

Scientific Note

Two new reports of armored scale insects (Hemiptera: Diaspididae) infesting *Ficus pumila* L. (Moraceae) in the Brazilian Midwest

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Edited by: **Leandro D. Geremias**

Received: February 02, 2025. Accepted: March 24, 2025. Published: April 01, 2025.

Abstract. *Ficus pumila* L. (Moraceae) is a species frequently used as an ornamental plant in many Brazilian regions. Until now, 22 species of scale insects (Hemiptera: Coccoomorpha) have been reported infesting *F. pumila* around the world. In this work, two new reports of armored scale insects (Hemiptera: Diaspididae) associated with *F. pumila* in the Brazilian Midwest are presented: *Pseudaonidia trilobitiformis* (Green, 1896), infesting leaves, and *Hemiberlesia lataniae* (Signoret, 1869), infesting fruits, both in the same plant located in the Federal District, Brazil. Studies with scale insects in Central Brazil must be stimulated to catalogue and expand the knowledge about new interactions, occurrence, and possible new species of Cerrado biome.

Keywords: Agricultural entomology, *Hemiberlesia lataniae*, *Pseudaonidia trilobitiformis*, phytophagous insects.

Brazilian paisagism is composed of many types of ornamental plants, including herbs, shrubs, trees, and climbers (Lorenzi 2022). Moraceae (Rosales) is a botanical family with numerous economic genus, like *Ficus* L., *Morus* L., and *Dorstenia* L., used as ornamental plants, especially the genus *Ficus* (Pederneiras et al. 2015). In Brazil, *Ficus benjamina* L., *Ficus lyrata* Warb., *Ficus elastica* Roxb., and *Ficus pumila* L. are easily observed in urban landscaping (Rodolfo Júnior et al. 2008; Almeida & Rondon Neto 2010; Pestana et al. 2011).

Ficus pumila is a species frequently used as an ornamental plant in many Brazilian regions due its climbing habit, being recommended for covering walls and creating hedges (Wong 2007). Many studies reveal that *F. pumila* has therapeutic characteristics like antibacterial, antioxidant, and anti-inflammatory compounds, including flavonoids, terpenes, steroids, alcohol, and phenolic acids (Noronha et al. 2014; Qi et al. 2021). However, its latex can be toxic to humans and animals, causing phytophotodermatitis (Rademaker & Derraik 2012).

Scale insects (Hemiptera: Coccoomorpha) are phytophagous arthropods that occur in all world's regions, with exception of Antarctica, infesting hundreds of botanical family plants (Grazia et al. 2024). Diaspididae is the most rich family of the Coccoidea superfamily, with 419 genus and 2714 species catalogued until now (García-Morales et al. 2016). In Brazil, this family have been reported in association with many exotic and native plants of the biomes Cerrado, Atlantic Forest and Amazon, for example (Wolff et al. 2016; Castro et al. 2020a; 2020b, 2022; 2024a; 2024b; Martins et al. 2022; Noronha et al. 2023).

Until now, 22 scale insects has been reported infesting *F. pumila* around the world, including species of the families Diaspididae (13), Pseudococcidae (3), Coccidae (2), Tarchidiidae (=Kerridae) (2), Monophlebidae (1), and Lecanodiaspididae (1) (García-Morales et al. 2016). This work aims to report the occurrence of two armored scale insects on *F. pumila* leaves and fruits for the first time in the Brazilian Midwest.

Scale insects associated with *F. pumila* were collected in November 2024 at Brasília, Federal District, Brazil (15°45'26.6"S; 47°56'07.5"W) in a single plant. The plant was identified using the description by Pederneiras et al. (2025). Brasília 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 and fruit 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 methodology described by Wolff et al. (2014). Specimens were identified using the key to genus and species description (Claps & Wolff 2003; Miller & Davidson 2005; Kondo & Watson 2022). The macroscopic images were obtained using a Sony® digital camera, and microscopic images were obtained using an Axiocam 208 color camera attached to an Axiolab 5 microscope with Zeiss Zen 3.10 software.

