

Tetranychus urticae* Koch, 1836 (Acari: Tetranychidae) infesting *Humulus lupulus* L. (Cannabaceae) in the State of Alagoas, Northeast Brazil**Tetranychus urticae* Koch, 1836 (Acari: Tetranychidae) infestando *Humulus lupulus* L. (Cannabaceae) no estado de Alagoas, Nordeste do Brasil****Elio Cesar Guzzo** 

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Plantas, Brazilizabel.souza@ifal.edu.br**Abstract**

Hops (*Humulus lupulus* L.) (Cannabaceae) leaves showing symptoms of mite infestation were collected from an experimental field in União dos Palmares, Alagoas, Northeastern Brazil. In the laboratory, the mites were mounted in glass slides with Hoyer's medium and identified as the two-spotted spider mite (*Tetranychus urticae* Koch, 1836) (Acari: Tetranychidae). The mite infestation was observed in the leaves of the hops varieties Cascade, Chinook, Comet, Nugget, Saaz, Triple Pearl, Triumph, and Zeus. Even after the hops harvesting, very high mite populations were observed in the cones (flowers) inside the drying room. Afterwards, *T. urticae* was also found infesting the hop varieties Hallertau Magnum, Triple Pearl, and Zeus in an ornamental hop plantation in Maceió, Alagoas. As far as the authors could investigate, this is the first report of *T. urticae* infesting *H. lupulus* in the State of Alagoas and even in the Northeast region of Brazil.

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Resumo

Folhas de lúpulo (Humulus lupulus L.) (Cannabaceae) com sinais de infestação por ácaros foram coletadas de um plantio experimental localizado em União dos Palmares, Alagoas, Nordeste do Brasil. No laboratório, os ácaros foram extraídos, montados em lâminas de microscopia em meio de Hoyer e identificados como o ácaro-rajado (Tetranychus urticae Koch, 1836) (Acari: Tetranychidae). A infestação dos ácaros foi observada nas folhas das variedades de lúpulo Cascade, Chinook, Comet, Nugget, Saaz, Triple Pearl, Triumph e Zeus. Mesmo após a colheita do lúpulo, populações muito altas do ácaro foram observadas nos cones (flores), dentro da câmara de secagem. Posteriormente, T. urticae também foi encontrado infestando as variedades de lúpulo Hallertau Magnum, Triple Pearl e Zeus, em uma plantação ornamental em Maceió, Alagoas. Até onde os autores puderam investigar, este é o primeiro registro de T. urticae infestando H. lupulus no estado de Alagoas, e mesmo na região Nordeste do Brasil.

Palavras-chave: ácaro-rajado; lúpulo; ácaros-praga; pragas do lúpulo.

Hops (*Humulus lupulus* L.) (Cannabaceae) is an herbaceous, climbing, perennial, and dioecious plant that can grow up to 15 m (Aquino et al., 2022; Fernandez, 2020). Although the plant is of interest to the pharmaceutical and cosmetics industries, its female flowers, also called cones, are of great value to the beer industry, used in beer to add flavor, bitterness, and aroma, constituting one of the essential ingredients of the beverage (Brasil, 2022; Spósito et al., 2019).

Native to temperate regions of the Northern Hemisphere, hops have been extensively cultivated in countries such as China, Czech Republic, Ethiopia, Germany, United States of America, and Argentina, the latter being the only country in South America with significant production (Fernandez et al., 2022). Recently, the crop was also introduced in the South/Southeast of Brazil, and, in addition to the rapid expansion of the craft beer market, hops have gained attention in the country for being a crop with high added value and for not requiring large areas of planted land to have a good financial return. Thus, it can fit perfectly as an alternative crop for family farming (Brasil, 2022), encouraging its expansion to new non-traditional areas in the country.

High-quality hop production requires careful attention to numerous pests, diseases, and weeds, as well as cultural practices that may exacerbate or suppress such phytosanitary

