



Avian-lizard saurophagy: an unusual predatory behaviour of the Southern House Wren in an urban area of the Brazilian Cerrado

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Received: 30 June 2024 / Revised: 30 August 2024 / Accepted: 4 November 2024
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Abstract

Many lizard-eating birds in tropical ecosystems are primarily insectivorous. The Southern house wren (*Troglodytes musculus*) is a small-sized diurnal bird species that is distributed throughout South America where it is found in both anthropized areas and natural habitats. Although *T. musculus* feeds mainly on insects, we report an unusual predatory behaviour for this small-sized insectivorous bird — preying upon a juvenile lava lizard (*Tropidurus hispidus*) on the ground, in an urbanized area of the municipality of Teresina, central-northern Piauí State, Northeast Brazil. Lizard predation is a new feeding behaviour for *T. musculus* and may be related to seasonal variation in the availability of food resources and predation risk. The only species of *Troglodytes* for which lizard predation has been reported is *Troglodytes aedon*, so this represents the first record of a lizard in the diet of *T. musculus*. Further studies are needed, however, to determine the frequency of saurophagy in populations of this insectivorous bird species.

Keywords Cerrado · Dry season · Feeding behaviour · Lizard predation · *Troglodytes musculus* · *Tropidurus hispidus*

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Many passerines and other bird species are known to play important roles as predators of lizards (Poulin et al. 2001; Schalk and Cove 2018). However, the significance of lizards in the diets of birds is poorly documented, hampering an understanding of how individual-based diet data can be used to characterize interaction networks among species, the foundation of community ecology (Ings et al. 2009). For instance, while studying the diet of birds in tropical forests in Central America, Poulin et al. (2001) found a high number of passerine birds preying on lizards and frogs, suggesting that the current view of passerines as predators is underestimated. Birds were found to be responsible for 55.1% of attacked reptiles in fragmented agricultural landscapes (Hansen et al. 2017). In recent years, several studies have documented lizard predation by birds (e.g. Messas et al. 2022; Oliveira et al. 2022; de Sousa et al. 2023; Silva et al. 2023). Nevertheless, any observation on lizard predation by birds is an interesting subject for investigation since new findings can be documented, especially for lizard species with a wide geographic distribution and that are commonly found in open habitats (Silva et al. 2023).

The Southern house wren, *Troglodytes musculus* Naumann, 1823, is a small-sized (up to 120 mm total length), diurnal bird species that is widely distributed throughout South America (Costa and Sander 2004; Sigrist 2009). It

inhabits a variety of habitats including human dwellings and gardens, urban parks, swamp edges, and forest remnants (Belton 2000; Efe et al. 2001; Sick 2001; Narosky and Yzurieta 2003). The diet of *T. musculus* is primarily composed of arthropods, mainly insects (Costa and Sander 2004).

The Neotropical lava lizard *Tropidurus hispidus* (Spix, 1825) is a medium-sized (up to 350 mm total length), diurnal lizard species that is widely distributed throughout South America (Ines Hladki et al. 2019). In Brazil, it occurs throughout the Amazon, Caatinga, and coastal areas of northeastern to southeastern Cerrado (Rodrigues 1987; Carvalho 2013). This lizard is a habitat generalist and can be found on the ground at the border of forests, on sandy soils, on rocky outcrops, and on tree trunks (Mikalauskas et al. 2017; Santana and Teixeira 2020). It is an opportunistic predator that employs an ambush strategy to hunt prey (Passos et al. 2016). Its diet is composed mainly of arthropods, but it also occasionally consumes plant material and other vertebrates (Van Sluys et al. 2004; Kolodiuk et al. 2010; Pelegrin et al. 2017). Predators of *T. hispidus* include invertebrates (Vieira et al. 2012), lizards (Sales et al. 2011; Silva et al. 2013), snakes (Mikalauskas et al. 2017; Santana and Teixeira 2020; Sousa et al. 2020; Oliveira et al. 2021) and mammals (Oliveira Melo et al. 2018). To our knowledge, there is no record of avian-saurophagy for this lizard species.

Here, we recorded for the first time the predatory behaviour of the small-sized and insectivorous *T. musculus* feeding upon a juvenile *T. hispidus*. The description of this avian-lizard predatory behaviour is based on detailed field notes and photographs of live individuals in nature.

The predatory behaviour was observed on 19 August 2019, during the dry season (Bastos and Andrade Júnior 2021), in a garden on the campus of the Universidade Federal do Piauí (UFPI), located in an urban area of the municipality of Teresina, central-northern Piauí State, Northeast Brazil (05°03'29.78" S, 42°47'28.75" W). The local vegetation is characterized by fruit trees (cashew and mango), Babaçu palm trees, and some typical Cerrado trees. The observation occurred during an ornithological survey by MVS. The avian-lizard predatory behaviour started at 2:10 pm and lasted 10 min. Images were acquired using a compact digital camera with a 30x optical zoom lens (22.5–675 mm) in automatic mode. The bird was identified to the species level based on the characteristic coloration and size (Silva and Auricchio 2019). The lizard was identified to the species level based on the lack of bands on the supraocular scales, smaller ventral scales than dorsal scales, and colour pattern (Rodrigues 1987).

