

Predation of *Rhinella ornata* (Anura: Bufonidae) by the water snake *Erythrolamprus miliaris* (Squamata: Dipsadidae) in São Paulo, Brazil

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Snakes are carnivorous animals that feed on a wide variety of prey (Toft, 1985). Anurans are among the main food items of the Atlantic Forest snakes (Hartmann et al., 2009). However, many amphibians have a large defensive repertoire against their predators including mechanical defensive mechanisms (e.g. puffing up the body, thanatosis, spine aggression) as well as chemical defence mechanisms (e.g. secretions) (Toledo et al., 2011; Wells, 2007).

Frogs of the genus *Rhinella* Fitzinger, 1826 have parotoid glands, which produce toxins, and are used both as a defensive mechanism against predators and as defence against microorganisms (Tempone et al., 2008; Jared et al., 2009). The toxins secreted by such glands can be lethal when a particular predator ingested these frog species (Barbosa et al., 2009). However, some species of snakes seems to be immune to these toxins, and can feed on these toads (Toledo et al., 2007; Oliveira et al., 2017). Herein, we report the first record of predation of *Rhinella ornata* (Spix, 1824) by the water snake *Erythrolamprus miliaris* (Linnaeus, 1758).

We observed the predation record at 20:30h on October 26, 2017, at district of São Francisco Xavier, municipality of São José dos Campos, state of São Paulo. The predation event occurred at a pond margin where several *Rhinella ornata* were calling (-23.0925°S, -46.0708°W, WGS-84). During the herein reported

observation, other anuran species was calling in the same pond (*Boana faber*, *Physalaemus olfersii*, *Scinax crospedospilus*, *Rhinella icterica*). At the start of the observation, the predation had already occurred and the snake was ingesting the toad head-first (Figure 1a).

The *Rhinella ornata* was motionless and had its lungs inflated in an effort to avoid its ingestion by the snake (*sensu* Toledo et al., 2011), which occurred over about 3 minutes. The behaviour of remaining motionless (immobility) is a primary defensive that allows the anuran to pass unnoticed by the predator (Toledo et al., 2011). Moreover, it is a mechanism that can prevent possible injuries if swallowed (Sazima, 1974). The toxicity of the parotoid glands present in bufonids can provide an advantage over the predator; once the snake detects the presence of the poison it may choose not to swallow its prey (Sazima, 1974). Another defensive mechanism among anurans, especially in true toads (Bufonidae) consists of puffing up the body and assume positions that exhibit the parotoid glands in the presence of a predator (Toledo and Jared, 1995). Although the toxin glands of *R. ornata* are not big (Almeida et al., 2010), and may have little effect on the predator in question, this is the first record of the snake *E. miliaris* feeding on a toad of the genus *Rhinella* (Toledo et al., 2007).

Although these predation events are poorly documented (Pombal Jr., 2007), we believe that this prey-predator relationship is common, since both species use the same habitats (Sazima and Haddad, 1992). Recently, Oliveira et al. (2017) presented a list of predators of the genus *Rhinella*. For *R. ornata* listed predators include other amphibians (Bovo et al., 2014), crustaceans (Banci et al., 2013; Segadilha and Silva-Soares, 2015), fishes (Toledo et al., 2007) and spiders (Almeida et al., 2010), however, this is the first record of *Erythrolamprus miliaris* preying on this species.

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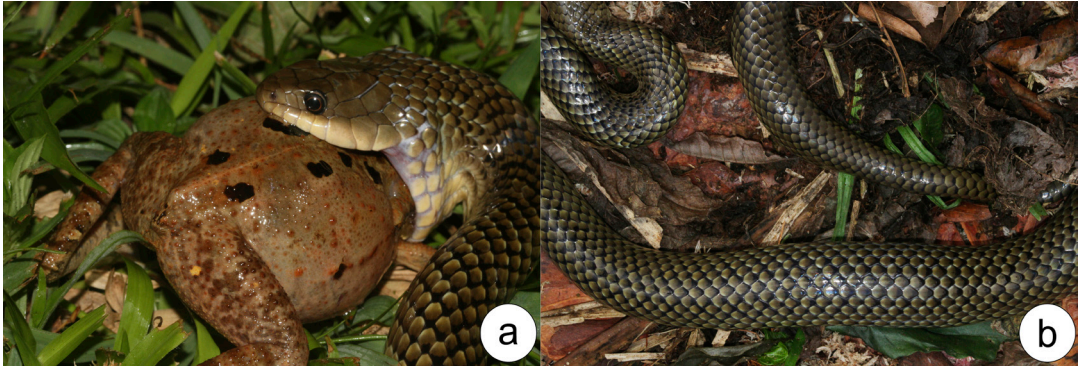


Figure 1. Predation event of *Erythrolamprus miliaris* on *Rhinella ornata*, which was ingested head-first (2) over a period of about 3 minutes (b). The predation event occurred at a pond edge in São Francisco Xavier, São Paulo, on October 26 2017, where several toads of *Rhinella ornata* were calling.

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