

## Predation of the lizard *Tropidurus hispidus* (Squamata, Tropiduridae) by the vine snake *Oxybelis aeneus* (Serpentes: Colubridae) in the Caatinga, northeastern Brazil

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### Predação do lagarto *Tropidurus hispidus* (Squamata, Tropiduridae) pela serpente bicuda *Oxybelis aeneus* (Serpentes: Colubridae) na Caatinga, nordeste do Brasil

**Resumo:** A predação é um fator ecológico que regula a vida dos lagartos, entretanto, sua visualização na natureza é esporádica. Quando os predadores são serpentes crípticas, temos registros ainda mais escassos. Aqui nós apresentamos a predação de *Tropidurus hispidus* (Spix, 1825) pela serpente bicuda *Oxybelis aeneus* (Wagler in Spix, 1824). Alguns estudos já identificaram lagartos do gênero *Tropidurus* Wied-Neuwied, 1824 como presas de *O. aeneus*. No entanto, este registro fornece informações que contemplam importantes aspectos da história natural das duas espécies, contribuindo para a compreensão de suas ecologias.

**Palavras chave:** Ecologia alimentar, dieta, Paraíba, Saurofagia.

**Abstract:** Predation is an ecological factor that regulates the life of lizards, but their visualization in the wild is sporadic. When predators are cryptic serpents, we have even scarcer records. Here we present the predation of *Tropidurus hispidus* (Spix, 1825) by vine snake *Oxybelis aeneus* (Wagler in Spix, 1824). Some studies have already identified lizards of the genus *Tropidurus* Wied-Neuwied, 1824 as prey of *O. aeneus*. However, this record provides information that clarify important aspects about the natural history of the respective species, contributing to the understanding of their ecology.

**Key words:** Feed ecology, diet, Paraíba, Saurophagy.

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In general, predation is an important factor influencing ecological community structure in all animal groups (Morin 1983; Beltrão-Mendes *et al.* 2018) including reptiles like lizards (Silva & Araújo 2008; Santos *et al.* 2012; Amora *et al.* 2014). However, the predation of lizards is rarely observed in the wild (Malkmus 2000; Aguiar & Di-Bernardo 2004), and the description of events involving snakes are scarcer still (Vitt & Vangilder 1983; Almeida *et al.* 2009; Mikalauskas *et al.* 2017).

The vine snake *Oxybelis aeneus* (Wagler, 1824) is an opistoglyphic snake belonging to the family Colubridae Oppel, 1811. It is widely distributed and occurs in the American continent, from southern North America to Central America and almost all South American continent. *Oxybelis aeneus* is an arboreal species, being strongly registered in Caatinga (Vanzolini *et al.* 1980; Hamdan & Lira-da-Silva 2012; Guedes *et al.* 2014; Caldas *et al.* 2016; Costa *et al.* 2018). This species is frequently found in open areas, such as grassland with shrubs, forest

edges and small clearings within the forest (Franzen 1996), has a diurnal habit, “sit-and-wait” strategy and feeds predominantly on lizards, but it also feeds on frogs, birds, small arboreal mammals and even fish (Vanzolini *et al.* 1980; Hetherington 2006; Silva & Araújo 2008; Grant & Lewis 2010; Santos *et al.* 2012).

The lizard *Tropidurus hispidus* (Spix, 1825) is distributed from northern South America (including the Caribbean coast), through Amazonia, Caatinga, coastal areas of northeastern Brazil to southeastern Cerrado, occurring in Brazil, Colombia, Venezuela, Guyana and Suriname (Rodrigues 1987; Carvalho 2013; Franzini *et al.* 2019). *Tropidurus hispidus* is the largest species of the genus, and is classified as a “sit-and-wait” forager (Colli & Paiva 1997; Santana *et al.* 2011a; Santana *et al.* 2014; Gomes *et al.* 2015) that feeds mainly on insects (Vitt *et al.* 1996; Gomes *et al.* 2015). This lizard is oviparous, has a habitat generalist, and can be observed mainly in the ground on rocky surfaces or sandy soils, on the borders of forests, and on tree trunks (Ribeiro & Freire 2010; Santana *et al.* 2011a,b; Gomes *et al.* 2015).

