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PREDATION AND CONSUMPTION STRATEGIES OF BEES AND WASPS BY *POLYCHRUS ACUTIROSTRIS* (SPIX, 1825) (SAURIA: POLYCHROTIDAE) IN CERRADO, BRAZIL

PREDATION AND CONSUMPTION STRATEGIES OF BEES AND WASPS BY *POLYCHRUS ACUTIROSTRIS* (SPIX, 1825) (SAURIA: POLYCHROTIDAE) IN THE CERRADO, BRAZIL

ESTRATEGIAS DE DEPREDACIÓN Y CONSUMO DE ABEJAS Y AVISPAS POR POLYCHRUS ACUTIROSTRIS (SPIX, 1825) (SAURIA: POLYCHROTIDAE) EN EL CERRADO, BRASIL

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Resumo

Polychrus acutirostris (Spix, 1825) (Sauria: Polychrotidae) é um lagarto arborícola do Cerrado brasileiro, que emprega estratégias de predação oportunistas sobre insetos, incluindo abelhas e vespas. Este estudo descreve o comportamento alimentar da espécie em uma área rural próxima à rodovia em Andradina, São Paulo. Durante observações diurnas, um indivíduo foi registrado forrageando sobre uma árvore de Eucalyptus em flor, capturando diretamente cinco insetos polinizadores, incluindo três *Apis mellifera* e um *Polybia cf. sericea*. O lagarto utilizou sua cauda para aumentar o alcance, apoiando-se ocasionalmente sobre os membros posteriores, e manteve comportamento predatório contínuo, sem sinais de desconforto durante ataques a insetos com capacidade de ferrão. A captura de presas parece guiada por fatores como disponibilidade de alimento, valor nutricional e oportunidade, destacando a flexibilidade comportamental de *P.*

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acutirostris. A espécie ajusta sua dieta conforme a presença de insetos no ambiente, maximizando o sucesso alimentar. Observações de predação direta em flores são raras, sendo este o primeiro registro documentado de estratégias comportamentais envolvendo a predação de *Apis mellifera* e *Polybia cf. sericea* por *P. acutirostris*. Esses resultados contribuem para a compreensão das interações predador–presa em ecossistemas de cerrado, evidenciando a importância de registros oportunísticos para elucidar aspectos ainda pouco estudados da ecologia alimentar de lagartos arborícolas.

Palavras-chave: *Polychrus acutirostris*; *Apis mellifera*; *Polybia* cf. *sericea*; predação; Cerrado.

Abstract

Polychrus acutirostris (Spix, 1825) (Sauria: Polychrotidae) is an arboreal lizard from the Brazilian Cerrado that employs opportunistic predation strategies on insects, including bees and wasps. This study describes the feeding behavior of the species in a rural area near a highway in Andradina, São Paulo. During diurnal observations, an individual was recorded foraging on a flowering *Eucalyptus* tree, directly capturing five pollinating insects, including three *Apis mellifera* and one *Polybia cf. sericea*. The lizard used its tail to extend its reach, occasionally supporting itself on its hind limbs, and maintained continuous predatory behavior without showing signs of discomfort when attacking stinging insects. Prey capture appears to be influenced by factors such as food availability, nutritional value, and opportunity, highlighting the behavioral flexibility of *P. acutirostris*. The species adjusts its diet according to the presence of insects in the environment, maximizing foraging success. Direct predation observations on flowers are rare, and this represents the first documented record of behavioral strategies involving the predation of *Apis mellifera* and *Polybia cf. sericea* by *P. acutirostris*. These findings contribute to the understanding of predator–prey interactions in Cerrado ecosystems and underscore the importance of opportunistic records in elucidating previously understudied aspects of the feeding ecology of arboreal lizards.

Keywords: *Polychrus acutirostris*; Apis mellifera; Polybia cf. sericeia; predation; Cerrado.

