

SCIENTIFIC NOTE

***Chrysomphalus dictyospermi* (MORGAN, 1889) (HEMIPTERA: DIASPIDIDAE) INFESTING THE ORNAMENTAL PLANT *Dianella tasmanica* 'VARIEGATA' HOOK.F. (ASPHODELACEAE) IN GOIÁS, BRAZIL**

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Dianella tasmanica Hook.f. (Asphodelaceae) is an ornamental herbaceous plant widely used in landscaping in several Brazilian cities. This study reports the occurrence of the scale *Chrysomphalus dictyospermi* (Morgan, 1889) (Hemiptera: Diaspididae) on leaves of *D. tasmanica*. Leaf samples with the scale insect were collected in Goiás, Brazil. The main symptoms observed in the leaves were yellowing of the leaf blade and drying of the apex, making them visually unattractive. This is the first report of the occurrence of this scale insect on *D. tasmanica*.

Key words: Agricultural Entomology, phytophagous insects, scale insects.

***Chrysomphalus dictyospermi* (Morgan, 1889) (Hemiptera: Diaspididae) infestando a planta ornamental variegata *Dianella tasmanica* Hook.f. (Asphodelaceae) em Goiás, Brasil.** *Dianella tasmanica* Hook.f. (Asphodelaceae) é uma planta herbácea ornamental comumente utilizada no paisagismo em várias cidades brasileiras. Esse estudo relata a ocorrência da cochonilha *Chrysomphalus dictyospermi* (Morgan, 1889) (Hemiptera: Diaspididae) em folhas de *D. tasmanica*. Amostras de folhas com a cochonilha foram coletadas no município de Jataí, estado de Goiás, Brazil. Os principais sintomas observados nas folhas foram amarelecimento do limbo foliar e secagem do ápice, tornando-as visualmente pouco atraentes. Este é o primeiro relato de ocorrência dessa cochonilha em *D. tasmanica*.

Palavras-chave: Entomologia Agrícola, insetos fitófagos, cochonilhas.

The landscaping of large Brazilian cities is composed of various native and exotic plant species, with great emphasis on those with exuberant foliage and flowering. Plants of the Asphodelaceae family are commonly used for ornamentation and garden composition, due to the beauty of their foliage (Gil & Schneider, 2020). Within the family, the genus *Dianella* is one of the most used and has about 30 described species (Chaudhuri, Panja & Saha, 2017), with emphasis on *Dianella tasmanica* Hook.f., popularly known as ‘dionela’ or ‘dianela’ (Gil & Schneider, 2020).

Dianella tasmanica is an herbaceous species, native to Australia and Tasmania, perennial, tussock and that produces rhizomes, having its use mainly in the covering of gardens. Its leaves are long and narrow, dark green in color with serrated margins. The ‘variegata’ variety has a yellowish color on the edges of the leaves, which makes it even more interesting to be used for landscaping purposes (Malwattage et al., 2021). It is an easy-to-grow plant and presents some phytosanitary problems mainly caused by pathogens, mainly fungi (Chaudhuri, Panja & Saha, 2017).

Insects (Insecta) are arthropods that can be found in the most varied types of habitats and niches, establishing either harmonious or disharmonious relationships with other organisms. Within the class, the order Hemiptera stands out for the richness and abundance of its species, with representatives that can be either beneficial or harmful to plants (Fujihara et al., 2016). Scale insects (Hemiptera, Sternorrhyncha, Coccoidea) are phytophagous insects frequently observed in native and exotic plants and can cause enormous economic losses when not controlled (Gillott, 2005; Grazia et al., 2012). Therefore, knowledge of the host range of the different species of scale insects already known is an important tool for effective management.

Among the reported scale insects associated with the genus *Dianella*, there are two of the genus *Chrysomphalus* (*Chrysomphalus bifasciculatus* (Ferris, 1938), *Chrysomphalus dictyospermi* (Morgan, 1889)), one of the genus *Poliaspis* (*Poliaspis floccosa* (Henderson, 2011)) and one of the genus *Pseudaulacaspis* (*Pseudaulacaspis cockerelli* (Cooley, 1897)) all of the Diaspididae family (García-Morales et al., 2016). For *D. tasmanica*, only *P. cockerelli* has been described so

far (García-Morales et al., 2016). This study aimed to report the occurrence of a diaspidid in *D. tasmanica* ‘variegata’ plants.

Scale insects samples were collected in the urban area of the municipality of Jataí, southwest of the state of Goiás, Brazil (17°88’36.8" S; 51°73’99.3" W) in October 2022. The area consisted of an urban residential backyard with *D. tasmanica* plants with approximately eight months old.