This registration was made at the Pedra da Boca State Park (Parque Estadual da Pedra da Boca-PEPB), in the Borborema Plateau (06°31'–06°33' S and 35°35'–35°37' W), located in the municipality of Araruna, Paraíba State, northeastern Brazil. The locality is composed of protected natural areas inserted in the Caatinga biome corresponding to an Integral Protection Area of Natural Resources (Cavalcante 2009). The vegetation is of savane steppique northeastern – Caatinga, originally shrub and arboreal, with small remnants of forest, a subcaducifolia vegetation with strong anthropic actions regarding the supply of wood and firewood for human use and for the raising of cattle and agricultural plantations (Cavalcante 2007). The territorial border of the Park is: North, Passa e Fica municipality, Rio Grande do Norte State; in south, Araruna municipality, Paraíba State; in east, Calabouço River and to the west, Confusão Mountain in Araruna municipality, Paraíba State. The Park is 170 km from João Pessoa, capital of Paraíba State, northeastern Brazil (Cavalcante 2007).

This study documents the predation of the lizard *Tropidurus hispidus* (Figure 1A) by vine snake *Oxybelis aeneus* (Figure 1B). An adult of *T. hispidus* (SVL: 87.6 mm) was observed and photographed being preyed by *O. aeneus* (SVL: 990.10 mm). The initial capture was observed, the snake grasped the individual by the head and remained suspended in vertical position until the prey was completely ingested (Figure 2). The lizard attempted to escape, however, it ceased struggling after around 10 minutes, possibly from energy expenditure and partial asphyxiation or combination of the two factors.

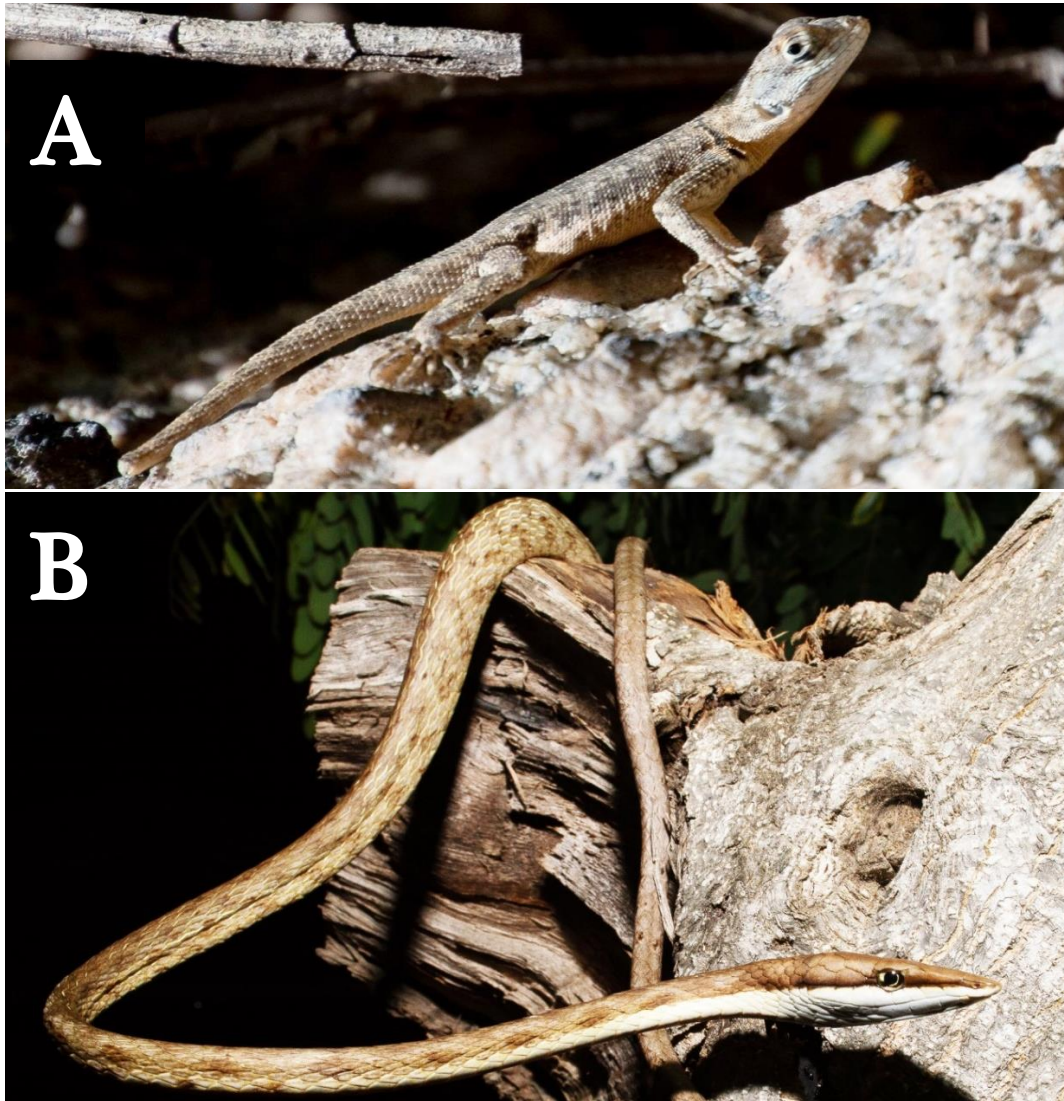
The predation event was observed on 27 November 2017 at 05:30 pm. The specimens were photographed, collected, measured, fixed in 10% formalin and preserved in 70% alcohol. Both specimens were deposited in the Herpetological Collection of the Universidade Federal da Paraíba (CHUFPB: *Tropidurus hispidus* – Voucher Field Serie 11070; *Oxybelis aeneus* - Voucher Field Serie 11071), João Pessoa municipality, Paraíba State, Brazil. Specimens were collected with permission from Instituto Chico Mendes de Conservação da Biodiversidade – ICMBio (SISBIO authorization # 60820–1) and Superintendência de Administração do Meio Ambiente – SUDEMA (authorization # 7045/2017).