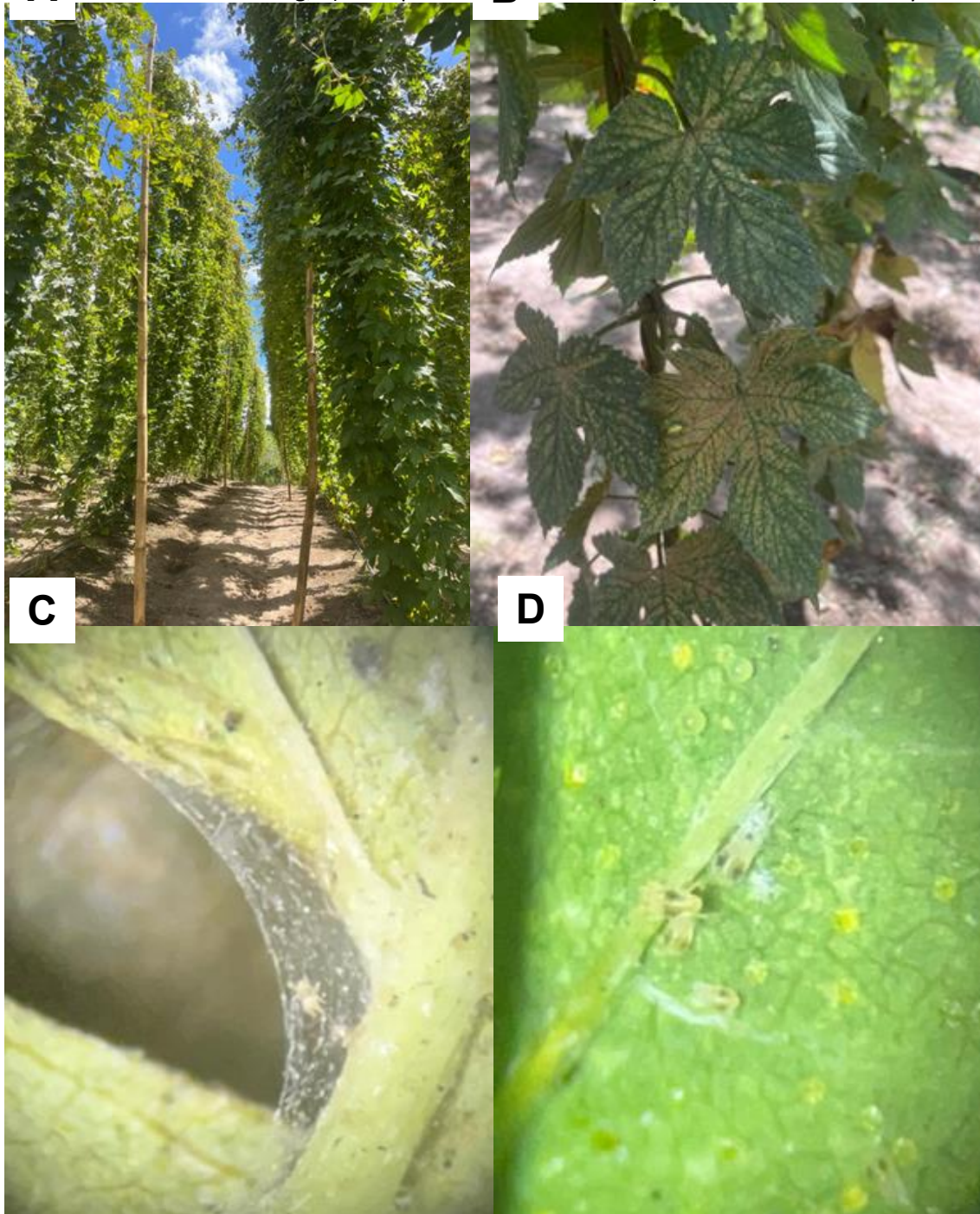
problems (Walsh et al., 2015). Several arthropod pests have been found infesting hops (Aguiar-Menezes and Fernandez, 2022; Brasil, 2022; Fernandez, 2020; Fernandez et al., 2022; Lourenço et al., 2021; O'Neal et al., 2015; Spósito et al., 2019), which makes monitoring of essential importance for the crop.

In the State of Alagoas, Northeast region of Brazil, an experimental hops plantation with the varieties Cascade, Chinook, Comet, Nugget, Saaz, Triple Pearl, Triumph, and Zeus was implemented in March 2022 in the municipality of União dos Palmares (9°10'05"S; 36°00'22"W, 152 m above sea level) (figure 1A). The region's climate is tropical with dry summer (As), according to the Köppen classification, with an average annual temperature ranging between 24 and 26°C, and annual precipitation between 1,300 and 1,600 mm (Alvares et al., 2014).

In December 2023, during crop inspections, leaves with whitish spots (figure 1B) and the presence of webbing (figure 1C), which are characteristic of infestation by phytophagous mites, were found in the basal third of the plants. These leaves were collected, stored in a cooler box with reusable ice, taken to the laboratory, and examined under a stereoscopic microscope, confirming the presence of mites (figure 1D). Subsequently, high populations of the mite were also found on cones of all hop varieties during the drying process, indicating that the cones must have come infested from the field and that the high temperature in the drying room may have favored their development, while the cones still contained enough moisture to serve as food.

