

SCIENTIFIC NOTE

MORPHOLOGY AND HISTOLOGY OF *Asteridiella pittieri* (MELIOLALES, ASCOMYCOTA) IN *Duranta erecta* L.

*Naasoom Luiz Santos Mesquita*¹, *Armínio Santos*¹, *Quelmo Silva de Novaes*¹, *Poliana Prates de Souza Soares*¹, *Carlos André Espolador Leitão*², *Avaldo de Oliveira Soares Filho*², *José Luiz Bezerra*³

¹Departamento de Fitotecnia e Zootecnia/Universidade Estadual dos Sudoeste da Bahia. Estrada Bem Querer, Km-04, Vitória da Conquista - BA, nasonmesquiata@yahoo.com; arminioo@uesb.edu.br; qsnovaes@uesb.edu.br; poliana_prates@hotmail.com

²Departamento de Ciências Naturais-UESB. avaldo.oliveira@uesb.edu.br; candreel@yahoo.com.br

³Programa de Pós-Graduação em Produção Vegetal/Universidade Estadual de Santa Cruz. Rodovia Jorge Amado, Km 16, Ilhéus - BA, 45662-900, zelulabezerra@yahoo.com.br

In November 2021, black mildew was observed on leaves of *Duranta erecta* L. (Verbenaceae) in the Campus of Universidade Estadual do Sudoeste da Bahia, Vitória da Conquista, Bahia, Brazil. Previous analyzes of the fungal structures revealed that they belonged to a Meliolaceae fungus. The identification of the fungus was carried out through morphological characterization, and comparison with other Meliolaceae species described in the literature. Based on these morphological characteristics, the pathogen was identified as *Asteridiella pittieri*.

Key words: Biotrophic fungus, black mildew, golden dew drop.

Morfologia e histologia de *Asteridiella pittieri* (Meliolales, Ascomycota) em *Duranta erecta* L. Em novembro de 2021 foram observadas colônias negras de um fungo em folhas de *Duranta erecta* L. (Verbenaceae), no campus da Universidade Estadual do Sudoeste da Bahia, Vitória da Conquista, Bahia. Análises prévias das estruturas fúngicas demonstraram ser um fungo pertencente à família Meliolaceae. A identificação da espécie foi realizada por meio de caracterização morfológica e comparação com outras espécies descritas de *Meliolaceae*. Baseado em semelhanças morfológicas esse fungo parasita foi identificado como *Asteridiella pittieri*.

Palavras-chave: Fungo biotrófico, míldio negro, pingo de ouro.

Duranta erecta L. is a species of the Verbenaceae family. It is a plant native to the Americas, widely distributed in the Florida Peninsula, Central America, Caribe, and South America. It has a shrub-tree habit, rarely a climber, with lilac flowers and yellow-orange drupaceous fruits (WFO 2023). It is popularly known as “pingo-de-ouro”, “rocío de oro”, “garbancillo”, and “golden dew drop”. This plant is widely cultivated in Brazil, specifically in Bahia, Sergipe, Mato Grosso, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo, Paraná, Rio Grande do Sul, and Santa Catarina (Moroni, 2023). It is considered invasive in several countries (Moroni et al., 2018).

Due to its traditional ornamental status, the occurrence of leaf spots or fungal colonies on these plants compromises the decorative function of the species.

In November 2021, a black mildew was observed occurring on leaves of *Duranta erecta* (Figure 1a-b) in the campus of Universidade Estadual do Sudoeste da Bahia, Vitória da Conquista, Bahia. Previous analyzes of the fungal structures revealed that they belonged to a Meliolaceae fungus. Fungi in this taxonomic group are biotrophic parasites of plants, causing minimal damage to the host plants (Hongsanan et al., 2015).

This study aimed to identify the black mildew found on the host species *Duranta erecta*. Specimens were deposited in the HUESBVC Herbarium and registered under the reference HUESBV 10097. The plant species was determined according to Moroni & O’Leary (2020) and taxonomic classification following Angiosperm Phylogeny Group (2016).

