



NOTA

New predatory interaction of *Trichonephila clavipes* (Linnaeus, 1767) (Araneae: Nephilidae) on *Fidicina* Amyot & Audinet Serville, 1843 (Hemiptera: Cicadidae) in a forest fragment of the Neotropical region

Una nueva interacción depredadora de *Trichonephila clavipes* (Linnaeus, 1767) (Araneae: Nephilidae) sobre un *Fidicina* Amyot & Audinet Serville, 1843 (Hemiptera: Cicadidae) en un fragmento de bosque de la región neotropical

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Abstract

Trichonephila clavipes (Linnaeus, 1767) (Araneae: Nephilidae) is an orb web-building spider whose diet is primarily based on flying insects. This note aims to report the first predatory interaction of *T. clavipes* on a cicada of the genus *Fidicina* Amyot & Audinet Serville, 1843 (Hemiptera: Cicadidae) in a fragment of the Atlantic Forest in Brazil. The predation event was observed (*ad libitum*) in the Benjamin Maranhão Botanical Garden situated in the Mata do Buraquinho Wildlife Refuge, northeastern Brazil. A specimen of *Fidicina* sp. was found freshly dead and trapped in the web of *T. clavipes*. The nephilid was observed moving slowly between the ventral and dorsal regions of the *Fidicina* sp. without weaving a web around the cicadid. Then, *T. clavipes* was observed perched on the left side of the *Fidicina* sp., with its pedipalps

► Ref. bibliográfica: Assis, H. Y. E. G.; Lima, S. F. B.; 2026. "New predatory interaction of *Trichonephila clavipes* (Linnaeus, 1767) (Araneae: Nephilidae) on *Fidicina* Amyot & Audinet Serville, 1843 (Hemiptera: Cicadidae) in a forest fragment of the Neotropical region". *Acta Zoológica Lilloana* 70 (2): 879-890. DOI: <https://doi.org/10.30550/j.azl/2499>

► Recibido: 31 de julio 2026 – Aceptado: 1 de septiembre 2026.

► URL de la revista: <http://actazoologica.lillo.org.ar>



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and chelicerae manipulating the thorax of the cicada. The spider had its second and third pairs of legs on the cicada, while the first and fourth pairs of legs were supported on the web. The spider always remained close to the cicada, without making any atypical movements even during the approach for observation and photographic recording or when the wind gently swayed the web. *Trichonephila clavipes* has a vital ecological role in controlling the population of flying insects. However, there are numerous aspects of the predatory interaction of *T. clavipes* that need further study, such as the insect richness that the species feeds on, as well as the feeding behavior of the nephilid.

Keywords: Arachnida, arthropods, Cicadoidea, Cicadinae, predator-prey interactions.

Resumen

Trichonephila clavipes (Linnaeus, 1767) (Araneae: Nephilidae) es una araña tejedora de telas orbiculares cuya dieta se basa principalmente en insectos voladores. Esta nota tiene como objetivo reportar la primera interacción depredadora de *T. clavipes* sobre una cigarra del género *Fidicina* Amyot & Audinet Serville, 1843 (Hemiptera: Cicadidae) en un fragmento de la Mata Atlántica en Brasil. El evento de depredación se observó (*ad libitum*) en el Jardín Botánico Benjamín Maranhão, ubicado en el Refugio de Vida Silvestre Mata do Buraquinho, noreste de Brasil. Se encontró un espécimen de *Fidicina* sp. recién muerto y atrapado en la tela de *T. clavipes*. Se observó al nefílido moviéndose lentamente entre las regiones ventral y dorsal de *Fidicina* sp. sin tejer una tela alrededor de la cigarra. Luego, se observó a *T. clavipes* posada en el lado izquierdo de *Fidicina* sp., con sus pedipalpos y quelíceros manipulando el tórax de la cigarra. La araña tenía su segundo y tercer par de patas sobre la cigarra, mientras que el primer y cuarto par se apoyaban en la telaraña. La araña permaneció siempre cerca de la cigarra, sin realizar movimientos atípicos, ni siquiera durante el acercamiento para la observación y la toma de fotografías, ni cuando el viento mecía suavemente la telaraña. *Trichonephila clavipes* desempeña un papel ecológico vital en el control de la población de insectos voladores. Sin embargo, existen numerosos aspectos de la interacción depredadora de *T. clavipes* que requieren mayor estudio, como la diversidad de insectos de los que se alimenta la especie, así como el comportamiento alimentario del nefílido.