In September 2024, the same spider mite was also found in an ornamental hop plantation in the municipality of Maceió (9°31'01"S; 35°35'02"W, 4 m above sea level), approximately 270 m far from the coastline, infesting the hop varieties Hallertau Magnum, Triple Pearl, and Zeus. Leaves were collected and examined as described above. Individuals of various life stages were collected with a soft brush, mounted in glass slides with Hoyer's medium, dried in an oven at 50°C for one week, sealed with nail polish (Moraes et al. 2024), and identified under an optical microscope, based on Baker and Tuttle (1994) and Chant and McMurtry (2007).

Figure 1 – Two-spotted spider mite *Tetranychus urticae* in hops *Humulus lupulus* in Alagoas State, Northeast Brazil. A) Aspect of the hops plant; B) Patchy discoloration of hops leaves caused by the mite feeding; C) Web produced by the mite; D) Detail of the mite colony



Source: Research data (2025).

The mite species found on the leaves of the nine hop varieties grown in both areas and also on the cones in the drying room was identified as *Tetranychus urticae* Koch, 1836 (Acari:

Tetranychidae), popularly known as the two-spotted spider mite. This is a cosmopolitan mite, present throughout Brazil, infesting hundreds of wild and cultivated host plants and being considered a pest in many of these (Moraes et al., 2024).

Adult female two-spotted spider mites measure approximately 0.5 mm, have an oval body, and are generally greenish in color, with two large dark spots on the sides of the idiosoma. Adult males measure approximately 0.35 mm and have a tapered idiosoma tip (Moraes et al., 2024; Walsh and Barbour, 2015). Colonies are located preferably on the underside of leaves, and the coloration of individuals can be more reddish, depending on environmental conditions (Moraes et al., 2024). The eggs are whitish in color and spherical in shape, measuring approximately 0.13 mm in diameter, and are laid singly. Newly hatched individuals (larvae) have three pairs of legs, while all other life stages (protonymphs, deutonymphs, and adults) have four pairs. The two-spotted spider mite produces a large amount of webbing, which can protect colonies from wind, rain, and natural enemies and even prevent exposure to acaricides since spray droplets can adhere to it and not reach the mites (Walsh and Barbour, 2015).

The two-spotted spider mite damages its host plants during feeding, using its stylets to pierce the epidermal and parenchymal cells, then removing the cellular content. The loss of chlorophyll results in discoloration of the leaf tissue, which is visible as small whitish/yellowish spots on the upper surface of the leaves, as well as in the reduction of the photosynthetic rate and the production of nutrients for the plant. Economic damage to the crop can be caused by the increase in the mite population, which usually occurs in the hottest and driest months of the year, and, consequently, by its feeding, which leads to the accumulation of injuries in a given period. The chlorotic spots increase in quantity and size, coalesce, and can cover the entire leaf, which becomes necrotic and falls prematurely (Moraes et al., 2024; Walsh and Barbour, 2015). Extreme infestations can eventually cause complete defoliation of the canopy or web covering. The most severe economic damage, however, is caused by the feeding of the two-spotted spider mite on the cones, which results in dry, brittle, and discolored (reddish) cones, reducing the quality and quantity of production. It has been documented that late-season infestation on leaves and cones reduces alpha-acids' content in the cones at harvest, which is essential for the beer industry. In addition, mites in the hop

cones after harvest are considered contaminants that reduce the quality of the cones. Thus, under severe infestations, the crop may be totally lost, or even the hops rejected by the industry (Walsh and Barbour, 2015).

Infestations of *T. urticae* in hops are already known in other traditional producing countries, such as Australia, Czech Republic, Germany, Spain, United Kingdom, and United States of America (Lawanprasert, 1994; Marcos et al., 2011; Vostřel, 2010; Walsh and Barbour, 2015; Weihrauch, 2005) and have also been reported in other Brazilian States where the crop was recently introduced, such as Rio de Janeiro, Rio Grande do Sul and São Paulo (Fernandez, 2020; Nascimento et al., 2019; Wurlitzer et al., 2021). *Tetranychus urticae* is the predominant phytophagous mite on hops, occurring together with a small group of related tetranychids, which include *Tetranychus mcdanieli* McGregor, 1931 and *Eotetranychus willamettei* (McGregor, 1917) (Walsh and Barbour, 2015). However, in Brazil, *T. urticae* has been the only phytophagous mite species found in hop crops (Fernandez, 2020; Nascimento et al., 2019; Wurlitzer et al., 2021).

As far as the authors could investigate, the present work constitutes the first record of the two-spotted spider mite *T. urticae* infesting hops *H. lupulus* in the State of Alagoas and even in the Northeast region of Brazil.

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