Although predation of lizards by snakes, especially in the family Colubridae, is cited in the literature (Vanzolini *et al.* 1980; Vitt & Vangilder 1983; Silva & Araújo 2008), only a few studies have identified event of predation in field and a small proportion of studies cited as food item species belonging to the genus *Tropidurus* Wied-Neuwied, 1824 in the diet of Brazilian snakes (Almeida *et al.* 2009; Mikalauskas *et al.* 2017). The first records of predation of the genus *Oxybelis* Wagler, 1830 on *Tropidurus* was performed by Almeida *et al.* (2009) when observing the predation of the lizard *T. cocorobensis* Rodrigues, 1987 in the municipality of Buíque, Pernambuco State, northeastern Brazil, in the Caatinga biome, and by Santos *et al.* (2012) when recording the predation of the lizard *T. hygomi* Reinhardt & Lütken, 1862 in the Serra de Itabaina National Park, Sergipe State, northeastern Brazil, that is inserted in Atlantic Forest domain. Mesquita *et al.* (2012) recorded the predation of *T. hispidus*, however, the diet data were analyzed based on stomach contents in the laboratory. More recently, Sousa *et al.* (2020) presented this same predation with field data, with very detailed data on the form of prey apprehension, however, it does not report the morphometric data related to the predator/prey size.

Others studies indicated that lizards, particularly anoles, are important prey for *Oxybelis aeneus* (Keiser Jr 1974; Henderson 1982; Wilson & Cruz-Díaz 1993; Savage 2002). *Oxybelis aeneus* has been reported to consume different lizards like *Basiliscus vittatus* Wiegmann, 1828, *B. plumifrons* Cope, 1876, *Iguana iguana* (Linnaeus, 1758), *Norops rodriguezi* Bocourt, 1873, *N. bourgeai* Campbell 1998, *N. uniformis* Cope, 1885, *Sceloporus* sp. and some *Cnemidophorus* sp. (Campbell 1999; Savage 2002; Diener 2007; Grant & Lewis 2010).

Our data appear as complementary to those already available in the literature, especially by Mesquita *et al.* (2012) and Sousa *et al.* (2020), confirming the behavior of *Oxybelis aeneus* to capture and ingest its prey suspended vertically upside down on the vegetation, as recorded by Sousa *et al.* (2020). Thus, in this record, we adding more information regarding the trophic ecology of this snake in natural environment. These combined records form an even larger data set in an attempt to understand the ecological relationships between these two species (predator/prey).

This record provides important insights into the natural history of both species, which are essential for the understanding of their natural history, and what ecological events they are involved. By recording some morphometric measurements of the species, prey capture way, their activity time, we expand the information of these animals in free life. We also hope that this data will assist future research that correlates diet and morphology and assist in understanding the trophic relationships between snakes and lizards.



**Figure 1.** Lizard *Tropidurus hispidus* (A) and snake *Oxybelis aeneus* (B) recorded in Pedra da Boca State Park, the municipality of Araruna, Paraíba State, northeastern Brazil. \*Only the snake is the specimen this present predation record (Photos: Daniel Santana).



**Figure 2.** Lizard *Tropidurus hispidus* being preyed by a snake *Oxybelis aeneus*, recorded in Pedra da Boca State Park, the municipality of Araruna, Paraíba State, northeastern Brazil (Photo: Daniel Santana).

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