Palabras clave: Arachnida, artrópodos, Cicadoidea, Cicadinae, interacciones depredador-presa.

Arthropods are the most biodiverse and successful metazoans on Earth and constitute a dominant ecological group of multiple ecosystems (Chakravarthy et al., 2016; Hébert, 2023; Lewthwaite et al., 2024). Terrestrial arthropods form a complex assemblage of invertebrates in different phytogeographic domains, prevailing in species richness, abundance, biomass, and trophic interactions within the animal kingdom (Rosenberg et al., 2023; Sharma, 2023; Seymour et al., 2024).

Spiders are predatory arthropods with vast taxonomic and functional diversity associated with terrestrial ecosystems (Cardoso et al., 2025; Pereira et al., 2025). These organisms occupy diverse microhabitats (Rodrigues et al., 2016; Barton et al., 2017) and offer a spectrum of crucial ecosystem services (Cardoso et al., 2025). Spiders are abundant, obligate generalist predators on a wide variety of phytophagous, saprophagous, and predatory arthropods, thus regulating the population growth of these guilds through complex interactions (Hébert, 2023; Cardoso et al., 2025).

The golden silk orb-weaver, *Trichonephila clavipes* (Linnaeus, 1767), is an abundant araneid spider with wide geographic distribution throughout the Americas. This species lives in association with distinct plant communities under different climatic conditions at low to high altitudes (Cubas-Rodriguez and Brescovit, 2024; Cazorla and Alarcón, 2025; Porto, 2025). *Trichonephila clavipes* is also adapted to living in human-dominated spaces due to several ecological advantages (Silva et al., 2023; Cubas-Rodriguez and Brescovit, 2024; Custódio et al., 2024; Cazorla and Alarcón, 2025; Feitosa et al., 2025; Carvalho et al., 2026).

Trichonephila clavipes has a diet primarily based on flying insects (Robison and Mirick, 1971; Silva et al., 2023; Custódio et al., 2024; Shirai et al., 2024; Porto, 2025), with rare records of the spider preying on small vertebrates, such as amphibians (Porto, 2025). It is an orb web-building spider, which enables it to capture its prey and also provides a favorable environment for smaller inquiline spiders (Feitosa et al., 2025). The cicada, *Quesada gigas* (Olivier, 1790) [Order Hemiptera], the Helenor Blue Morpho butterfly, *Morpho helenor* (Cramer, 1776) [Order Lepidoptera], and the social wasp, *Protopolybia sedula* (de Saussure, 1854) [Order Hymenoptera] are among the flying insects that *T. clavipes* preys upon in its web (Silva et al., 2023; Custódio et al., 2024; Shirai et al., 2024).

Cicadas are medium size to large (adult body length: 1 to 7 cm) hemipteran insects, the vast majority of which reside in tropical ecosystems and belong to the family Cicadidae Latreille, 1802 (Sanborn, 2008; Simões et al., 2013; Barreto and Porfiro, 2015). Cicadas are found in a number of intact or anthropogenically modified ecosystems, including rural and urban areas (Aoki et al., 2010; Nunes et al., 2023). Cicadas have a fascinating life cycle that varies between one and 17 years (Sanborn, 2008). Males usually emit specific sounds to attract females during the reproductive period (Sanborn, 2008; Nunes et al., 2023; Sanborn et al., 2024).

