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Reports of centipede (Chilopoda: Scolopendromorpha) predation by scorpions (Scorpiones: Buthidae) in the Brazilian Atlantic forest

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Abstract: Chilopoda are venomous predators that feed on other arthropods, mostly small, even for their predation capacity. However, this group can often serve as prey for other groups of invertebrates, such as scorpions. These arachnids are voracious hunters that are able to prey on a wide variety of invertebrates and small vertebrates. Despite their generalist diet, field observations of prey capture is scarce in neotropical enviroments, mainly with dangerous prey. Here we report two predation events involving scorpions and centipedes in the Brazilian Atlantic forest, thus contributing to a better knowledge of these predators, mostly generalists.
Key words: Scorpiones, Buthidae, *Tityus pusillus*, *Tityus brazilae*, Chilopoda, predation, Brazil, Atlantic Forest.

Registros de depredación de ciempiés (Chillopoda: Scolopendromorpha) por escorpiones (Scorpiones: Buthidae) en el Bosque Atlántico brasileño
Resumen: Los quilópodos son depredadores venenosos que se alimentan de otros artrópodos, en su mayoría pequeños, incluso por su capacidad depredadora. Sin embargo, este grupo muchas veces puede servir de presa para otros grupos de invertebrados, como los escorpiones. Estos arácnidos son cazadores voraces que son capaces de cazar una amplia variedad de invertebrados y vertebrados pequeños. A pesar de su dieta generalista, las observaciones de campo de la captura de presas son escasas en ambientes neotropicales, principalmente con presas peligrosas. Aquí reportamos dos casos de depredación protagonizados por escorpiones y quilópodos en el bosque atlántico brasileño, contribuyendo así a mejorar el conocimiento sobre estos depredadores, en su mayoría generalistas.
Palabras clave: Scorpiones, Buthidae, *Tityus pusillus*, *Tityus brazilae*, Chilopoda, depredación, Brasil, bosque atlántico.

Centipedes belong to the Chilopoda class, which has more than 3,000 species with a cosmopolitan distribution (except Antarctica) (Edgecombe & Giribet, 2007). These invertebrates are venomous predators that feed other arthropods, most of them small (Brusca & Brusca, 2015). Despite centipedes being predators of many taxa, they are also constantly subjected to predation by invertebrates, such scorpions (McCormick & Polis, 1990; Barro & Cherva, 2013; Rodríguez-Cabrera *et al.,* 2015). These arachnids are voracious hunters, preying a wide range of invertebrates and even small vertebrates (e.g., Córdoba & Otero, 2000; Lira *et al.*, 2017; Polis, 1986). Eventually, scorpion prey item includes poisonous animals such as spiders, miryapods and others scorpions (McCormick & Polis, 1990). Despite their generalist diet, knowledge about Brazilian scorpion prey item in field remains fragmented (e.g., Battirola *et al*., 2015; Lira *et al*., 2017a, b). In this country, predation records of venomous preys are rare and quite recent (Battirola *et al*., 2015; Lira *et al*., 2017a, b). For example, Battirola *et al.* (2015) found an individual of *Tityus strandi* Werner, 1939 preying *Ancylometes rufus* (Walckenaer, 1837) spider in an Amazon Forest remnant. In similar way, Lira *et al*. (2017a, b) reported an intraguild predation in Atlantic Forest and Caatinga biomes. In these reports, *Ananteris mauryi* Lourenço, 1982 and *Ananteris otavianoi* Lira, Pordeus and Albuquerque, 2017 were preyed by *Tityus pusillus* Pocock, 1893 individuals. Here, we report two cases of centipede predation by scorpions, during a nocturnal sampling in the Brazilian Atlantic Forest.

All the centipede predation events were recorded through nocturnal sampling between 19:00-22:00 h. First observation was made on November-2014 in Atlantic Forest remnant (49.6 ha) belong to Reserva Particular de Patrimônio Natural Fazenda Santa Rita (08°41'31.4" S 035°29'49" W), Água Preta municipality, Brazil. The second observation was made on January-2021 in Atlantic Forest remnant (200 ha) belong to Tapacurá Ecological Station (8º2'12" S 35º11'41"W), São Lourenço da Mata municipality, Brazil. After the photographical record of the predation events, scorpions and their prey were collected. Animals were stored in ethanol 70% and a *posteriori*, scorpions were identified according to Lourenço (2002). Centipedes lost important characters for identification, and thus were identified at the order level (Scolopendromorpha). Voucher specimens were deposited in the Arachnological Collection of Universidade Federal de Pernambuco, Brazil.

In the first case, an adult female of the scorpion *Tityus brazilae* Lourenço & Eickstedt, 1984 was found on a tree trunk about 1 m above the ground holds a scolopendromorph centipede in their pedipalps and chelicerae. When disturbed, the predator fled to leaf litter with the centipede in its mouthparts, without releasing its prey. In the second case, an adult female of the scorpion *T. pusillus* feeding a scolopendromorph centipede on upper leaf litter layer (Figure 1). When disturbed, the predator fled to below a fallen log with the centipede in its mouthparts, without releasing its prey.

Although the exact timing of the capture of centipedes by scorpions has not been recorded, the active behavior of the prey and the similar use of microhabitat (e.g., leaf litter) by these invertebrates may have facilitated the prey-predator encounter. Scorpions are sedentary predators that live close to their prey and use the sit-and-wait tactic to capture prey (Polis & McCormick, 1986). This scorpion hunting mechanism is particularly effective for highly mobile prey such as centipedes. For example, Rodríguez-Cabrera *et al*. (2015) argues that centipedes may have been a common prey of scorpions in Cuba. These authors suggests that *Centruroides gracilis* (Latreille, 1805) scorpion, act as habitual predator for centipedes from three genera. However, the centipedes can easily become potential prey due to their venom and the predator can easily become potential prey.

In conclusion, the observations reported in this study contributes to information about the prey-predator interactions between scorpions and centipedes from Brazil. In addition, our findings



Fig 1. *Tityus pusillus* Pocock, 1893 female preying a scolopendromorph centipede in a Brazilian Atlantic Forest.

expanding the list of scorpions' invertebrate prey. Finally, to our knowledge, this is the first report of a centipede predation by these arachnids in the Atlantic Forest.

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