiás (17°37'18"S; 51°42'05"W), which is covered by typical Cerrado vegetation. We observed an adult male *Lethocerus delpontei* preying on an adult male *E. nattereri* (SVL = 40.09 mm) on 19 December 2011 at 10:31 pm (Figure 1). The interaction occurred in the middle of an open-canopy temporary pool (22 cm deep), about 100 m far from a soybean plantation. The insect remained partially submerged for 3 min and grabbed the frog by the inguinal region (Figure 1). Both frog and insect are housed at the Zoological Collection of

the Federal University of Goiás (ZUFG). Additionally, males of eight species vocalized in the pool: *Dendropsophus minutus*, *Scinax fuscovarius*, *E. nattereri*, *Physalaemus cuvieri*, *P. marmoratus*, *Leptodactylus fuscus*, *Elachistocleis cesarii*, and *Chiasmocleis albopunctata*. Air and water temperature at the time of observation was 34.04° C and 28.4° C respectively. We observed two carcasses of *E. nattereri* the day after in the same pool, suggesting that predation on this species seems to be common.



Figure 1. Predation on *Eupemphix nattereri* by *Lethocerus delpontei* in a temporary pool in Jataí, state of Goiás, Brazil. Photo: Vinicius G. Batista.

The second event was recorded in the rural area of Diamante do Norte, state of Paraná (22°36'41"S; 52°53'55"W), in the surroundings of the Caiuá Ecological Station, an area with seasonal semideciduous Atlantic forest. We observed an adult female *Lethocerus annulipes* preying on an adult male of *E. nattereri* on 3 October 2012 at 11 pm (Figure 2), in a permanent pool at the edge of a sugar cane plantation. The insect had stuck the frog on the belly. The insect remained submerged supported by the bottom vegetation for 5 min (Figure 2). When we tried to capture the insect, it released the frog and dove away. Then, the agonizing frog swam to the margin of the water body, where it took shelter in the vegetation. Males of six species vocalized in the pool: *Rhinella schneideri*, *D. minutus*, *S. fuscovarius*, *E. nattereri*,

P. cuvieri, *Pseudis* sp. (aff. *platensis*), and *Elachistocleis bicolor*.

McCormick & Polis (1982) pointed out the lack of quantitative data evaluating the impact of arthropod predators upon vertebrates. This is particularly true for predation by invertebrates upon post-metamorphic anurans. Predation is one of the principal causes of mortality in natural populations of anurans, and may occur throughout their ontogenetic cycle (Wells 2007). There are two crucial periods of the anuran life cycles in which almost 90% of the predation observations were recorded (Toledo 2005): during the breeding season (e.g., Santos-Silva *et al.* 2012) and when the newly-metamorphosed frogs are leaving the water (e.g., Robertson 1989, Clerke & Williamson 1992, Hirai & Hidaka 2002, Toledo 2003).



Figure 2. Predation on *Eupemphix nattereri* by *Lethocerus annulipes* in a permanent pool at Diamante do Norte, state of Paraná, Brazil. Photo: Fabrício H. Oda.

Our observations took place in a large chorus of *E. nattereri*. This fact reinforces the idea that anurans are more vulnerable to predation during the breeding season (e.g., Bastos *et al.* 1994, Oliveira & Pombal 1994, Haddad & Bastos 1997, Toledo 2003, Santos-Silva & Ferrari 2012). It is often difficult to obtain data on diets of invertebrates, differently from vertebrates, in which the analysis of stomachal contents is straightforward. Thus, predation on anurans by invertebrates may be even more common than recorded in the literature (Pombal Jr. 2007).

Amphibians are preyed upon by invertebrates, independent of prey body size and age (McCormick & Polis 1982). Hirai & Hidaka (2002) found that water bugs (*Lethocerus deyrollei*) might have difficulty in handling large frogs. Therefore, we suggest that small and medium frogs calling on the water surface and other abundant species (e.g., *Scinax fuscovarius*, *Eupemphix nattereri*, *Physalaemus cuvieri*, *Elachistocleis* spp.), may be potential prey for giant water bugs. Predation has been thought to be one of the main mechanisms regulating species richness and composition (e.g., Heyer *et al.* 1975, Sih 1984, Kopp *et al.* 2006). Giant water bugs may have a role in controlling

amphibian populations during the breeding season (Hirai & Hidaka 2002) and also regulating community structure (Duellman & Trueb 1994).

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