Revista Ibérica de Aracnología, nº **32** (30/06/2018): 121–122.
Grupo Ibérico de Aracnología (S.E.A.). ISSN: 1576 - 9518.

Scorpion predation by spiders in a Brazilian urban environment (Scorpiones, Araneae)

David de S. Gadelha[1], Arthur A.C. Silva-Filho[2] & André F.A. Lira[3]*

[1] Universidade Federal de Pernambuco, UFPE, Rua Prof. Moraes Rego S/N, Cidade Universitária, Recife, Pernambuco, CEP 50670-420, Recife, PE, Brazil.
[2] Centro de Estudos Fernando Beltrão, Rua Benfica 480, CEP 50720-001, Recife, PE, Brazil.
[3] Programa de Pós-graduação em Biologia Animal, Departamento de Zoologia, Universidade Federal de Pernambuco, UFPE, Rua Prof. Moraes Rego S/N, Cidade Universitária, Recife, Pernambuco, CEP 50670-420, Recife, PE, Brazil.
* Author for correspondence: andref.lira@gmail.com

Abstract: Most reports on scorpion predation by spiders correspond to areas with natural vegetation, and there have been no such events reported from Brazilian urban areas. We describe herein the predation of the buthid scorpion *Tityus stigmurus* (Thorell 1876) by spiders *Nesticodes rufipes* (Lucas 1846) (Theridiidae) and *Mesabolivar* sp. (Pholcidae) inside a human residence in a Brazilian north-eastern region. In both cases, juvenile scorpions were paralysed and wrapped in silk, with the spiders feeding on their fluids. These new records contribute to a better understanding of the interspecific relationships between these arachnids in an urban environment.
Key words: Scorpiones, Buthidae, Araneae, Theridiidae, Pholcidae, natural history, intraguild predation, Brazil.

Depredación de escorpiones por arañas en un ambiente urbano brasileño (Arachnida: Scorpiones, Araneae)
Resumen: La mayoría de los informes sobre la depredación de escorpiones por arañas corresponden a áreas con vegetación natural; en Brasil no se han publicado eventos de este tipo ocurridos en áreas urbanas. Presentamos aquí la depredación del escorpión bútido *Tityus stigmurus* (Thorell 1876) por las arañas *Nesticodes rufipes* (Lucas 1846) (Theridiidae) y *Mesabolivar* sp. (Pholcidae) dentro de una residencia humana en una región del noreste de Brasil. En ambos casos, los escorpiones juveniles estaban paralizados y envueltos en seda, y las arañas se alimentaban de sus fluidos. Estos nuevos registros contribuyen a una mejor comprensión de las relaciones interespecíficas entre estos arácnidos en un entorno urbano.
Palabras clave: Scorpiones, Buthidae, Araneae, Theridiidae, Pholcidae, historia natural, depredación intragremial, Brasil.

Predation refers to the consumption of one organism (prey) by another (predator), whereby the former is alive when attacked and consumed by the second. Despite scorpions being predators of many taxa, these arachnids are also constantly subjected to predation by vertebrates and invertebrates (e.g. Mccormick & Polis, 1990; Žagar *et al.*, 2011; Jablonsk *et al.*, 2015; Lira *et al*., 2017). Most reports on spiders are associated with black widows (Theridiidae), wandering spiders (Ctenidae), wolf spiders (Lycosidae), crab spiders (Thomisidae), tarantulas (Theraphosidae), caponiids (Caponiidae), and six-eyed sand spiders (Sicariidae) (McCormick & Polis, 1990; Teruel & Sánchez, 2000; Lourenço *et al*., 2006; Teruel & Armas, 2012; Lira & Costa, 2014; Lira *et al*., 2016). However, these reports correspond to areas with natural vegetation, with only one report for urban areas (Armas, 2016). Thus, the first cases of scorpion predation by red house spider (Theridiidae) and cellar spider (Pholcidae) in a Brazilian urban environment, are herein reported.

All observations were made in June 2017, between 1900 and 2300 hours, in an urban area of Olinda municipality (08° 00' 32" S; 34° 51' 18" W), north-eastern Brazil. This municipality is inhabited by over 390,000 people (IBGE, 2016). The average annual temperature is 26°C with mean annual rainfall of 1,700 mm, which is concentrated between the months of April and July (APAC, 2017). Voucher specimens were deposited in the Arachnological Collection of Universidade Federal de Pernambuco, Brazil.

In the first case, an adult female of the cellar spider *Mesabolivar* sp. (Pholcidae) was found inside a human residence beneath a sofa feeding on a juvenile *Tityus stigmurus* (Thorell, 1876) (carapace length = 3.2 mm). The scorpion was wrapped in silk within the spider's web. In the second case, an adult female of the red house spider *Nesticodes rufipes* (Lucas, 1846) (Theridiidae) was found inside a human residence on the corner of a wall preying on a young *T. stigmurus* individual (carapace length = 4 mm) (Figure 1). All scorpions were paralyzed, with the spiders feeding on their fluids. The spider and scorpion species involved in the antagonistic relationships reported in the present study are considered synanthropic,



Fig. 1. *Nesticodes rufipes* (Araneae, Theriidiidae) feeding on a juvenile *Tityus stigmurus* (Scorpiones, Buthidae) in a Brazilian urban environment. Photo by Cinara S. Silva.

and can be found both inside and around human residences (Gonzalez, 1989; Lira-da-Silva et al., 2009; Sekhar & Jose, 2017). *Tityus stigmurus* is the principal medically important scorpion species in the northeast region of Brazil; scorpionism by this species can cause death in children (Albuquerque *et al*., 2013; Pucca *et al*., 2015).

Our predation records were obtained during periods of high rainfall, and previous studies have shown that scorpions leave their habitats in response to an increase in rainfall looking for shelter inside the residences (Lira-da-Silva *et al*., 2009; Albuquerque *et al*., 2013). This enhances their probability of contact with spiders inside residences. It is probable that these scorpions were captured while

they walked across the floor, as these spiders prey capture touching sues capture vertical wires. However, predation events by spiders on scorpions, as described in the present study, may be considered occasional, whilst cellar spiders and red house spiders are considered opportunistic predators that capture a wide variety of arthropods (Nentwig, 1983; Rossi *et al*., 2005).

We are very grateful to Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) for providing the doctoral scholarship to AFAL.

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