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Scientific Note

Geographic expansion of *Aulacaspis tubercularis* (Newstead, 1906) (Hemiptera: Diaspididae): occurrence in the Federal District, Brazil, on *Cinnamomum verum* J.Presl (Lauraceae)

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Abstract. *Aulacaspis tubercularis* (Newstead, 1906) (Hemiptera: Diaspididae) is a polyphagous scale insect with a wide geographic distribution, having been reported in more than 81 countries. In Brazil, this species has been recorded in the Northeast (Bahia, Maranhão, and Pernambuco), Central-West (Goiás), Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo), and South (Rio Grande do Sul) regions associated with mango trees (*Mangifera indica* L., Anacardiaceae). This study aims to report, for the first time, the occurrence of *A. tubercularis* in the Federal District, Brazil, associated with seedlings of *Cinnamomum verum* J. Presl (Lauraceae). Aspects related to the morphology, biology, importance, and geographical distribution of this scale insect are discussed in this article.

Keywords: armored scale, forest entomology, phytophagous insects, scale insects.

Cinnamomum verum J. Presl (Lauraceae) is a tree native to Sri Lanka (formerly Ceylon), whose bark yields cinnamon, widely used in grocery products, perfumery, and culinary applications, as well as for medicinal purposes, with broad popular acceptance (Vinitha & Ballal 2008). This plant has shown good adaptability to tropical and subtropical regions and is widely cultivated in Brazil, with plantings occurring from the North to the South of the country, except in the states of Acre, Tocantins, Piauí, and the Federal District (Quinet et al. 2015).

More than seventy insect species have been reported in association with *C. verum*, including sap-sucking insects (Hemiptera), mites (Acari), caterpillars (Lepidoptera), thrips (Thysanoptera), and beetles (Coleoptera) (Jayasinghe et al. 2020; Khan et al. 2020). In Brazil, three species of treehoppers (Hemiptera: Auchenorrhyncha: Aetalionidae and Membracidae) have been reported in association with a *C. verum* tree in Minas Gerais, Brazil (Oliveira 2024; 2025).

Scale insects (Hemiptera: Coccomorpha) are phytophagous insects with a broad global distribution, occurring on all continents except Antarctica. They may be generalists or host-specific, and many species can become serious pests of agricultural, forestry, and ornamental crops (Grazia et al. 2024). Among the most rich families of scale insects worldwide are Diaspididae, Coccidae, and Pseudococcidae (García-Morales et al. 2016; Kondo & Watson 2022b; Grazia et al. 2024).

To date, 30 scale insect species from four families have been reported in association with *C. verum*: Diaspididae (15), Coccidae (13), Monophlebidae (1), and Tachardiidae (1) (also known as Kerriidae) (García-Morales et al. 2016). This study aimed to report the geographic expansion of the occurrence of a diaspidid to the Federal District, Brazil, associated with *C. verum*.

Scale insects associated with twelve seedlings of *C. verum* were collected in April 2026 in a greenhouse at Embrapa Cerrados (Brazilian Agricultural Research Corporation) situated in Planaltina, Federal District, Brazil (15°36'17.9"S 47°42'59.7"W). The seedling nursery is an open-type structure, with shade cloth covering the top and no lateral protection, allowing the entry of insects and other animals. Irrigation of the seedlings within the nursery is carried out using sprinklers. The identity of the plants was confirmed with the description by Orwa et al. (2009). Planaltina is located at Cerrado biome that has two well-defined seasons, and the regional climate is classified as AW (i.e., a tropical climate with rain in summer and drought in winter), in which the rainy season runs from October to April and the drought from May to September (Köppen & Geiger 1928).

Leaf samples containing armored scales were stored in a Falcon tube containing 70% alcohol until identification. Slides were mounted for subsequent analysis under an optical microscope, according to the method described by Wolff et al. (2014). Specimens were identified using the key to genus and species, and the description by Miller & Davidson (2005). The slides containing the scale insects are deposited on the "Coleção Entomológica do Museu Ramiro Gomes Costa (MRGC)", Rio Grande do Sul, Brazil.