The slides containing the scale insects are deposited on the "Coleção Entomológica do Museu Ramiro Gomes Costa (MRGC)". The material was collected with authorization from the Brazilian government granted to the first author by the Chico Mendes Institute for Biodiversity Conservation (ICMBio), Ministry of the Environment (MMA) (Collection Permit No. 96628-1).

Two armored scale insects were observed on *F. pumila* in Brasília, Federal District: *Pseudaonidia trilobitiformis* (Green, 1896) (Hemiptera: Diaspididae) insects, infesting the leaves, and *Hemiberlesia lataniae* (Signoret, 1869) insects (Hemiptera: Diaspididae), infesting the fruits. These two scales have already been reported in association with *F. pumila* in New Caledonia (France), Japan, Taiwan and, in the South Pacific region (*P. trilobitiformis*) and in New Zealand (*H. lataniae*) (García-Morales et al. 2016).

Pseudaonidia trilobitiformis was observed on *F. pumila* leaves (Fig. 1). Individuals of the scale insect were observed mainly on the central nervure of the upper surface of the leaf (Fig. 1A). The adult female has a white subcircular shield (or scale), more or less thin, with subcentral or submarginal exuviae yellowish brown (Fig. 1B). No apparent symptoms were observed on the infested plant. Therefore, it is not possible to identify the genus and species of the scale insect based only on the macroscopic characteristics. To determine the species, it is necessary to examine the microscopic characteristics of the adult female's body.

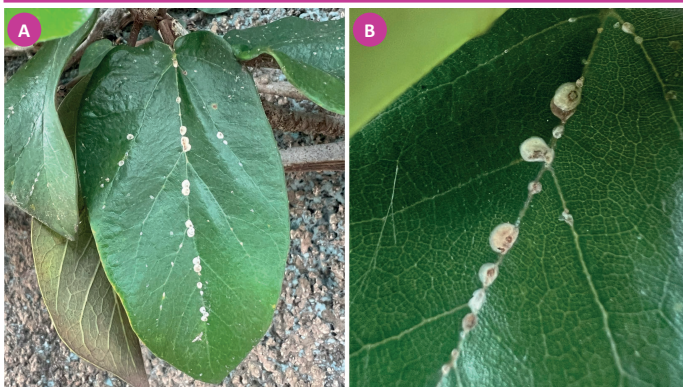


Figure 1. *Ficus pumila* leaf infested by *Pseudaonidia trilobitiformis* in Federal District, Brazil. A) Leaves with armored scale insects; B) Detail of the adult female shield on the central nerve.

Microscopically, the adult female of *P. trilobitiformis* has a body elongated, pyriform, widened in the cephalic region and tapering at the pygidium, with pronounced constriction between the pro- and mesothorax, thoracic abdominal segments and pre-pygidium; cuticle strongly sclerotized in the mature female, but with a lighter area in the pygidium (Fig. 2A); in the dorsomedial region of the pygidium with a conspicuous areolar pattern and a large number of macroduct pores; at the base of the pygidium, in the ventral region, are the perivulvar pores; at the margin of the pygidium there are four pairs of lobes almost at the same level: well-developed, separate, strongly sclerotized median lobes; second, third and fourth lobes smaller and not sclerotized (Fig. 2B).



Figure 2. Microscopic characters of the adult female of *Pseudaonidia trilobitiformis*. A) Body (50x objective); B) Pygidium (200x objective).

Pseudaonidia Cockerell, 1897 has 22 described species around the world, infesting more than 60 botanical families (García-Morales et al. 2016). In Brazil there are records of *Pseudaonidia marquesi* Costa Lima, 1924 (Hemiptera: Diaspididae) and *P. trilobitiformis* (Peronti et al. 2025a). The main species in the genus is *P. trilobitiformis*, an exotic and cosmopolitan scale that can be found in 100 countries, infesting 57 families and 130 plant genera (García-Morales et al. 2016). This species can infest some important agronomic crops, like coffee (*Coffea* spp., Rubiaceae), avocado (*Persea americana* Mill., Lauraceae), olive tree (*Olea europaea* L., Oleaceae), and peach (*Prunus persica* (L.) Batsch, Rosaceae) (Raga et al. 2003).

