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New records of predation and feeding behavior of the vine snake *Chironius brazili* (Squamata: Colubridae) in the Espinhaço Mountain Range, Brazil

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ABSTRACT
The vine snake *Chironius brazili* inhabits rocky *campo rupestre* environments in the Espinhaço Mountain Range, Brazil. Although species of *Chironius* primarily feed on anurans, we report new prey records for *C. brazili*, including the Cycloramphidae and the first documented case of fish predation in the genus. These records expand the known diet of *C. brazili* and demonstrate its ability to exploit different environments while foraging.

Key Words: : Snake, Diet, Cycloramphidae, Fish.

The vine snake *Chironius brazili* Hamdan and Fernandes, 2015, is found in the ecoregions of the Cerrado, Atlantic Forest, and Pampa, primarily inhabiting gallery forests and open areas (Hamdan and Fernandes, 2015; Ugalde *et al.*, 2024). Species of the genus *Chironius* Fitzinger, 1826, exhibit morphology primarily adapted for an arboreal lifestyle (*i.e.* slender body, long tail, and large number of vertebrae; Banci *et al.*, 2022; Parreira *et al.*, 2024) and have a predominantly batrachophagous diet, although they also feed on reptiles, mammals, and birds (Roberto and Souza, 2020). However, *C. brazili* can exploit different substrates while foraging, including rocky outcrops along waterfall margins in mountainous regions of the Brazilian Cerrado (Parreira *et al.*, 2024).

The Espinhaço Mountain Range, in eastern Brazil, extends for approximately 1200 km across the states of Minas Gerais and Bahia, with altitudes ranging from 800 to 2000 m a.s.l. (Silveira *et al.*, 2016). This mountain range forms a transition between the Atlantic Forest to the east and the open landscapes of the Cerrado and Caatinga to the north and west (Guedes *et al.*, 2020; Santana *et al.*, 2023). Above 1000 m a.s.l., *campo rupestre* (rupestrian fields) predominates, an environment characterised by shrub-grass vegetation interspersed with rocky outcrops and open areas with sandy soil and low water availability (Silveira *et al.*, 2016; Santana *et al.*, 2023).

Although the low tree cover density in the open areas of the Cerrado and *campo rupestre*, *Chironius* species occurring in these environments primarily feed on hylids (Kok, 2010; Fernandes and Hamdan, 2014; Hamdan and Fernandes, 2015; Roberto and Souza, 2020; Parreira *et al.*, 2024). This association suggests that, even in predominantly open habitats, *Chironius* maintains its dietary preference for arboreal anurans (Roberto and Souza, 2020; Parreira *et al.*, 2024). This study presents new observations

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on the feeding and hunting behavior of *C. brazili* in the *campo rupestre*, highlighting a new predation record on the Cycloramphidae big-eared river frog, *Thoropa megatympanum* Caramaschi and Sazima, 1984, and the first documented case of fish predation in *Chironius*.

On 16 October 2022, at approximately 03:40 pm, in the southern region of the Espinhaço Mountain Range, in the municipality of Presidente Kubitschek, Minas Gerais, Brazil (18°27'16.7"S 43°36'10.9"W) (Fig. 1), an adult *C. brazili* was observed foraging on a rocky outcrop, moving through crevices and cavities on the rock surface, close water bodies and waterfalls, as reported by Parreira *et al.* (2024). The snake inserted its head into a rocky foramen, struck, and captured an adult *T. megatympanum* (Fig. 2), extracting it from the rock crevices and swallowing it. After digestion, the snake resumed its foraging activity, climbed onto the rocks, and captured another *T. megatympanum*, repeating the same capture and consumption process. Both anurans were ingested in a postero-anterior direction within approximately 20 minutes.

The second record was made on 10 October 2024, at approximately 02:20 pm, also in the southern region of the Espinhaço Mountain Range, in the municipality of Diamantina, Minas Gerais, Brazil (18°11'01.08"S, 43°37'05.60"W) (Fig. 1). An adult *C. brazili* was observed foraging within a waterfall, near rocky outcrops. During the observation, the snake submerged in the water and, while still underwater, it grabbed an unidentified fish, which it carried to the surface and swam towards one of the banks surrounding the waterfall. This is the first known record of *Chironius* preying on a fish.