Images of the infested plants were obtained using an IPhone® 13 Pro Max digital camera. Adults (males and females) of the scale insects were photographed using a Zeiss Discovery V12 stereomicroscope and the Zen 2 (Blue Edition) software. Microscopic analyses were performed using an Axiocam 208 color camera attached to an Axiolab 5 microscope with Zeiss Zen 3.10 software. The figure plates and the map were prepared using the Canva software.

The scale insect was identified as *Aulacaspis tubercularis* (Newstead, 1906) (Hemiptera: Diaspididae) (Fig. 1). All twelve inspected seedlings were infested, with some leaves harboring both males and females simultaneously (Fig. 1A). Males were aggregated in dense groups, resulting in a whitish appearance. Their covers were elongated and exhibited two parallel longitudinal white ridges (Fig. 1B). Females were dispersed across the leaves and were oval, white, opaque, and semi-transparent, with elongate anterior exuviae of dark coloration (Fig. 1C).

Material examined. Twenty adult females were examined on temporary slides for species determination. For deposition in the MRGC collection, the best slide was selected for permanent preparation.

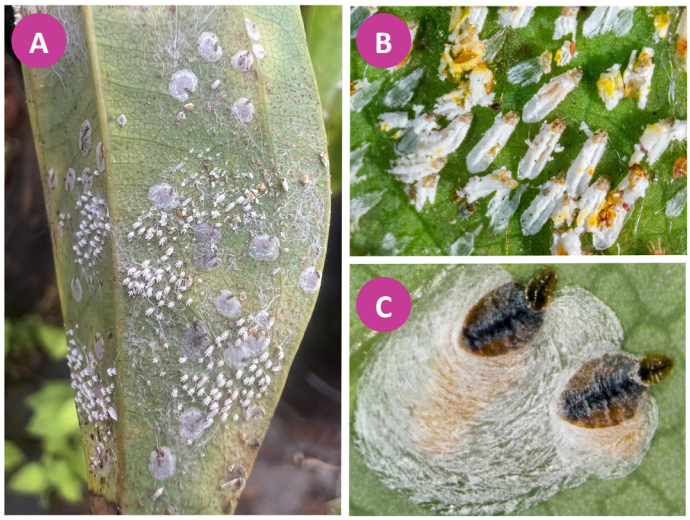

Figure 1. *Aulacaspis tubercularis* (Newstead, 1906) (Hemiptera: Diaspididae) on *Cinnamomum verum* J.Presl (Lauraceae) seedlings in the Federal District, Brazil. A. Leaf with male and female scales of *A. tubercularis*. B. Male scales insects. C. Female scales insects.

Material deposited. The selected permanent slide has been deposited in the MRGC collection: BRAZIL: Distrito Federal, Planaltina, Embrapa Cerrados, 15°36'17.9"S, 47°42'59.7"W, March 2026, ex *Cinnamomum verum,* col. M. T. de Castro. 02 adult females in 02 slides. Slides 2437 deposited in MRGC (five female).

The genus *Aulacaspis* Cockerell, 1893, comprises 154 described species (García-Morales et al. 2016). In Brazil, two species are recorded: *Aulacaspis tubercularis* (Newstead, 1906) and *Aulacaspis rosae* (Bouché, 1833), the latter found on *Rubus idaeus* L. (Rosaceae) in the Southeast (Minas Gerais) and the South (Rio Grande do Sul) (Claps et al. 2001). *Aulacaspis tubercularis* differs from *A. rosae* by having a tubercle on each side of the prothorax in older females and by having the labium inserted in a groove with sclerotized areas laterally; additionally, *A. tubercularis* has fewer ducts in the submarginal and submedian zones of the third to sixth abdominal segments (Fig. 2). Further details on microscopic characters and the differentiation between the two species can be found in Miller & Davidson (2005).