Insect collections were authorized by the permit number 57418-4 of Chico Mendes Institute for Biodiversity Conservation, Brazil. Leaf samples with many insects were collected and packed in Falcon tubes containing 70% ethyl alcohol until assembly and identification in optical microscope. Twelve plants of *D. tasmanica* ‘variegata’ infested with the diaspidid were analyzed, by observing the main injuries caused by the insect and the parts of the plant where more individuals were found, through the visual analysis of leaves, stems, floral buds and flowers. Microscopic images were obtained using a digital camera coupled to a Zeiss 3.0 microscope.

Body samples of adult female mealybugs were mounted on permanent slides according Wolff, Botton and Silva (2014) and identified using the keys of Miller & Davidson (2005). Vouchers were deposited in “Museu de Entomologia Ramiro Gomes Costa (MRGC), Departamento de Diagnóstico e Pesquisa Agropecuária, Secretaria de Agricultura, Pecuária, Produção Sustentável e Irrigação, Porto Alegre, Rio Grande do Sul” (n° 2413).

The scale insect was identified as *Chrysomphalus dictyospermi* (Morgan, 1889) (Hemiptera: Diaspididae) using the macroscopic characteristics of the scutes (Figure 1) and microscopic characteristics of the pygidium of adult females (Figure 2). The macroscopic characteristics were adult female cover circular, slightly convex, thin, reddish brown; central and clearer second instar cover; first instar cover whitish. Pygidium characters slide-mounted on adult female slides: with 3 pairs of definite lobes, fourth lobes represented by low series of sclerotized dots. Median lobes separated, with paraphyses attached to the medial margin, medial margins and lateral margins slightly convergent, with 1 lateral notch; second lobes simple, slightly smaller than the median lobes, with 2 lateral notches; third lobes simple,



Figure 1. *Chrysomphalus dictyospermi* (Hemiptera: Diaspididae) on leaves of *Dianella tasmanica* 'variegata' (Asphodelaceae). *Dianella tasmanica* plant infested with scale insects (A); Adaxial part of the leaf presenting many individuals of *C. dictyospermi* (B); and detail of the adaxial part of the leaf with colorose and individuals of *C. dictyospermi* (C). Pictures: M. T. de Castro.

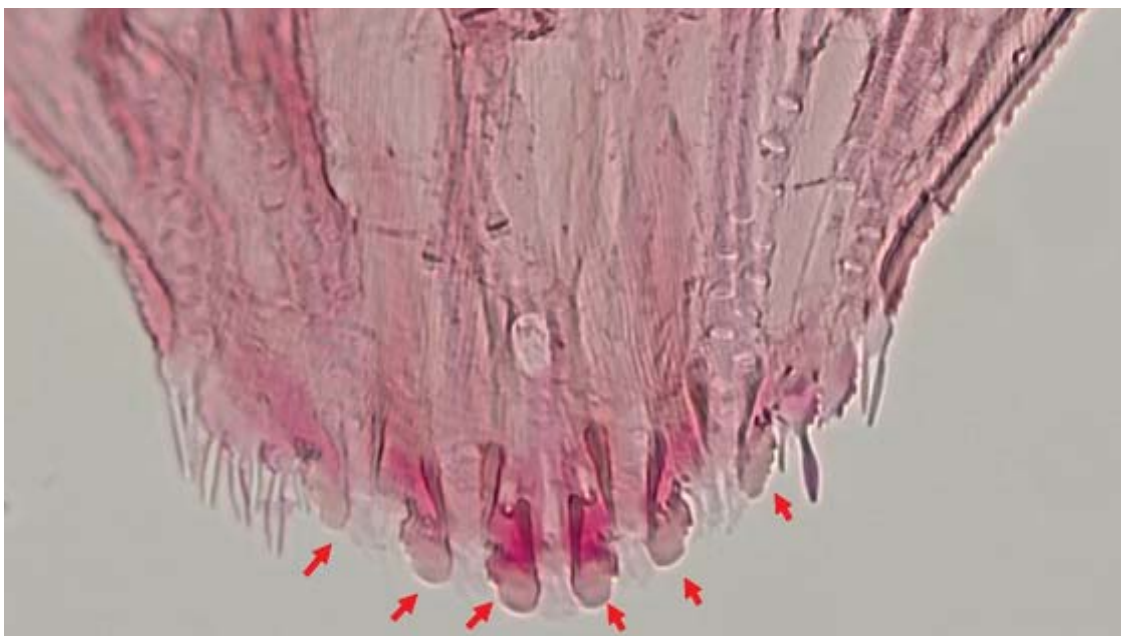


Figure 2. Microscopic details of an adult female of *Chrysomphalus dictyospermi* (Hemiptera: Diaspididae) with morphological details of the pygidium, with 3 pairs of definite lobes (arrows) (200x magnification). Picture: V. R. S. Wolff.

slightly smaller than second lobes. Plates between the lobes fimbriate, after the third lobe with a conspicuous clavate process in the plates (Figure 2).