Two seemingly adult individuals of *T. musculus* (each ~100 mm total length) were found foraging on the ground under the leaves of a Caribbean agave (*Agave angustifolia*). Suddenly, we realized that one of the individuals was holding a juvenile *T. hispidus* (~40 mm snout-vent length) (Fig. 1) by

Fig. 1 An adult individual of *Troglodytes musculus* holding a juvenile *Tropidurus hispidus* by the head (black arrow). **(a)** Frontal view. **(b)** Lateral view. Photo author: Mateus Vieira Silva



the head with its beak. Although the death-feigning behaviour (i.e. thanatosis) has been described for *T. hispidus* (Bertoluci et al. 2006), we presumed the lizard was newly killed because it did not show any movement, yet the body was still malleable. Therefore, we cannot say whether the bird found the lizard already dead or killed it. After successive pecks to position the lizard for head-first ingestion, the bird partially swallowed the prey. Ingestion lasted for approximately 10 min, when the presence of MVS disturbed the birds, which took shelter among the agave leaves. The birds remained sheltered in the agave for approximately 20 min, during which MVS could not make further observations to determine if the bird completely swallowed the lizard. The birds then left the shelter, and MVS observed that the predator bird was finishing swallowing the lizard whole, with just its tail protruding out of its beak.

To our surprise, lizard predation is a new feeding behaviour for *T. musculus*, which feeds mainly on insects (Costa and Sander 2004). This predatory behaviour may be related to seasonal variation in the availability of food resources and predation risk (Nordberg and Schwarzkopf 2019). For instance, while examining the relationship between seasonal variation in flock structure and the availability of food resources, Develey and Peres (2000) found lower arthropod abundance in the dry season. In contrast, while testing the role of habitat structural complexity and inter-seasonality variation in determining lizard predation risk in the Caatinga, Ferreira and Faria (2021) found higher predation rates during the dry season. Considering that *T. hispidus* is an abundant lizard species in urbanized areas (de Andrade 2020), that lizard predation rates are higher in the dry season (Ferreira and Faria 2021), and that the eaten lizard was of a small size, we believe that the predation event reported here occurred opportunistically while the bird was foraging for insects on the ground. Many bird species have been reported as predators of lizards (Poulin et al. 2001; Lopes et al. 2005; Ríos-López et al. 2015). The only species of *Troglodytes* to have been reported preying on lizards is *Troglodytes aedon rufescens* (van den Burg and Brisbane 2021), so this represents the first record of a lizard in the diet of *T. musculus*. Further studies are needed, however, to determine the frequency of saurophagy in populations of this insectivorous bird species.

In highly diverse areas such as the Neotropics, where biotic networks are complex and poorly understood, records of predator-prey interactions such as the one presented in this paper, in both wild and anthropized areas, can be considered relevant. If systematically organized and analyzed, records scattered throughout the scientific literature can contribute to a better understanding of species' diets and ecological networks.

Acknowledgements FHO thanks Universidade Federal de Mato Grosso do Sul - UFMS, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES, and Fundação de Apoio ao Desenvolvimento do Ensino, Ciência, e Tecnologia de Mato Grosso do Sul - FUNDECT for financial support. WOA thanks Conselho Nacional

de Desenvolvimento Científico e Tecnológico - CNPq for a Research Productivity fellowship. TBG thanks Fundação de Amparo à Pesquisa do Estado de São Paulo - FAPESP for a Young Researcher Grant.

Author contributions M.V.S. recorded the reported predation event. F.H.O., M.V.S. and T.B.G. conceptualized the manuscript. F.H.O. prepared Fig. 1. All authors wrote and reviewed the main manuscript text.

Funding FHO is supported by Visiting Researcher grant (#23104.025114/2022-13; #23104.024938/2023-57) from UFMS, CAPES (Finance Code 001), and FUNDECT (TO: #192/2023). WOA is supported by a Research Productivity fellowship (#308534 2021-2) from CNPq. TBG is supported by a Young Researcher grant (#2022/09428-2) from FAPESP. This paper is part of the project "Evolution and biogeography of herpetofauna: patterns, process and implications for conservation under a scenario of environmental and climate changes" funded by FAPESP (#2021/07161-6).

Data availability No datasets were generated or analysed during the current study.

Declarations

Ethics approval Not applicable.

Conflict of interest The authors declare that they have no competing interests.

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