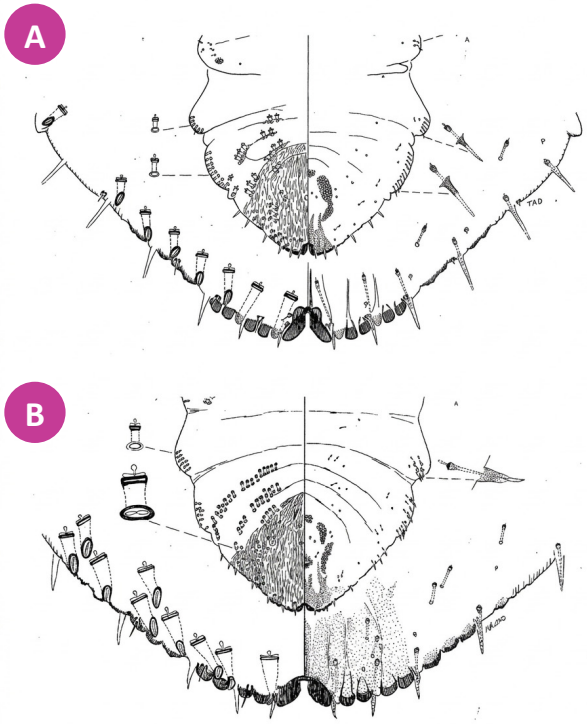

Figure 2. Microscopic characteristics of the female adults of *Aulacaspis tubercularis* (Newstead, 1906) (Hemiptera: Diaspididae) (A) and *Aulacaspis rosae* (Bouché, 1833) (Hemiptera: Diaspididae) (B) (based on Miller & Davidson 2005).

Aulacaspis tubercularis, known as the white mango scale, is an exotic species with a broad global distribution, having been recorded on all continents, except Antarctica, and in 81 countries (García-Morales et al. 2016). In Brazil, this scale insect has been reported in the Northeast (Bahia, Maranhão, and Pernambuco), Central-West (Goiás), Southeast (Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo), and South (Rio Grande do Sul) regions (Peronti et al. 2026) (Fig. 3). Therefore, this study represents the first record of its occurrence in the Federal District.

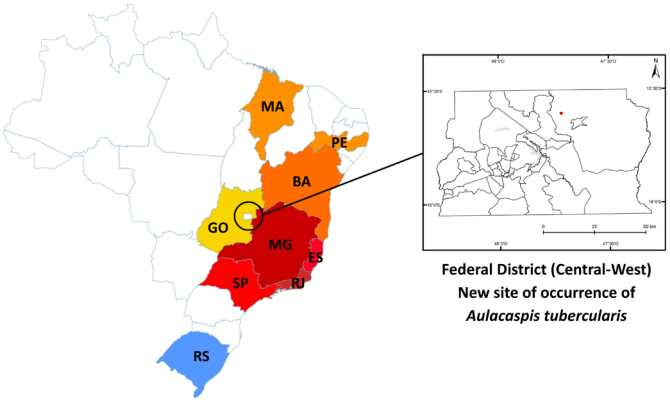

Figure 3. Distribution of *Aulacaspis tubercularis* (Newstead, 1906) (Hemiptera: Diaspididae) in Brazil, with a new report of occurrence in the Federal District (based on Peronti et al. 2026).

As a polyphagous species, *A. tubercularis* has 24 plant families as hosts and occurs on 40 different genera, and may become an important pest in some crops of economic interest (García-Morales et al. 2016; Costa-Lima et al. 2021). It is commonly found on four plant families: Arecaceae, Lauraceae, Rutaceae and Anacardiaceae, especially mangoes, coconut and cinnamon (Kondo & Watson 2022a).

In Brazil, this scale insect has been reported only on mango (*Mangifera indica* L., Anacardiaceae), occurring from the Northeast to the South (Bahia, Maranhão, Pernambuco, Goiás, Rio de Janeiro, São Paulo, Minas Gerais, Espírito Santo, and Rio Grande do Sul) (Peronti et al. 2026). Therefore, this study reports, for the first time, the occurrence of *A. tubercularis* on *C. verum* in Brazil. As this scale insect is frequently associated with mango trees in several regions, this new record highlights the need to prioritize phytosanitary measures to prevent it from becoming a problem in future *C. verum* plantings in Brazil.

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Authors' Contribution

MTC: Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing; VRSW: Formal analysis, Investigation; Writing – original draft, Writing – review & editing; MFSA: Investigation; SCLM: Investigation.

Conflict of Interest Statement

The authors declare no competing interests.

Ethical Approval

Not applicable.

Data Availability

Not applicable, all data used is disponible on manuscript.

Generative AI Statement

We used AI tools exclusively for linguistic editing and readability improvements. The use of these tools was strictly limited to textual enhancement and did not involve data analysis, results interpretation, or the development of scientific conclusions.

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