

First record of predation of the scorpion *Tityus footei* Chamberlin, 1916 (Scorpiones: Buthidae) by the spider *Sicarius cf. boliviensis* Magalhaes, Brescovit & Santos, 2017 (Araneae: Sicariidae) in Peru

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Abstract: Predation of scorpions by other arachnids is a seldom observed behavior. As part of a common guild, these arachnids are direct competitors for the same resources and can occasionally prey on each other. Here, we are recording a new case of predation of the scorpion *Tityus footei* by *Sicarius cf. boliviensis* spider in the warm inter-Andean valleys of southern Peru. Both organisms, were found during the night of August 22, 2023, in the middle of a dry season. Although the total length of the spider's body was half that of the scorpion, *S. cf. boliviensis* captured the scorpion by successfully biting through the ventral part of its body, thus immobilizing the prey. Probably the spider's longer legs and its hunting strategies advantageously facilitate the capture. This is the first record of scorpion predation by a spider in Peru.

Keywords: natural history, intra-gremial predation, inter-Andean valleys, South America.

Primer registro de depredación del escorpión *Tityus footei* Chamberlin, 1916 (Scorpiones: Buthidae) por la araña *Sicarius cf. boliviensis* Magalhaes, Brescovit & Santos, 2017 (Araneae: Sicariidae) en Perú.

Resumen: La depredación de escorpiones por otros arácnidos es un comportamiento raramente observado. Como parte de un gremio común, estos arácnidos son competidores directos por los mismos recursos y ocasionalmente pueden depredarse mutuamente. Aquí, registramos un nuevo caso de depredación del escorpión *Tityus footei* por la araña *Sicarius cf. boliviensis* en los cálidos valles interandinos del sur de Perú. Ambos organismos, fueron encontrados durante la noche del 22 de agosto de 2023, en plena estación seca. Aunque la longitud total del cuerpo de la araña era la mitad de la del escorpión, *S. cf. boliviensis* capturó exitosamente al escorpión con sus quelíceros por la parte ventral del cuerpo, inmovilizando. Probablemente las patas más largas de la araña y sus estrategias de caza facilitaron ventajosamente la captura. Este es el primer registro de depredación de escorpiones por una araña en Perú.

Palabras clave: historia natural, depredación intragremial, valles interandinos, Sudamérica.

Spiders and scorpions are considered generalist predators and part of a common guild (Punzo, 2008). Scorpions have specialized trichobothria (sensory organs) in their pedipalps and can inject venom with their stingers into their prey, allowing them to be efficient predators of a wide range of organisms (Brownell, 1984; McCormick & Polis, 1990). Likewise, spiders of the genus *Sicarius* Walckenaer, 1847; possess a considerably toxic venom that allows them to feed on different types of prey, such as small insects, other spiders, centipedes, and even geckos (Binford *et al.*, 2009; Magalhaes *et al.*, 2017; Taucare-Ríos & Piel, 2020).

Spiders of the genus *Sicarius* and scorpions may be therefore direct competitors for the same resources, and sometimes they can prey on each other (Polis and McCormick 1986; Polis, 1991; Punzo, 2008). However, reports of *Sicarius* predation on scorpions are scarce. For example, in the Caatinga, a dry biome exclusive to Brazil, a specimen of *Sicarius* was recorded feeding on a juvenile scorpion *Rhopalurus rochai* Borelli, 1910; which, having a soft exoskeleton, was more vulnerable to predation than adults (Lira *et al.*, 2016). A second case was reported in Antofagasta in northern Chile, where the *Bachistosternus mattoni* Ojanguren-Affilastro, 2005 scorpion; was predated by *Sicarius thomisoides* Walckenaer, 1847; *B. mattoni* is a small scorpion that was possibly attacked by ambush (Taucare-Ríos & Iuri, 2021).

Here, a new case of predation of a scorpion by a *Sicarius* spider was recorded in the warm inter-Andean valleys of the locality of Cconoc (Curahuasi, Apurímac, Peru), during the dry season. This biome, formed by the Apurímac, Pachachaca, and Pampas rivers in the Andes of Cusco, Apurímac, and Ayacucho, are environments with a warm and dry climate between 1800 and 2800 m altitude. They have steep slopes and deep canyons where the characteristic vegetation is xerophytic such as forests, pluvifolious scrubs and numerous thorny plants (Weberbauer, 1945; Ochoa, 2005).

