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Predation of the rare casque-headed treefrog *Trachycephalus mambaiensis* (Hylidae: Lophiohylini) by the parrot-snake *Leptophis mystacinus* (Colubridae) in a Cerrado-Caatinga ecotone

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ABSTRACT

Anurans are key prey for snakes, and their decline can affect snake diversity. Defensive behaviors in frogs are diverse and include secretions, distress calls, and body inflation. Frogs of the genus *Trachycephalus*, known as "milk frogs," produce sticky and potentially toxic secretions. Predation events involving these frogs are rarely documented. We observed an adult parrot-snake *Leptophis mystacinus* preying on an adult treefrog *Trachycephalus mambaiensis* in a Cerrado–Caatinga transitional area in Minas Gerais, Brazil. The frog briefly escaped but was recaptured and ingested within 10 minutes. This is the first documented case of *L. mystacinus* preying on *T. mambaiensis*. Although *Leptophis* species are known to prey primarily on hylid frogs, little is known about the diet of *L. mystacinus*. This observation supports its potential specialization on nocturnal treefrogs and suggests that it may use both visual and olfactory cues to detect inactive prey during day.

Key Words: Scansorial Snakes; Milky Secretion; Trophic Ecology.

Anurans are relevant prey for various snake species (e.g., Santos-Silva *et al.*, 2014; Parreira *et al.*, 2023) and declines in their availability can have pervasive effects on snake diversity (Zipkin *et al.*, 2020). Therefore, predator-prey interactions between snakes and anurans play a pivotal role in the dynamics and structure of amphibian communities and the evolution of anuran defensive behaviors (Toledo *et al.*, 2011). Anuran defense mechanisms are multimodal, encompassing different and escalated strategies, such as cloacal discharge, body inflation, distress calls, and skin secretions (Toledo *et al.*, 2011), likely providing defense in rich tropical predator communities.

The genus *Trachycephalus* (Anura: Hylidae) comprises 17 species of nocturnal large-sized arboreal frogs, commonly known as 'milk frogs', which secrete a milky, latex-like substance. These copious and eventually noxious secretions are notable defenses against predators and collectors, acting both mechanically (as glue) and chemically (Rigolo *et al.*, 2008; Brown, 2020; Frost, 2025). Considering this chemical defense mechanism, only a few *Trachycephalus* species have been documented as prey for other anurans (Mira-Mendes *et al.*, 2012; Cervantes-López *et al.*, 2024) and reptiles, including arboreal snakes of the genus *Chironius* (Dias-Silva

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et al., 2021; George, 2023) and *Leptophis* (Solé *et al.,* 2010; Clegg, 2015; Hayes, 2023). *Trachycephalus mambaiensis* Cintra, Silva, Silva, Garcia, and Zaher, 2009 is a rare species known only from the Brazilian biome Cerrado (Cintra *et al.,* 2009; Vaz-Silva *et al.*, 2020).

The Neotropical genus *Leptophis* comprises 20 species widely distributed from Mexico through Central and South America (Albuquerque *et al.*, 2025; Uetz *et al.,* 2025). These diurnal snakes inhabit arboreal and terrestrial environments (Albuquerque and Fernandes, 2022). Parrot snakes are opportunistic predators feeding on frogs, lizards, snakes, and small birds (López *et al.,* 2003; Mumaw *et al.,* 2015; Vieira and Gomez, 2016). *Leptophis mystacinus* Albuquerque, Martins, Carvalho, Shepard, and Santana, 2025 is a recently described, large, slender, and diurnal species found in open vegetation formations within the Cerrado biome, particularly in the states of Tocantins and Minas Gerais, as well as in regions influenced by the humid Amazon rainforest (Albuquerque *et al.*, 2025). However, little is known about their dietary habits. Herein, we report a predation of the casque-headed treefrog *Trachycephalus mambaiensis* by the parrot snake *Leptophis mystacinus* in a transitional Cerrado-Caatinga habitat.

On 24 January 2025, at 14:40, a predation event involving *Leptophis mystacinus* and the casque-headed tree frog *Trachycephalus mambaiensis* was observed at the Cavernas do Peruaçu National Park, Minas Gerais, Brazil. The event occurred during transit between the research station and visitor center (15°09'23"S 44°13'52"W; datum: SAD69; 530 m a.s.l.) in a transitional area between the Cerrado and Caatinga biomes, characterized by Dry Forest habitat (Dryflor *et al.*, 2016). The environment was humid at the time, as January is a rainy month. Despite clear weather, the road was shaded by a continuous canopy of tall trees (10–15 m in height).

The adult *Leptophis mystacinus* was sighted at the roadside holding an adult *Trachycephalus mambaiensis* in its mouth, which already showed signs of injury, including lacerations of the skin in the dorsal and ventral regions of the head and on the lateral side of the body with bleeding (Figs. 1A, 1B), suggesting that the snake had seized the frog before our observation. When sighted, both animals were motionless. The frog soon tried to escape but was quickly chased and recaptured by the snake (Fig. 1C). The parrot snake coiled around the frog and