Fungal identification was conducted morphologically and comparison with described Meliolaceae species (Hansford, 1961; Pereira et al., 2006.). Thirty measurements were taken for each structure under an optical microscope. The measurement results were presented in the format: (minimum) (average - standard deviation) - (average + standard deviation) (maximum).

Fresh anatomical sections of leaves infected with the fungus were also made. The slides were prepared with distilled water and cotton blue stain and photographed under a Leica DM750 microscope equipped with Leica ICC50HD digital camera and Leica LAS EZ software. Scale bars were calculated as described in Leitão (2016).

The host species is *D. erecta* - synonym *D. repens* L. (Moroni 2023, WFO 2023).

Description

Asteridiella pittieri (Toro) Hansf., Beih. Sydowia 2: 685 (1961).

The fungus generally establishes itself on the upper surface of petioles and leaves, with dark brown septate hyphae, thick-walled, measuring 7.5 to 9 μm in diameter. The hyphae produce fine hyphal pegs that penetrate the outer periclinal wall of leaf epidermal cells, where they form coralloid apressoria (Figure 2e-g). Bicellular, alternating, dark brown hyphopodia, straight to slightly curved, measuring (17) 18-20.5 (20) \times (10) 11-13.8 (15) μm (Figure 1c and 2d). Phialides, opposite or alternating, mixed with hyphopodia, measuring (17) 18.5-23.5 (25) \times (7) 7.8-9.5 (10) μm . Perithecia scattered, black, globose, with crenulate surface, (150) 175-230 (232) μm in diameter (Figure 1d-e). Asci unitunicate, elliptical, thin-walled, with two ascospores per ascus (Figure 2a). Ascospores dark brown, narrowly elliptical, obtuse, 4-septate (rarely with 2-3 septate), constricted, measuring (39) 39.5-42.5 (44) \times (14) 14.6 \times 16.0 (18) μm (Figure 2b-c).

Examined specimens

BAHIA: Vitória da Conquista, Campus da Universidade Estadual do Sudoeste da Bahia (), em folhas de *Duranta repens* 10/02/2023, N.L.S. Mesquita and A. Santos, HUESBV 10097.

Comments

The species was identified based on morphology and measurements of the fungus in comparison with the description of Hansford (1961). The fungus has been reported in Brazil on *D. erecta* in the states of Minas Gerais and São Paulo (Pereira et al., 2006), in Colombia, Mexico, and Venezuela (Hansford, 1961), and also reported for *D. mutisii* L.F. in Venezuela (GBIF, 2023).

Acknowledgments

To the Bahia State Research Support Foundation (FAPESB) for granting scholarships to the first author.