All the evaluated plants were infested with the scale insect, however, the diaspidid were observed mainly on older leaves. A greater number of individuals of *C. dictyospermi* were found on the upper (adaxial) part of the leaves and no insects were found in other parts of the plants such as the stem, flower buds and flowers. The leaves attacked by the insects showed marked chlorosis, becoming dry at the ends of the leaf apex (Figures 1 A, B and C).

Chrysomphalus is a cosmopolitan genus composed of 17 described species, many of which pests of agricultural and forest crops (García-Morales et al., 2016). Currently, their occurrence records include hundreds of countries and are reported on all continents, except polar zones. Among the main damages caused on plants by scale insects, the intense suction of sap which causes stains, withering and even death of the host stands out (Grazia et al., 2012). Therefore, defining the host range of these insects is important for effective control, especially by adopting integrated management practices.

Chrysomphalus dictyospermi has already been reported in 82 families, including Asphodelaceae, and in 200 plant genera (García-Morales et al., 2016; Martins et al., 2022). Although it has already been found on members of Asphodelaceae family (*Aloe barberae*, *Aloe ciliaris*, *Aloe succotrina*, *Dianella intermedia* and *Gasteria* sp.), so far there has been no report of occurrence on *D. tasmanica* (García Morales et al., 2016).

In Brazil, *C. dictyospermi* already been observed in the following states: Bahia, Espírito Santo, Pará, Rio Grande do Sul, Rio de Janeiro and São Paulo (Culik et al., 2008; Martins et al. 2022). The hosts of this scale insect in Brazil are presented in Table 1. This scale insect can present problems in plantations with these plants in the Goiás state due to its polyphagous and cosmopolitan habit. Therefore, this study

Table 1. Hosts of *Chrysomphalus dictyospermi* and its distribution in Brazil

Host	Distribution	References
<i>Agave</i> sp.	BR	
<i>Aloidendron barberae</i>	BR	
<i>Annona</i> sp.	BR	
<i>Annona squamosa</i>	BR	
<i>Anthurium</i> sp.	BR	
<i>Areca</i> sp.	BR	
<i>Areca triandra</i>	BR	
<i>Citrus sinensis</i>	BR	
<i>Cocos</i> sp.	BR	
<i>Syagrus romanzoffianus</i>	BR	
<i>Cycas</i> sp.	BR	
<i>Cycas revoluta</i>	BR	Lepage (1938)
<i>Cyprimpedium</i> sp.	BR	Silva et al. (1968)
<i>Dendrobium</i> sp.	BR	Claps et al. (2001)
<i>Dictyospema</i> sp.	BR	Claps & Wolff (2003)
<i>Dictyosperma alba</i>	BR	Peronti et al. (2022)
<i>Erythrina indica</i>	BR	
<i>Ligustrum</i> sp.	BR	
<i>Magnolia</i> sp.	BR	
<i>Mangifera indica</i>	BR	
<i>Maranta</i> sp.	BR	
<i>Orchidaceae (unidentified species)</i>	BR	
<i>Palmae (unidentified species)</i>	BR	
<i>Psidium</i> sp.	BR	
<i>Sida ulmifolia</i>	BR	
<i>Rosa</i> sp.	BR	
<i>Spondias dulcis</i>	BR	
<i>Citrus sinensis</i>	RS	Wolff et al. (2004)
<i>Citrus spp.</i>	RJ, SP, RS	Almeida et al. (2018)
<i>Clusia fluminensis</i> Planch & Triana	ES	Culik et al. (2008)
<i>Ficus benjamina</i> L.	ES	
<i>Laurus nobilis</i> L.	RS	Wolff et al. (2009)
<i>Rosa</i> sp.	ES	Culik et al. (2008)
<i>Areaceae (unidentified species)</i>	ES	
<i>Beaucarnea recurvata</i> Lem.	ES	
<i>Ficus benjamina</i>	ES	
<i>Leea guineenses</i> G. Don	ES	Martins et al. (2022)
<i>Leea rubra</i> Blume	ES	
<i>Syzygium jambos</i> (L.) Alston	ES	
<i>Zamioculcas zamiifolia</i> (Lodd.) Engl.	ES	

BR: undefined state

records for the first time the occurrence of this scale insect on the referred host and this is the first observation for the state of Goiás.