Certain cicadas are considered pests of ornamental plants and agricultural crops (Ribeiro et al., 2006; Neto, 2008; Sanborn, 2008; Santos and Martinelli, 2009; Aoki et al., 2010; Kubota et al., 2011; Barreto and Porfiro, 2015). Although *T. clavipes* is recognized here as a potential predator of cicadas, there is only the documented record of this spider feeding on the species *Q. gigas* (Custódio et al., 2024).

In the present report, we describe the first predatory interaction of *T. clavipes* on a cicada of the tribe Fidicinini Distant, 1905 and genus *Fidicina* Amyot & Audinet Serville, 1843 in a fragment of the Atlantic Forest in Brazil.

The predation event on a cicada by the spider was observed (*ad libitum*) for approximately 20 minutes and photographed on April 17, 2026, at 12:20 PM in the *Jardim Botânico Benjamim Maranhão* (Benjamin Maranhão Botanical Garden). The botanical garden is situated in the Mata do Buraquinho Wildlife Refuge under the coordination of the *Superintendência de Administração do Meio Ambiente* (SUDEMA) [Superintendency of Environmental Administration] located in the city of João Pessoa, state of Paraíba, northeastern Brazil (Paraíba, 2025; Gadelha Neto et al., 2026) (Figure 1). The wildlife refuge (07°08'42" S, 34°51'54" W) is a predominant remnant of lowland semideciduous seasonal Atlantic Forest (area: 512.93 hectares; perimeter: 9,589.32 meters) and is recognized as one of the largest areas of native urban forest in Brazil (Paraíba, 2025; Gadelha Neto et al., 2026; Menezes and Souza, 2026). The refuge plays an important role in the protection and preservation of high biological diversity and its unique genetic heritage, as well as having considerable scenic and cultural importance to the region (Paraíba, 2025; Gadelha Neto et al., 2026; Vasconcellos et al., 2026). The forest has diverse landscapes ranging from layers of leaf litter, seedlings, and trees with a small trunk diameter to large trees, including portions with clear vegetation renewal (Pereira Filho et al., 2017). The climate is tropical, hot and humid, with a rainy season between March and August and dry season mainly between October and December. The average annual temperature is 27°C and average annual rainfall ranges from 1.600 mm to 1.800 mm (Pereira Filho et al., 2017; Azevedo and Barbosa, 2026). The soil is predominantly red-yellow argisol (Paraíba, 2025; Menezes and Souza, 2026), with areas that are seasonally or permanently flooded (Menezes and Souza, 2026). *Trichonephila clavipes* is an araneid spider previously recorded in the Mata do Buraquinho Wildlife Refuge, with no information on its ecological aspects in this remnant of the Atlantic Forest (Carvalho et al., 2026).

The ecological interaction between an adult female of *T. clavipes* ($\approx$ 30 mm: cephalothorax–abdomen length) and a cicadid of the genus *Fidicina* ($\approx$ 52 mm: head–thorax–abdomen length) was observed casually for about 20 minutes on April 17, 2026, at 12:20 PM, in a semi-open wooded area alongside a forest trail near the edge of the forest during maintenance work on one of the ecological trails of the study area.