Pseudaonidia trilobitiformis was reported in North (Pará), North East (Bahia, Ceará, Paraíba, Pernambuco, and Rio Grande do Norte), Southwest (Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo) and South (Paraná and Rio Grande do Sul) of Brazil, infesting 38 species in 24 plant families, including *F. pumila* (Peronti et al. 2025a). Therefore, this is the first report of this scale insect in the Federal District and in the Brazilian Midwest, expanding its geographical distribution in the country.

Hemiberlesia lataniae was observed on *F. pumila* fruits (Fig. 3). Many individuals of the insect were observed covering the fruit's surface (Fig. 3A). The main symptom observed was discoloration of the fruit. The adult female has a white shield (or scale) with brownish regions, about 2 mm of diameter, rounded or subcircular in shape (Claps

& Wolff 2003; Castro et al. 2024b) (Fig. 3B). As reported previously in the identification of *P. trilobitiformis*, the visualization of microscopic characteristics of the adult female is necessary to determine the species.



Figure 3. *Ficus pumila* fruit infested by *Hemiberlesia lataniae* in Federal District, Brazil. A) Scales covering the fruit's surface. B) Details of the shields of the insects.

Microscopically, the adult female of *H. lataniae* has a body rounded, tapering towards the pygidium, cuticle membranous, pygidial margin with a prominent pair of median lobes (Fig. 4A); on the pygidium, a large anal opening near the base of the median lobes; median lobes well developed, sclerotized, with separate but slightly convergent apical inner margins; second and third pairs of lobes are tiny and not sclerotized; on the margin between the median lobes and the second pair of lobes and between these and the third pair of lobes there are well developed and sclerotized paraphyses (Fig. 4B); four small groups of perivulvar glands can be observed under the microscope in the central ventral median region of the pygidium.



Figure 4. Microscopic characters of the adult female of *Hemiberlesia lataniae*. A) Body (100x objective); B) Pygidium margin (400x objective).

Hemiberlesia Cockerell, 1897, is a cosmopolitan genus that has 54 species distributed around the world (García-Morales et al. 2016). In Brazil, *H. lataniae* and *Hemiberlesia rapax* (Comstock, 1881) (Hemiptera: Diaspididae) are the most common species (Peronti et al. 2025b). Both are morphologically similar, and the difference consist in a circumgenital glands observed in adult females of *H. lataniae* (Miller & Davidson 2005; Noronha et al. 2023; Castro et al. 2024b).

In fruits, *H. lataniae* was described as an important pest in kiwifruit (*Actinidia deliciosa* Liang & Ferguson, Actinidiaceae), *Citrus* spp. (Rutaceae), coconut (*Cocos nucifera* L. (Arecaceae)), and avocado (*P. americana*), causing discoloration and irritation of the flesh, especially on thin-skinned fruits (CABI 2021).

Hemiberlesia lataniae is an exotic and cosmopolitan armored scale insect that can be found in 153 countries, infesting 120 families and 371 genera (García-Morales et al. 2016). This species is reported in ten Brazilian States, in North (Amazonas and Pará), North East (Pernambuco), Midwest (Goiás), Southwest (Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo) and South (Paraná and Rio Grande do Sul) of the country (Peronti et al. 2025b). This scale insect was reported infesting more than 30 plant species from 18 families in Brazil (Castro et al. 2024b; Peronti et al. 2025b). Therefore, this is the

first report of this scale insect on *F. pumila* in Brazil.

This work reports two armored scale insects associated with *F. pumila* for the first time in the Brazilian Midwest: *P. trilobitiformis* on the leaves, and *H. lataniae* on the fruits. Studies with scale insects in Central Brazil must be stimulated to catalogue and expand the knowledge about new interactions, occurrence, and possible new species of Cerrado biome.

Funding Information

No funding received.

Authors' Contributions

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

Conflict of Interest Statement

The authors declare that there is no conflict of interest.

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