Literature Cited

- ALMEIDA, L. F.V.; PERONTI, A. L. B. G.; MARTINELLI, N.; WOLFF, V. R. S. 2018. A survey of scale insects (Hemiptera: Coccoidea) in citrus orchards in São Paulo, Brazil. *Florida Entomologist* 101(3):353-363.
- CHAUDHURI, T.; PANJA, B.; SAHA, J. 2017. Cultural and morphological characteristics of *Lasiodiplodia theobromae* of *Dianella* in various carbon and nitrogen containing media. *Journal of Pharmacognosy and Phytochemistry* 6:160-164.
- CLAPS, L. E.; WOLFF, V. R. S.; GONZÁLES, R. Z. 2001. Catálogo de las Diaspididae (Hemiptera: Coccoidea) exóticas de la Argentina, Brazil y Chile. *Revista de la Sociedad Entomológica Argentina* 60(1-4):9-34.
- CLAPS, L. E.; WOLFF, V. R. S. 2003. Cochinillas Diaspididae (Hemiptera: Coccoidea) frecuentes en plantas de importancia económica de la Argentina y Brasil. *Publicación Especial de La Sociedad Entomológica Argentina*. San Miguel de Tucumán, n. 3. 62p.
- CULIK, M. P.; MARTINS, D. S.; VENTURA, J. A.; WOLFF, V. R. dos S. 2008. Diaspididae (Hemiptera: Coccoidea) of Espírito Santo, Brazil. *Journal of Insect Science* 8(17):1-6.
- LEPAGE, H. S. 1938. Catálogo dos coccídeos do Brasil. *Revista do Museu Paulista (Brasil)* 23:327-491.
- FUJIHARA, R. T.; FORTI, L. C.; ALMEIDA, M. C.; BALDIN, E. L. L. 2016. Insetos de importância econômica: guia ilustrado para identificação de famílias. Botucatu, SP, FEPAF. 391p.
- GARCÍA-MORALES, M.; DENNO, B. D.; MILLER, D. R.; MILLER, G. L.; BEN-DOV, Y. & HARDY, N. B. 2016. ScaleNet: a literature-based model of scale insect biology and systematics. Database. Disponível em: <<http://scalenet.info>> Acesso em: 01.fev.2023.
- GIL, A. S. B.; SCHNEIDER, L. J. C. 2020. Asphodelaceae in Flora e Funga do Brasil. Jardim Botânico do Rio de Janeiro. Disponível em: <<http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB607353>> Acesso em 01.fev.2023.
- GILLOTT, C. 2005. *Entomology*. 3rd ed. Netherlands. Springer. 831p.
- GRAZIA, J. et al. 2012. Hemiptera Linnaeus, 1758. In: RAFAEL, J. A. et al. (Orgs.). *Insetos do Brasil: Diversidade e Taxonomia*. 1 ed. Ribeirão Preto, SP, Holos Editora. pp.347-405.
- MARTINS, D. S.; WOLFF, V. R. dos S.; CULIK, M. P.; SANTOS, B. C.; FORNAZIER, M. J.; VENTURA, J. A. 2022. Diversity, distribution and host plants of armored scale insects (Hemiptera: Diaspididae) in Espírito Santo, Brazil. *Biota Neotropica* 22(2):e20211248.
- MILLER, D. R.; DAVIDSON, J. A. 2005. *Armored scales insect pests of trees and shrubs (Hemiptera: Diaspididae)*. Cornell University Press, Ithaca. 442p.
- MALWATTAGE, G.; RATNAYAKE, R. D.; SENEVIRATNE, K. L.; PEIRIS, S. E.; PEIRIS, B. C. N. 2021. Novel surface sterilization technique for in vitro establishment of *Dianella tasmanica variegata* nodal explant. In: *Proceedings of National Symposium on Floriculture Research*, 21, Sri Lanka. *Proceedings...* Department of National Botanic Gardens, NasFlor. pp.8-13.
- PERONTI, A. L. B. G.; WOLFF, V. R. S.; PACHECO da SILVA; V. C. 2022. Coccoidea. In: *Lista da Fauna do Brasil*. Disponível online em: <http://fauna.jbrj.gov.br/fauna/listaBrasil/> Acesso: 03.maio.2023.
- SILVA, A. G. d'A.; GONÇALVES, C. R.; GALVÃO, D. M.; GONÇALVES, A. J. L.; GOMES, J.; SILVA, M. N.; SIMONE, L. 1968. *Quarto catálogo dos insetos que vivem nas plantas do Brasil, seus parasitos e predadores, parte dois, tomo I*. Rio de Janeiro. Ministério da Agricultura. 622 p. parte II 1^o Tomo.
- WOLFF, V. R. S. et al. 2009. Cochonilhas (Hemiptera, Sternorrhyncha, Coccoidea) associadas às plantas medicinais e aromáticas. *Pesquisa Agropecuária Gaúcha* 15(1):65-68.

WOLFF, V. R. S; BOTTON, M.; SILVA, D. C. 2014.
Diaspidídeos e parasitoides associados ao cultivo

da videira no Rio Grande do Sul, Brasil. Revista
Brasileira de Fruticultura 36:835-840.