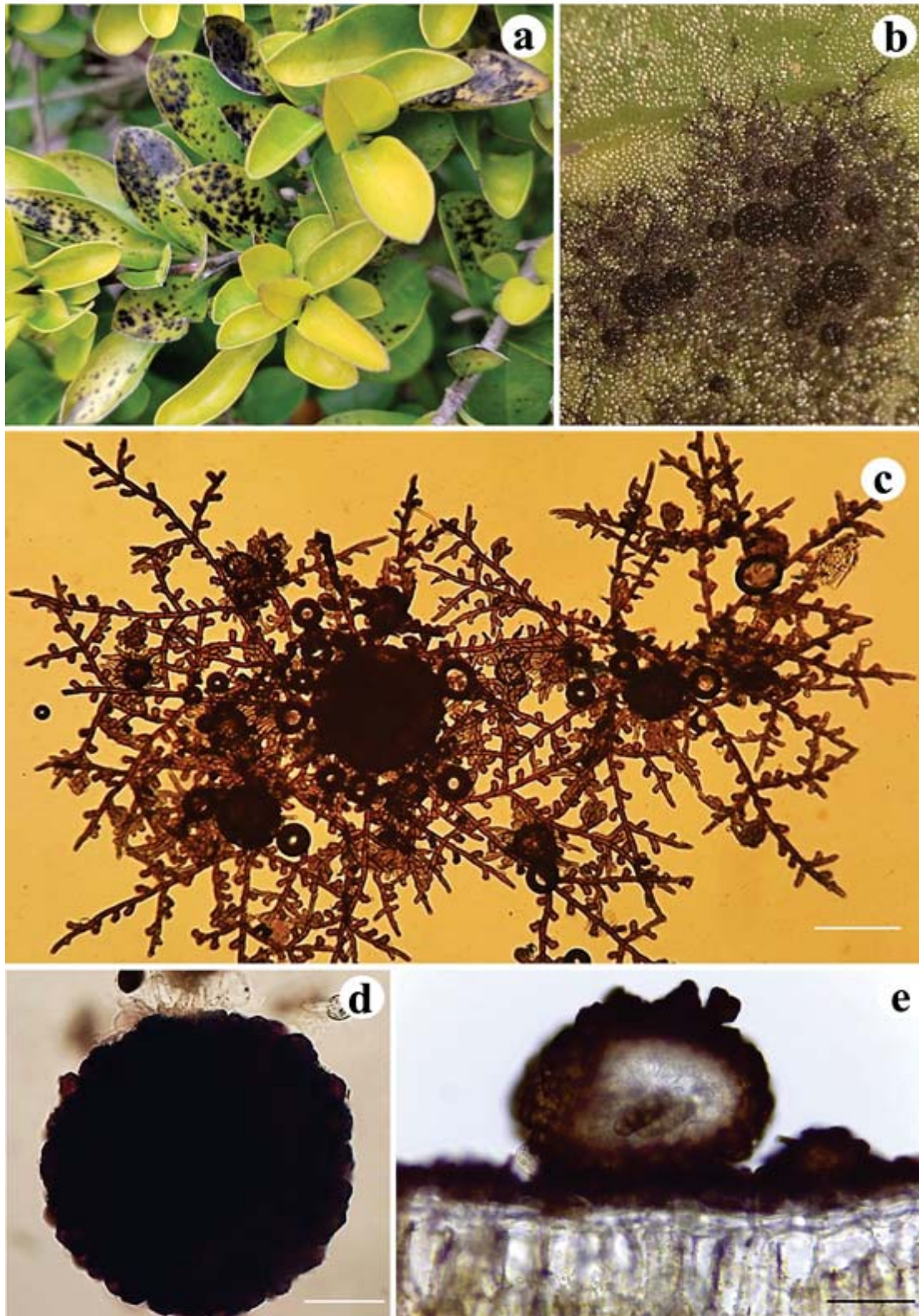


Figure 1. Signs of the fungus on leaves of *Duranta erecta* (a), fungal colony (b), colony showing perithecia and mycelium (c), perithecium seen from above (d), cross section of perithecium showing hymenium (e). Scales: 50µm.