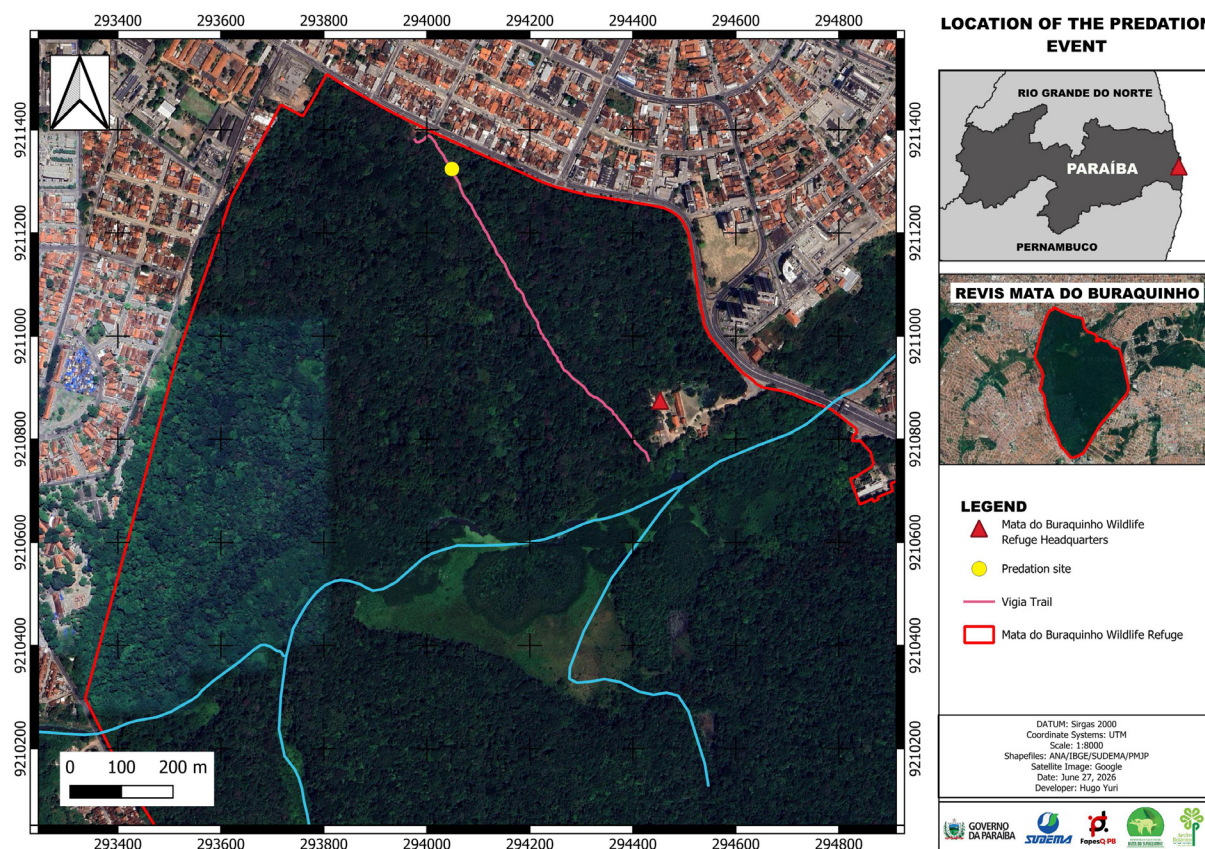


Figure 1. Map of study area showing location of predation event in Benjamin Maranhão Botanical Garden situated in Mata do Buraquinho Wildlife Refuge, state of Paraíba, northeastern Brazil.

Figura 1. Mapa del área de estudio que muestra la ubicación del evento de depredación en el Jardín Botánico Benjamin Maranhão, situado en el Refugio de Vida Silvestre Mata do Buraquinho, estado de Paraíba, noreste de Brasil.

A specimen of *Fidicina* sp. was found freshly dead and trapped in the web of *T. clavipes* (Figure 2A). The web was built attached to small-diameter tree trunks in a shaded area of the forest containing leaf litter, fragments of fallen dry branches, low-lying vegetation covering the ground, and tree trunks with a small to large diameter. The cicada was observed with its head hanging down and attached mainly by its left ventral region to the edges of an orb web approximately 50 centimeters in diameter, which was built approximately 1.8 meters from the ground. The nephilid was observed for about five minutes moving slowly between the ventral and dorsal regions of the specimen of *Fidicina* sp. without weaving a web around the cicadid. Most of the time, *T. clavipes* was observed perched on the left side of the *Fidicina* sp., with its pedipalps and chelicerae manipulating the thorax of the cicada. At this moment of prey manipulation, the spider had its second and third pairs of legs on the cicada, while the first and fourth pairs of legs were supported on the web. The spider always remained close to the cicada, without making any atypical movements even during the approach for