Information on the foraging and diet of *C. brazili* is scarce (Roberto and Souza, 2020; Parreira *et al.*, 2024). Until now, only two prey species have been recorded for this snake, both occurring in high-altitude rocky streams being *Bokermannohyla martinsi* (Bokermann, 1964) (n= 1) and *B. pseudopseudis* (Miranda-Ribeiro, 1937) (n= 3) (Lucas *et al.*, 2017;

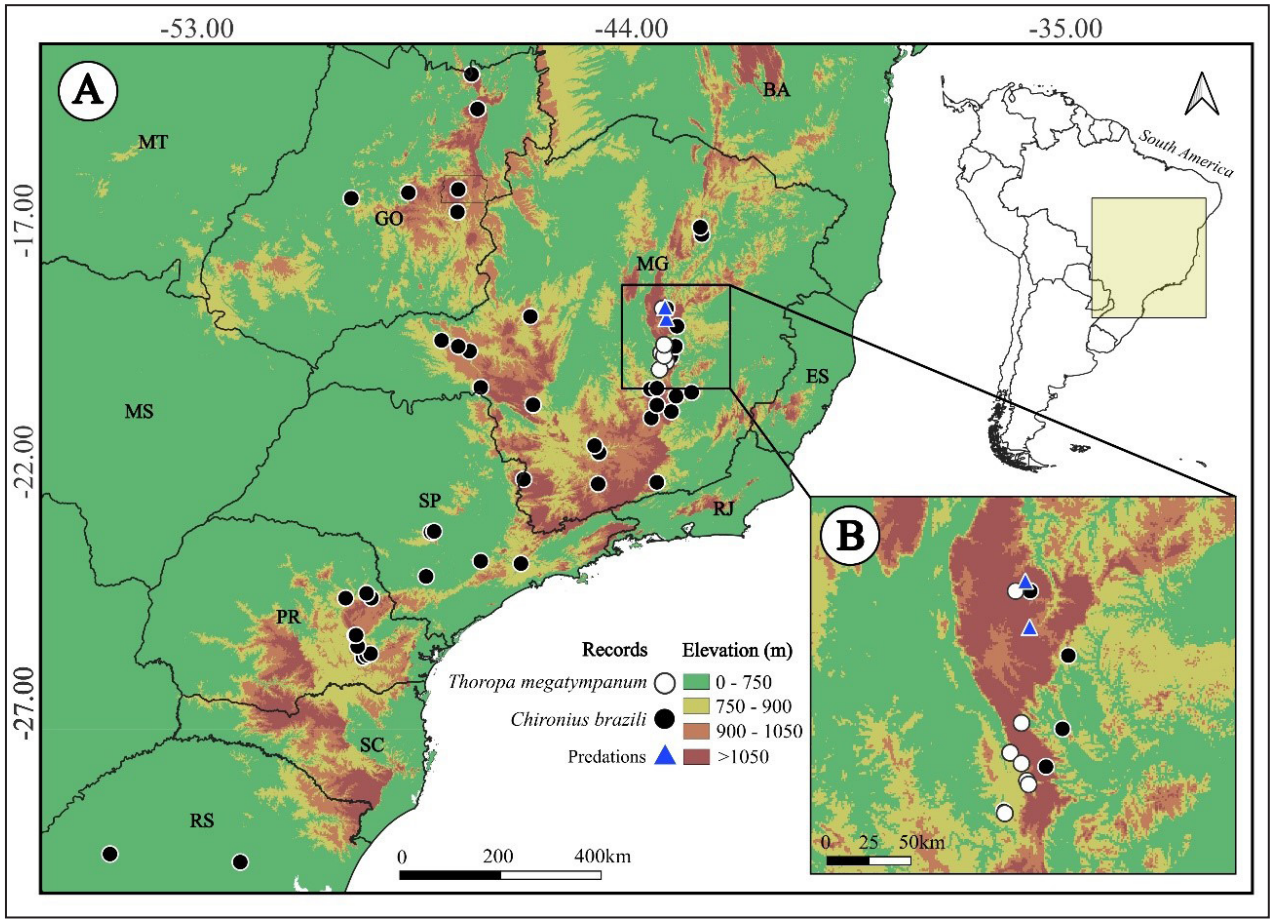

Figure 1. (A) Topographic map showing the known distribution of vine snake *Chironius brazili* (black circles), big-eared river frog *Thoropa megatympanum* (white circles) and our records (blue triangles). (B) Enlarged region showing the location of predation events in the southern portion of the Espinhaço Mountain Range (Minas Gerais, Brazil).

Figure 2. Adulte vine snake *Chironius brazili* with an adult big-eared river frog *Thoropa megatympanum* in its mouth in Espinhaço Mountain Range (Minas Gerais, Brazil).

Parreira *et al.*, 2024). Similarly, *T. megatympanum* also inhabits high-altitude *campo rupestre* environments (Fig. 1B), using these habitats for shelter and reproductive vocalization (Caramaschi and Sazima, 1983; Sabbag *et al.*, 2018). The association of these anurans with streams, rocky outcrops, and sparse vegetation makes them potential prey for snakes that forage in such environments (*e.g.*, Roberto and Souza, 2020; Parreira *et al.*, 2024). Although the diet of the genus *Chironius* is largely based on hylid frogs (Roberto and Souza, 2020), our records indicate that *C. brazili* exhibits an opportunistic feeding strategy, consuming the prey available in its habitat. This report expands the knowledge of the species diet and highlights its efficient foraging capability in rocky Cerrado environments. Moreover, the predation of a fish by this species suggests a greater dietary flexibility, as well as the ability to explore aquatic environments in search of prey.

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