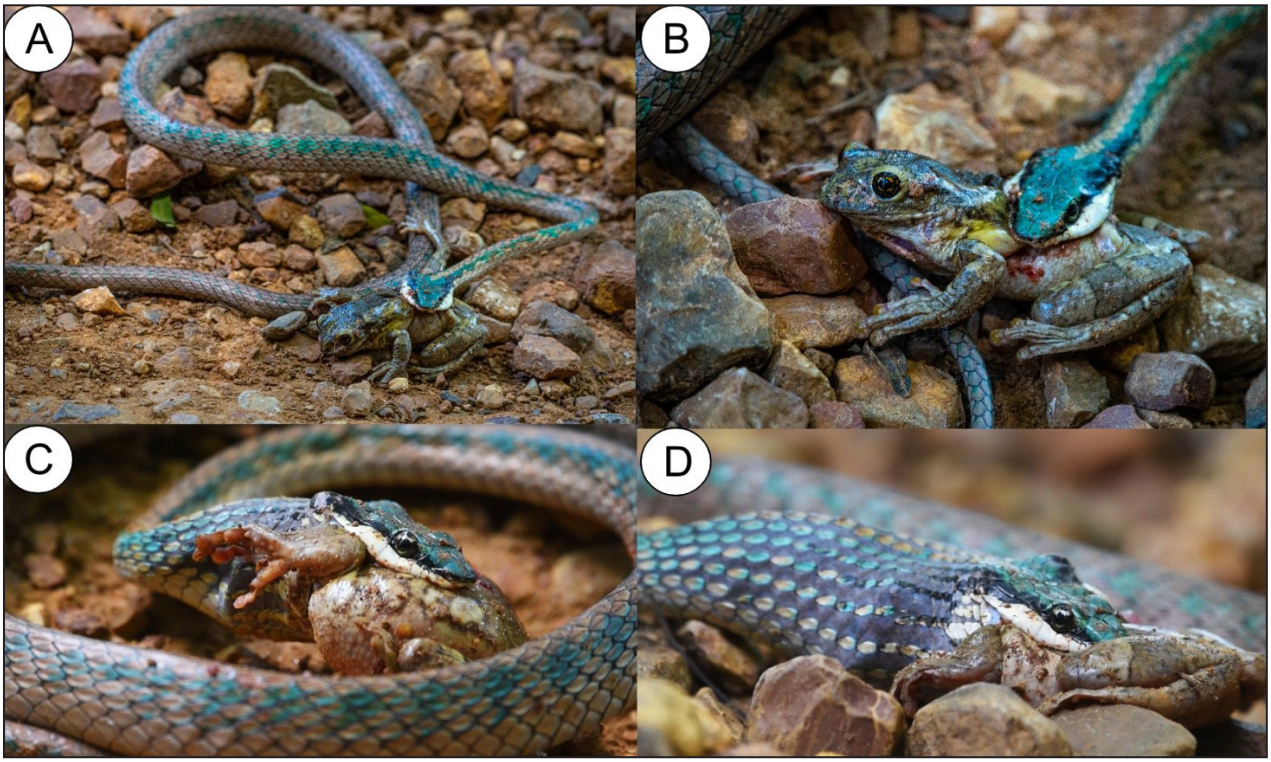

Figure 1. Predation event at Peruaçu National Park, Minas Gerais, Brazil, on 24 January 2025. A) An adult individual of *Leptophis mystacinus* seizing an adult individual of *Trachycephalus mambaiensis* as initially observed. B) Detail of the snake and the treefrog, before the frog's escape. C) *L. mystacinus* ingesting the *T. mambaiensis* after recapture. D) Detail of the greatly distended body of the parrot-snake during ingestion of the treefrog.

swallowed it headfirst in about 10 minutes (Fig. 1D). After consuming the prey, the snake swiftly moved into the adjacent forest, climbed a tree, and disappeared into the canopy.

We did not observe head rubbing behavior in *Leptophis mystacinus*, suggesting no apparent effect of the frog's milky secretions, although this behavior has been documented in some colubrid snakes when handling noxious amphibian prey (Feder & Arnold, 1971; Brodie *et al.*, 1980). However, it is possible that the secretion of *Trachycephalus mambaiensis* momentarily affected the snake, facilitating the frog's initial escape.

Since we did not collect the animals, species identification was based on external morphological traits and geographic location. The snake was identified as *Leptophis mystacinus* due to its general coloration, distinctive black pigmentation around the rostral scale (creating a mustache-like appearance) (Albuquerque *et al.,* 2025). The frog was identified as *Trachycephalus mambaiensis* based on the poorly ossified skull, particularly in the squamosal region (Fig. 1B) (Cintra *et al.,* 2009).

This observation represents the first documented case of *Leptophis mystacinus* preying on *Trachycephalus mambaiensis*, contributing to our understanding of the trophic interactions within these genera. To date, predation within the clade *T. nigromaculatus* has only been recorded for *Trachycephalus nigromaculatus* Tschudi, 1838, preyed upon by the ocellated treefrog *Itapotihyla langsdorffii* (Duméril and Bibron, 1841) (Cervantes-López *et al.*, 2024).

Species of the family Hylidae account for 90% of the diet of *Leptophis ahaetulla* (Linnaeus, 1758) in northern Brazil (Albuquerque *et al.*, 2007) and 63% of the diet of *Leptophis marginatus* (Cope, 1862) in northeastern Argentina (López *et al.*, 2003). Although no predation records are available for *L. mystacinus*, our observation suggests that this species also targets nocturnal treefrogs when they are inactive during the day. Such behavior likely relies on visual cues, as reported for other diurnal colubrids, including species of genus *Chironius* (Dias-Silva *et al.*, 2021; George, 2023; Parreira *et al.*, 2023).

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