observation and photographic recording or when the wind gently swayed the web. The animals were not handled and were left in place. As the observer (first author) had to leave the area, it was not possible to observe the conclusion of the predation event with the consumption of the prey. On April 18, 2026, at 10:50 AM, Hugo Assis returned to the study site and found only the specimen of *T. clavipes* on its web (Figure 2B).

Trichonephila clavipes is recognized as a generalist predator of a variety of flying insects, such as bees, beetles, butterflies, cicadas, dragonflies, flies, moths, and wasps that vary in size and are captured in large orb webs built by the species (Robison and Mirick, 1971; Silva et al., 2023; Custódio et al., 2024; Shirai et al., 2024; Weems Jr. and Edwards Jr., 2024). However, there are not yet numerous records of predatory interactions of *T. clavipes* based on field observations that describe the behavior of the spider and identify the prey captured on either the generic or specific level. Orb-weaver spiders use their chelicerae to tear apart and crush the cuticle of insects while injecting enzymes, which frequently leaves the body of the prey macerated and thus unrecognizable for identification (Burke Museum, 2026).

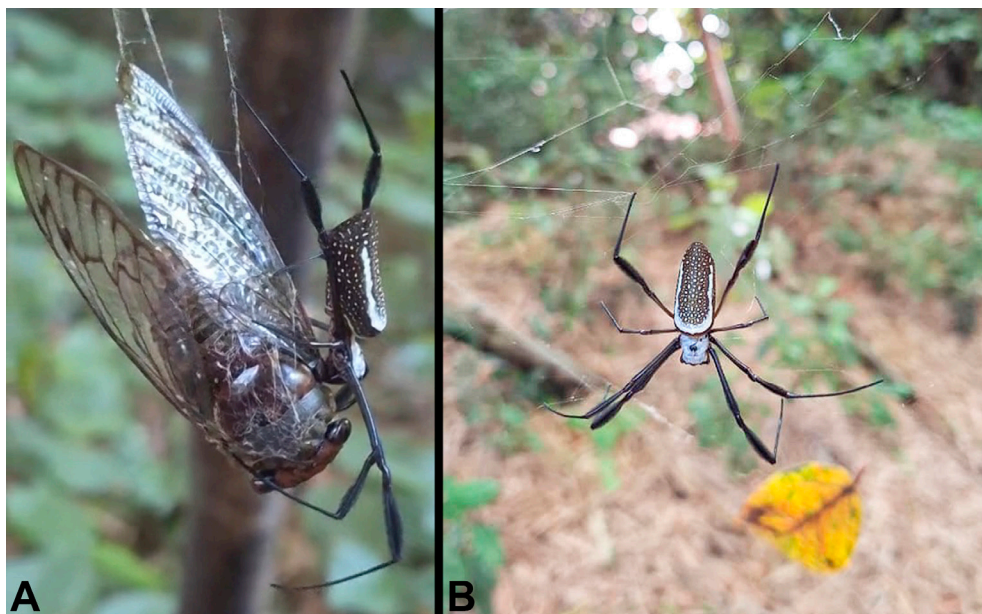


Figure 2. Predatory interaction of Nephilidae on Cicadidae: A. *Trichonephila clavipes* female preying upon *Fidicina* sp. in Mata do Buraquinho Wildlife Refuge, B. Same individual photographed one day after predation event.

Figura 2. Interacción depredadora de Nephilidae sobre Cicadidae: A. Hembra de *Trichonephila clavipes* depredando sobre *Fidicina* sp. en el Refugio de Vida Silvestre Mata do Buraquinho, B. El mismo individuo fotografiado un día después del evento de depredación.