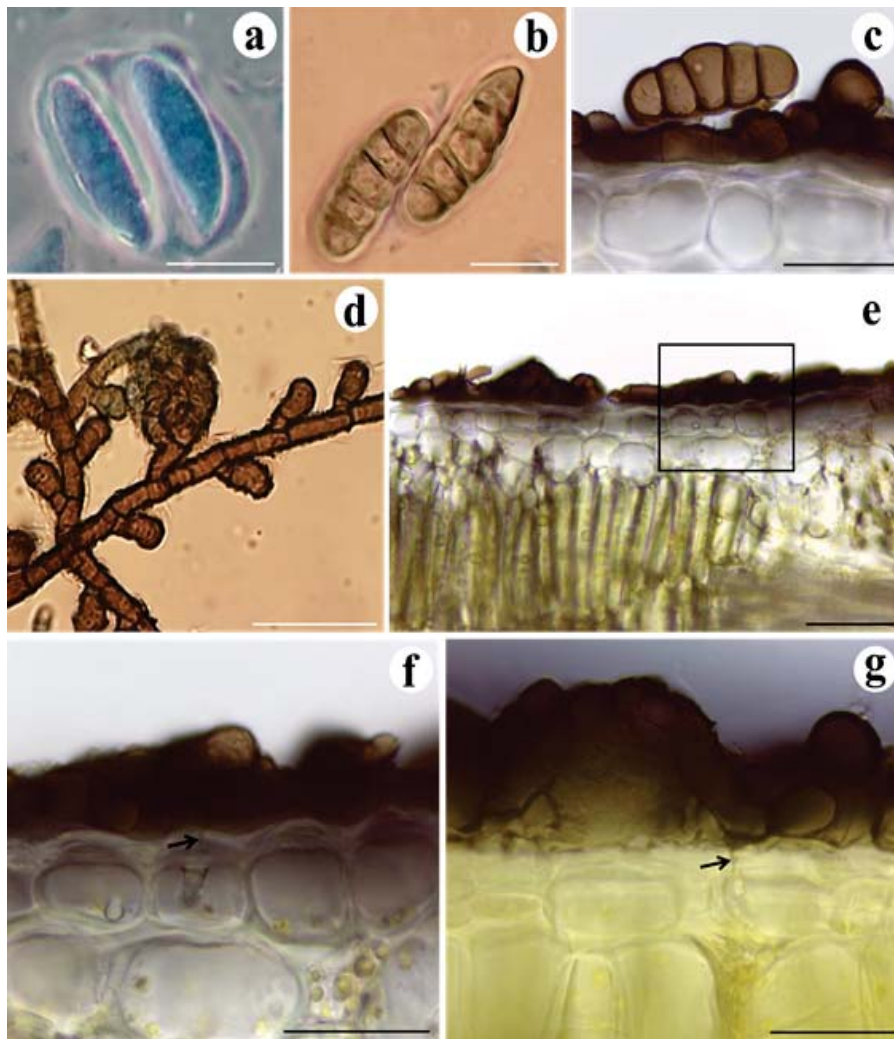


Figure 2. Asci with two immature ascospores (a), two immature ascospores (b), cross section of leaf showing epidermal of cells and superficial mycelium with one ascospore above (c), branched hypha with lateral alternate hyphopodia and perithecial primordium (d), cross section of leaf showing epidermal of cells and superficial mycelium (e), penetration peg (isthmus) from mycelium (f, g). Figure f corresponds to the rectangle marked in e. Scales: 20 μm (a, b), 25 μm (c, f, g), 50 μm (d, e).

Literature Cited

- ANGIOSPERM PHYLOGENY GROUP-APG. 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Botanical Journal of the Linnean Society* 181(1): 1-20.
- GLOBAL BIODIVERSITY INFORMATION FACILITY - GBIF. Disponível em <https://www.gbif.org/pt/species/3523105>. Acesso em: 04 de outubro de 2023.
- PEREIRA, O. L.; SOARES, D. J.; BARRETO, R. W. 2006. First report of *Asteridiella pittieri* on golden dewdrop (*Duranta repens* var. *aurea*) in Brazil. *Australasian Plant Disease Notes* 1(1): 17-18.
- WFO 2023. *Duranta erecta* L. Disponível em: <http://www.worldfloraonline.org/taxon/wfo-0000946828>. Acesso em: 04 de outubro de 2023.

HANSFORD, C. G. 1961. The Meliolineae – a monograph. *Beihefte Sydowia* (2): 1–806.

HONGSANAN, S. et al. 2015. *Meliolales*. *Fungal Diversity* 74: 91-141.

LEITÃO, C. A. E. 2016. Na alternative stage micrometer for use at light microscope. *Perspectivas da Ciência e Tecnologia* 8(2): 58-61.

MORONI, P.; O'LEARY, N. 2020 Insights into the Systematics of Tribe Duranteae (Verbenaceae) II: A Taxonomic Revision of the New World Genus *Duranta*. *Annals of the Missouri Botanical Garden* 105: 502-577.

MORONI, P. 2023. *Duranta* in Flora e Funga do Brasil. Jardim Botânico do Rio de Janeiro. Available at: <<https://floradobrasil.jbrj.gov.br/FB15139>>. Accessed on: 04 Oct. 2023.

MORONI, P.; SALOMÓN, L.; O'LEARY, N. 2018. A framework for untangling Linnaean names based on Plumier's *Nova plantarum americanarum genera*: Revised typification of *Duranta erecta*. *Taxon* 67 (6):1202-1208.