During a night walk on 22-VIII-2023, with the help of a black light, we observed several specimens of *Sicarius cf. boliviensis* Magalhaes, Brescovit & Santos, 2017; and *Tityus footei* Chamberlin,

1916 along a trail on a slope (Lat. 13°32'43"S, Long 72°38'10"W, 1950 m a.s.l.). Then, in the middle of the dry sandy and stony ground, we detected a specimen of *S. cf. boliviensis* with its chelicerae inserted in the ventral part (apparently doing damage to the pleura) of the scorpion *T. footei*, almost immobilized (fig. 1). The spider, identified using the work of Magalhaes *et al.* (2017), has a total body length of 17 mm, while the scorpion, determined following Ochoa (2005), almost doubled the spider length (tail included). This is the first record of scorpion predation by a spider in Peru.

Species of the genus *Tityus* have a quite powerful venom and they are considered medically important for being responsible of severe envenomation in humans (Bücherl, 1971; de Roodt *et al.*, 2014). It is therefore rather surprising that a relatively small-sized spider hunted a *Tityus* specimen. Although we do not know how the scorpion was captured, it can be considered that the long legs of the spider *S. cf. boliviensis* could have been a determining factor in the predation of the scorpion. In addition, according to the hunting strategies described in the literature for both organisms, the active search strategy of buthid scorpions (McCormick & Polis, 1990), which allows them to attack by raising their powerful and poisonous tail; in contrast to the sit-and-wait hunting strategy of *Sicarius*, staying buried and hidden under the sand, probably enables it to advantageously catch its prey by ambush (Reiskind, 1969; Schoener, 1971; Magalhaes *et al.*, 2017; Taucare-Ríos & Iuri, 2021).

Although some cases of intragremial predation among scorpions by other arachnids have been studied (*e.g.*, Faúndez & Alborno, 2017; Duberstein & Sherwood, 2020; Rodríguez-Cabrera *et al.* 2020; Galindo Bernal, 2022), they have not been commonly reported. Because scorpions and spiders are part of a common ecological species assemblage (guild) they might be linked by different aspects such as competition by interference, exploitation of limited resources (food, territory, shelter), and predation (Punzo, 2008). Therefore, in this study, it is possible that due to the scarcity of prey and the dry fact, unlike in other cases of intraguild predation of *Sicarius* on a scorpion, where the scorpion prey was characterized as smaller or

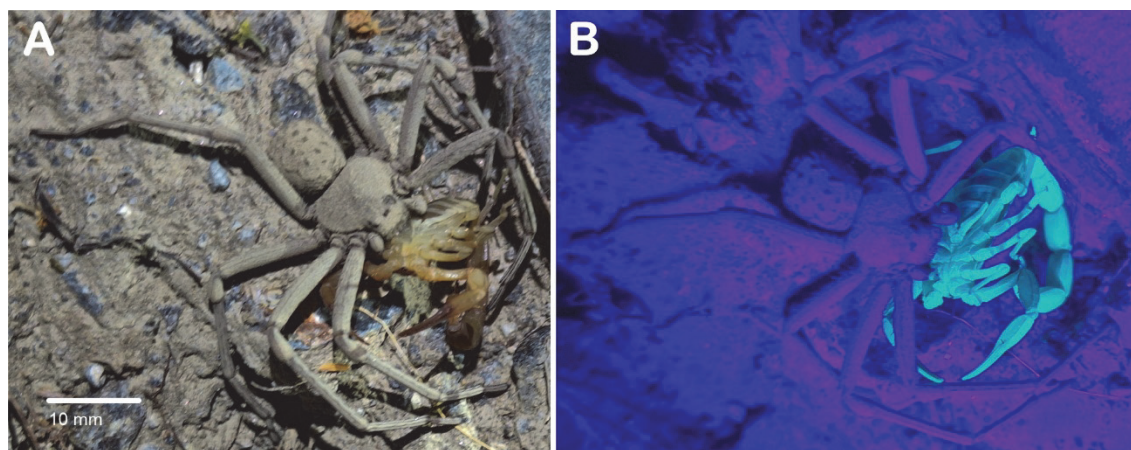


Figure 1. *Sicarius cf. boliviensis* feeding on the scorpion *Tityus footei* in Peru. A. Nocturnal photograph made using electronic flash. B. The same specimens were photographed under ultraviolet light.

season, the spider *S. cf. boliviensis* may have risked fighting against a deadly enemy (Finke & Denno 2002, Polis & McCormick, 1987). In juvenile (Lira *et al.*, 2016; Taucare-Ríos & Iuri, 2021), in the present report, both specimens were potential adult competitors and the scorpion prey was larger than the predatory spider. So, within the same guild, arachnids can be dangerous prey because the predator might end up being the prey of the one it was going to hunt (Polis *et al.*, 1989).

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