Compatible with the observations reported by Robinson and Mirek (1971) and Porto (2025), the *T. clavipes* individual studied here also built its web at the edge of a forest gap alongside a trail. Individuals also build webs associated with anthropized areas at forest edges, such as residential communities (Silva et al., 2023; Custódio et al., 2024). Robinson and Mirick (1971) suggest that webs by *T. clavipes* located at forest edges enable greater success in capturing flying insects.

The cicada observed here was trapped in the web mainly by the ventral region. However, there were silk threads on the left wing and dorsal region of its head and thorax. This suggests that the cicada collided with the web during flight and became more entangled while trying to free itself from the silk threads and/or the spider wove silk threads around the already trapped insect to ensure its immobilization.

Trichonephila clavipes has previously been recorded as a predator of *P. sedula*, *Q. gigas*, and *M. helenor* in remnants of the Atlantic Forest. However, Silva et al. (2023), Custódio et al. (2024), and Shirai et al. (2024) also did not observe the entire predation event from capture to consumption of the respective insects by the nephilid. Silva et al. (2023) identified individuals of the social wasp *P. sedula* trapped in suspended webs of *T. clavipes* in an impacted forest fragment in southeastern Brazil. In contrast to this study, Silva et al. (2023: Figure 1A) found specimens well entangled in webs and partially consumed by a *T. clavipes* female. Custódio et al. (2024) indirectly studied a predation event of *T. clavipes* on the cicada *Q. gigas* in anthropogenically modified forest fragments in southeastern Brazil, but did not provide detailed information on the ecological interaction. Compatible with the present study, Custódio et al. (2024: Figure 1A) also photographed *T. clavipes* similarly positioned over its prey, which was also trapped in the web with its head down. In contrast, the trapped cicada recorded by Custódio et al. (2024) was under the roof of a house and apparently had greater reinforcement of silk threads around its body, which were likely woven by the spider. Furthermore, the *T. clavipes* individual of this study was photographed attacking the thorax of *Fidicina* sp. (Figure 2A), while Custódio et al. (2024: Figure 1A) illustrated the nephilid with its mouthparts away from the body of *Q. gigas*. The *Fidicina* sp. recorded here was freshly dead, apparently unaffected by the action of the spider's digestive enzymes (Figure 2A). In contrast, Custódio et al. (2024: Figure 1B) illustrated an individual of *Q. gigas* clearly consumed by the spider. The *Fidicina* sp. was found immobile in the web even before the predator began manipulating its thorax with its mouthparts during the prolonged observation period. Robinson and Mirick (1971) and Shirai et al. (2024) previously reported the aforementioned behavior of *T. clavipes* when analyzing the spider performing a prolonged bite on flying insects.

The web-building spider *T. clavipes* has an extremely varied diet based mainly on flying insects, playing a vital ecological role in controlling the population of these arthropods in terrestrial ecosystems.

However, there are numerous aspects of the predatory interaction of *T. clavipes* that need further study, such as the insect richness that the species feeds on, the most frequently captured prey, as well as the feeding preferences and behavior of the nymph.

ACKNOWLEDGMENTS

The authors are grateful to Dr. Adriano Medeiros de Souza (Municipal Government of Macaíba, state of Rio Grande do Norte) for help with information on biological aspects of *T. clavipes*; Dr. Tatiana Petersen Ruschel (Universidade Federal do Paraná) for help with the identification of the cicadid; the board of directors of SUDEMA for making the photographic record of invertebrates available for study; FAPESQ/FEPAMA (Proc. n° 045/2024) for the scholarship granted to HYEGA; and the anonymous reviewers for critically reviewing the manuscript.

AUTHOR CONTRIBUTIONS

HYEGA and SFBL were responsible for conceptualization, investigation and writing (review and editing).

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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