Resumen

Polychrus acutirostris (Spix, 1825) (Sauria: Polychrotidae) es un lagarto arborícola del Cerrado brasileño que emplea estrategias de depredación oportunistas sobre insectos, incluyendo abejas y avispas. Este estudio describe el comportamiento alimentario de la especie en un área rural cercana a la carretera en Andradina, São Paulo. Durante observaciones diurnas, se registró un individuo forrajeando sobre un árbol de *Eucalyptus* en flor, capturando directamente cinco insectos polinizadores, incluyendo tres *Apis mellifera* y un *Polybia cf. sericea*. El lagarto utilizó su cola para aumentar el alcance, apoyándose ocasionalmente sobre sus miembros posteriores, y mantuvo un comportamiento depredador continuo, sin mostrar signos de incomodidad durante los ataques a insectos con capacidad de picadura. La captura de presas parece estar influenciada por factores como la disponibilidad de alimento, el valor nutricional y la oportunidad, destacando la flexibilidad comportamental de *P. acutirostris*. La especie ajusta su dieta según la presencia de insectos en el

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ambiente, maximizando el éxito alimentario. Las observaciones de depredación directa sobre flores son poco frecuentes, siendo este el primer registro documentado de estrategias comportamentales que involucran la depredación de *Apis mellifera* y *Polybia cf. sericea* por *P. acutirostris*. Estos resultados contribuyen a la comprensión de las interacciones depredador–presa en ecosistemas del Cerrado, subrayando la importancia de los registros oportunísticos para esclarecer aspectos aún poco estudiados de la ecología alimentaria de lagartos arborícolas.

Palabras-clave: *Polychrus acutirostris*; *Apis mellifera*; Polybia cf. sericeia; depredación; Cerrado.

1. Introdução

Pollinators provide one of the most important ecosystem services, pollination, which is essential for the reproduction of the majority of plants (Gazzoni 2022). It is estimated that 87% of plants are pollinated by animals, with insects being the primary pollinators, and among them, bees represent the most significant group (Ollerton et al. 2011; Rech et al. 2016). In addition to their role in pollination, bees also serve as a food source for various predators, establishing complex interaction networks within ecological communities (Del-Claro & Torezan-Silingardi 2010). Although the role of floral visitors in the reproductive success of plants has been extensively studied, there are still gaps in understanding predator-prey dynamics and how these relationships may influence community organization.

Predation is one of the primary biotic processes influencing population dynamics and community structure (Romero & Koricheva, 2011). In Brazil, bees constitute part of the diet of various opportunistic predator species, including mammals, birds, and some invertebrates (Roubik, 1989; Hilário & Imperatriz-Fonseca, 2003; Romero & Vasconcellos-Neto, 2004; Brechbühl et al., 2010; Silva-Neto et al., 2019). There are also reports, particularly from beekeepers, of frogs and geckos preying on bees, although such occurrences are less common (Sezerino et al., 2020).

Some mammals, such as coatis and jaguarundis, steal honey produced by bees and feed on adult bees. Others, including kinkajous, anteaters, small mustelids, and opossums, consume adult bees as well as larvae, while species like armadillos feed exclusively on honey and larvae (Roubik, 1989; Nogueira-Neto, 1997; Soares, 2021). Additionally, certain bird species, such as siriri, woodpeckers,

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bem-te-vi, and gato-de-asa, are known to prey on bees (Filho, 2002; Sezerino et al., 2020). These birds typically perch on the ground in front of hives, patiently waiting to capture bees emerging in search of forage. An important predator among invertebrates is the ant, which attacks hives to prey on adult bees, larvae, and occasionally honey. Weakened colonies are often unable to withstand ant attacks and become decimated. Stronger colonies may survive but usually incur significant losses, particularly of forager bees (Villas-Bôas, 2012; Sezerino et al., 2020).

In general, predation occurs at nests or in their immediate surroundings. However, there is a specific case that deviates from this pattern. Spiders from the Thomisidae family, for example, camouflage themselves within flowers, waiting for floral visitors to arrive in order to capture them (Carvalho et al., 2012). Unlike the other predators mentioned, which focus on hive predation, these spiders attack prey directly in the foraging environment, using their raptorial forelegs to ambush prey (Rocha-Filho & Rinaldi, 2011). Members of this family are capable of modifying their body color to reduce chromatic contrast with the flowers they are utilizing as foraging sites (Chittka, 2001).

