







Report of intraguild predation of the scorpion *Physoctonus debilis* (C. L. Koch, 1840) (Scorpiones: Buthidae) by the assassin bug *Microtomus tibialis* Stichel, 1926 (Hemiptera: Reduviidae)

Registro de depredación intragremial del escorpión *Physoctonus debilis* (C. L. Koch, 1840) (Scorpiones: Buthidae) por la chinche *Microtomus tibialis* Stichel, 1926 (Hemiptera: Reduviidae)

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Abstract. Scorpions and assassin bugs are arthropod predators that may impact in trophic chain, coexisting in similar microhabitats and exhibiting antagonistic interactions. This study reports the first case of predation of the scorpion *Physoctonus debilis* by the assassin bug *Microtomus tibialis* in a Brazilian Seasonal Dry Tropical Forest biome. During a nocturnal collection, an adult individual of *M. tibialis* was observed, with the head and body facing downwards, while holding a female of *P. debilis*, with the aid of the mouthparts under the vegetation. Reports like these are important to understand the evolutionary dynamics and natural history of predators that cohabit in the same microhabitat.

Key words: Antagonistic interaction; assassin bug; Caatinga.

Resumen. Los escorpiones y las chinches asesinas son artrópodos depredadores que pueden impactar en la cadena trófica, coexistiendo en microhábitats similares y exhibiendo interacciones antagónicas. Este estudio reporta el primer caso de depredación del escorpión *Physoctonus debilis* por la chinche asesina *Microtomus tibialis* en un bioma de Bosque Tropical Seco Estacional Brasileño. Durante una colecta nocturna, se observó un individuo adulto de *M. tibialis* con la cabeza y el cuerpo hacia abajo, mientras sujetaba a una hembra de *P. debilis* con la ayuda del aparato bucal bajo la vegetación. Informes como estos son importantes para comprender la dinámica evolutiva y la historia natural de los depredadores que cohabitan en el mismo microhábitat.

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Palabras clave: Caatinga; chinche asesina; interacción antagónica.

Scorpions are considered ecologically important predators in arid and semi-arid habitats, as they play an ecological role in population control by capturing a wide variety of preys (Polis 1990; Stockmann 2010). Therefore, these animals may act at different levels in the trophic chain, exerting a direct influence on the flow of energy (McCormick and Polis 1990). However, scorpions may be subject to predation by several arthropods, such as spiders, ants, assassin bugs, and other scorpions (*e.g.*, Polis *et al.* 1981; Faúndez and Albornoz 2017; Rodríguez-Cabrera *et al.* 2020). This interplay between prey and predator involving scorpions and other arthropod predators may result in a combination of competition and predation for a similar resource (*e.g.*, prey source) (Polis *et al.* 1989; Duyck *et al.* 2004; Castro-Guedes *et al.* 2020). In arid regions, scorpions are mainly preyed by spiders and other scorpions (Polis *et al.* 1981; Lira *et al.* 2016a; McReynolds 2020), however records of insects acting as predators are scarce (*e.g.*, Stevenson and Stohlgren 2015; Lira *et al.* 2016b). Here, we report the first case of predation of a scorpion by an assassin bug in the Brazilian Seasonal Dry Tropical Forest (SDTF).

The observation was made during an active search carried out at night (19:00-22:00 h), in January 2023, in a SDTF fragment (Lat. -9.329045, Long. -40.5467983) located at Universidade Federal do Vale do São Francisco (UNIVASF), Petrolina municipality, Pernambuco state, Brazil. After the photographic record of the predation, the specimens were collected, taken to the laboratory, measured with a digital caliper and identified. Scorpion was identified based on Esposito *et al.* (2017), while the identification assassin bug followed Costa Lima (1935) and Coscarón *et al.* (2003). Voucher individuals were deposited in the Centro de Conservação e Manejo de Fauna da Caatinga at UNIVASF as follows:

***Microtomus tibialis*.** BRAZIL: Pernambuco - Caatinga remnant in *campus* of Universidade Federal do Vale do São Francisco; latitude -9.329045, longitude -40.5467983; 23.I.2023; André O. Silva-Júnior, Gabriel L. Celante, Adeilson M. Silva leg.; collected in trunk through active search; 1 adult female, preserved in alcohol 70%. ***Physoctonus debilis*.** BRAZIL: Pernambuco - Caatinga remnant in *campus* of Universidade Federal do Vale do São Francisco; latitude -9.329045, longitude -40.5467983; 23.I.2023; André O. Silva-Júnior, Gabriel L. Celante, Adeilson M. Silva leg.; collected in trunk through active search; 1 adult female, preserved in alcohol 70%.

An adult female individual of *Microtomus tibialis* Stichel, 1926 (Hemiptera: Reduviidae) (23 mm total length) was found oriented vertically on the tree trunk, approximately 1.70 m above the ground, with the head and body facing downwards holding an adult female of *Physoctonus debilis* (C. L. Koch, 1840) (Scorpiones: Buthidae) (12 mm total length) with the aid of the mouthpiece inserted in the penultimate segment of the scorpion mesosoma (Fig. 1). Representatives of the genus *Microtomus* Illiger, 1807 can be found on tree bark (Stevenson and Stohlgren, 2015), similar microhabitat used by *P. debilis* (Lira *et al.* 2018). Usually, assassin bugs capture their preys using a sit-and-wait strategy (Masonick 2020), thus, the shared microhabitat may facilitate the encounter between prey and predator. It is important to note that *M. tibialis* possess almost twice the size of the scorpion. Despite their difference in body size, scorpion may be a dangerous prey because their ability to inject venom through their stinger. However, assassin bugs are able to use poisonous saliva to paralyze their prey (Evangelin *et al.* 2014). This ability allows these insects capture dangerous preys as previously reported in the predation of the scorpions *Centruroides hentzi* Banks, 1900 and *Tityus pusillus* Pocock, 1893 by *Microtomus purcis* (Drury, 1782) and Harpactorini assassin bug, respectively (Stevenson and Stohlgren 2015; Lira *et al.* 2016b).



Figure 1. Adult female of *Microtomus tibialis* capturing a *Physcoctonus debilis* scorpion in the trunk in a Caatinga fragment located in the municipality of Petrolina, Pernambuco, Brazil. / Hembra adulta de *Microtomus tibialis* capturando un escorpión *Physcoctonus debilis* en tronco en un fragmento de Caatinga ubicado en el municipio de Petrolina, Pernambuco, Brasil.

The observation reported here expands the list of scorpion predators in the Brazilian SDTF, in addition to strengthening the main concepts of intraguild predation being mediated by body size and predator strategy (e.g., poisonous saliva in assassin bugs). More studies are needed to better understand predator-prey interactions between scorpions and assassin bugs, which is an important milestone in understanding the evolution and ecology of animals that share the same microhabitat.

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