ENYALIUS PERDITUS (SQUAMATA: LEIOSAURIDAE): VOMITING AS A DEFENSIVE BEHAVIOR.

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Lizards have many predators, mostly snakes, other lizards, birds, mammals, and invertebrates (mainly arachnids) (Schalk & Cove, 2018). Numerous strategies have evolved to escape this diverse range of predators, including mimicry and camouflage, rapid escape, death feigning, caudal autotomy, tail display and vibration, mouth opening, and gular expansion (Arnold, 1984; Green, 1988; Martins, 1996; Vitt & Caldwell, 2014; Pough *et al.*, 2015). In addition to natural predation pressure, introduction of invasive species (Trompeter & Langkilde, 2011) can lead to a change in the effectiveness of a particular strategy, and changes in behavioral defensive responses.

Enyalius perditus Jackson, 1978 (Squamata, Leiosauridae) is a semi-arboreal lizard endemic to the Atlantic Forest in southeastern and southern Brazil (Jackson, 1978; Rocha *et al.*, 2000; Sturaro & Silva, 2010; Rodrigues *et al.* 2014). It is a diurnal species found in forest leaf litter, exhibiting sexual dimorphism in color and size, and a diet based on invertebrates (Jackson, 1978; Sousa & Cruz, 2008; Sturaro & Silva, 2010; Barreto-Lima & Sousa, 2011; Barreto-Lima *et al.*, 2013).

During fieldwork conducted from January to December 2010 in Serra do Ouro Branco, municipality of Ouro Branco, Minas Gerais, Brazil (20°30′32.91″ S 43°36′30.47″ W; datum SAD 69), we captured 52 specimens of *Enyalius perditus* using active searches and

pitfall traps with drift fences (Cruz *et al.*, 2014), and documented an unusual and unrecorded defense behavior for *Enyalius*. We sexed young specimens by everting the hemipenis, and used a digital caliper to take snout-vent length to 0.01 mm resolution. All captured specimens were deposited in the herpetological collection of the Laboratório de Zoologia dos Vertebrados (LZV), Universidade Federal de Ouro Preto (UFOP), Minas Gerais. The lizards were collected under permits issued by the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA-481/06-NUFAS-MG) and Instituto Chico Mendes de Conservação da Biodiversidade (ICMBIO-21543-1).

In January 2010, while attempting to photograph a male (LZV-940s) the lizard performed the defensive behavior of mouth opening, hissing and gular expansion before and during handling. Following this behavior, it regurgitated its stomach contents. The second and third vomiting records were made In September 2010, while removing two males (LZV-1038s and LZV-1040s) from a pitfall trap, both exhibited the same vomiting behavior. In October 2010, another male (LZV-1077s) vomited while being transported in a transparent plastic bag.

All regurgitations were preceded by similar defensive behavior (mouth opening, hissing and gular expansion). Analysis of the vomit revealed the presence of beetles (Coleoptera), crickets (Orthoptera) and spiders (Aranae) (Table 1), common prey of *E. perditus* (Sturaro & Silva, 2010; Sousa & Cruz, 2008; Barreto-Lima & Sousa, 2011).

Most sedentary lizards, including *Enyalius*, use camouflage, running, or jumping and running as primary defensive behavior (Rautenberg & Laps, 2010). Previous studies report a wide range of defensive strategies for *Enyalius* when individuals are cornered or handled, such as mouth opening, hissing, biting, tail whipping, death feigning, gular inflation, cloacal discharge, and even physiological color changes (males becoming darker) (Rautenberg & Laps, 2010; Gomides & Sousa, 2011; Silva *et al.*, 2018). During our fieldwork, all these behaviors were also displayed by specimens of *E. perditus* on at least one occasion, except for death feigning and tail whipping, which were not recorded.

Different individuals or populations of a species do not always exhibit the same defensive strategies (Trompeter & Langkild, 2011). Indeed, in a population of *E. perditus* from Juiz de Fora, Minas Gerais (approximately 140 km southeast of Ouro Branco), Gomides & Sousa (2011) reported death feigning in approximately 9% of individuals during handling. None of the 52 individuals handled in Serra do Ouro Branco feigned death, although four adults (8%) regurgitated. Although these records represent a small percentage of

examined specimens, they may suggest differences in defensive response between the two populations.

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Table 1. Individuals of *Enyalius perditus* that regurgitated while/after handling in Serra do Ouro Branco, Minas Gerais, Brazil.

SVL = snout-vent length; M = male; F = female.

Collection number	SVL (mm)	Sex	Regurgitated content	Local coordinates
LZV- 940s	75.95	M	Aranae; Orthoptera	20°29′35.13″S, 43°36′24.17″ W
LZV- 1038s	64.89	M	Aranae; Coleoptera	20°29′45.00″S, 43°35′48.53″ W
LZV- 1040s	75.97	M	Aranae	20°29′37.08″S, 43°36′25.55″ W
LZV- 1077s	78.98	F	Coleoptera	20°29′37.08″S, 43°36′25.55″ W