Polychrus acutirostris (Spix, 1825) is an arboreal lizard species belonging to the family Polychrotidae, distributed across open vegetation formations in Argentina, Bolivia, and Brazil (Garda et al., 2012), specifically in the Cerrado and Caatinga biomes (Kawashita-Ribeiro & Ávila, 2008; Ribeiro et al., 2012). It is generally found near human habitats (Vanzolini, 1974). Its reproductive cycle occurs between September and October (Vitt & Lacher, 1981). It is a medium-sized, diurnal reptile that employs a sit-and-wait foraging strategy, primarily feeding on arthropods such as beetles and hymenopterans, as well as plant material including leaves, seeds, and flowers (Garda et al., 2012). The reproductive cycle occurs between September and October (Vitt & Lacher, 1981). In this study, we describe the feeding behavior of *Polychrus acutirostris* in the Cerrado.

2. Results and discussion

The observation took place in a rural area near a highway in the municipality of Andradina, São Paulo State (Coordinates: 20°52'23.42"S, 51°20'48.82"W),

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around 4:30 PM. The encounter was opportunistically recorded when the presence of an indeterminate-sex *Polychrus acutirostris* was observed perched at the highest point of a young Eucalyptus sp. tree, approximately 1 meter in height (Figure 1). The tree was flowering and surrounded by pollinating insects flying among the flowers. The lizard exhibited active behavior, attempting to capture insects circulating around the blossoms. The estimated duration of the observation was approximately 10 minutes.

Figure 1. *Polychrus acutirostris* preying on *Apis mellifera* and *Polybia* cf. *sericea* on *Eucalyptus* sp. flowers in the Cerrado, Brazil.

During this period, five individuals of *Apis mellifera* were recorded: three were captured through direct contact with the flowers, while two were caught in flight near the same. Additionally, predation on a *Polybia* cf. *sericea* was observed. No signs of

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discomfort or reactions to stings were noted during predation, suggesting that the animal did not display pain or irritation, thereby maintaining its predatory behavior. On specific occasions, the lizard supported itself on its hind limbs, using its tail to reach higher regions of the flowers and increase its mobility. During insect capture attempts, the lizard occasionally aimed inaccurately, biting at insects in flight or on the flowers, which resulted in the ingestion of floral parts.

Prey selection can be influenced by various factors. One such factor is the pursuit of specific nutrients at certain stages of the predator's life cycle, such as growth phases, reproductive periods, or nutritional deficiencies (Couto et al., 2025). *Apis mellifera* contains approximately 10 to 15% protein and, on average, 5% fat (Winston, 1991). These values are relatively low compared to the risk of stings, especially considering that some insect larvae can provide protein levels of up to 50% and fat content of approximately 35%, offering high energy value (Yandi et al., 2023) and posing no significant risk. Another factor that may facilitate this type of predation is opportunity; animals can, occasionally, become specialists in capturing certain prey when access to food is easy or during periods of abundance.

The foraging behavior and differential habitat use influence prey choice in *Polychrus acutirostris*, which can be classified as opportunistic foragers, adjusting their diet according to the available insect species to maximize feeding opportunities. Although previous records suggest the presence of Hymenoptera in minor proportions within the diet of *Polychrus acutirostris*, this constitutes the first documented behavioral report describing predatory strategies involving *Apis mellifera* and *Polybia* cf. *sericea*.

3. Conclusion

This study provides the first documented evidence of *Polychrus acutirostris* preying on pollinator insects, specifically *Apis mellifera* and *Polybia* cf. *sericea*, in the Brazilian Cerrado. The observations highlight the species' opportunistic foraging strategy, demonstrating behavioral flexibility in response to prey availability, nutritional value, and environmental opportunities. The use of perches, tail-assisted reach, and active predation on flowering trees illustrate an adaptive hunting strategy

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that maximizes feeding efficiency without apparent interference from stinging prey. These findings expand the understanding of predator–prey interactions in Cerrado ecosystems, showing that arboreal lizards can exploit prey traditionally considered high-risk. Overall, the study emphasizes the ecological relevance of opportunistic predation and provides new insights into the feeding ecology of *P. acutirostris*, enriching the understanding of community dynamics and trophic interactions in tropical savanna habitats.

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