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Occurrence of greedy scale, *Hemiberlesia rapax* (Comstock) (Hemiptera: Diaspididae), on mahogany in Brazil

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Abstract - The Brazilian mahogany (*Swietenia macrophylla* King, Meliaceae) is an important forest species known worldwide for the high commercial value of its wood. Few arthropods have been observed associated with mahogany. However, this paper reports the occurrence of *Hemiberlesia rapax* (Comstock) (Hemiptera: Diaspididae) in *S. macrophylla* plants for the first time. The greedy scales did not cause apparent damage on the trunks and petioles, but the leaves turned yellowish, dried, and fall prematurely. This is the first reported occurrence of *H. rapax* in *S. macrophylla* in the world.

Key Words: Scale insect. *Swietenia macrophylla*. Meliaceae. Insect-plant interaction. Forest entomology.

Ocorrência da cochonilha *Hemiberlesia rapax* (Comstock) (Hemiptera: Diaspididae) em mogno no Brasil

Resumo- O mogno brasileiro (*Swietenia macrophylla* King, Meliaceae) é uma importante espécie florestal conhecida mundialmente pelo elevado valor comercial de sua madeira. Poucos artrópodes têm sido observados associados ao mogno. Portanto, esse artigo reporta pela primeira vez a ocorrência de *Hemiberlesia rapax* (Comstock) (Hemiptera: Diaspididae) em plantas de *S. macrophylla*. As cochonilhas não causaram danos aparentes nos troncos e pecíolos, mas as folhas se tornaram amareladas, secas, e caíram prematuramente. Este é o primeiro relato de ocorrência de *H. rapax* em *S. macrophylla* no mundo.

Palavras-chave: Cochonilhas. *Swietenia macrophylla*. Meliaceae. Interação inseto-planta. Entomologia florestal.

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The Brazilian mahogany (*Swietenia macrophylla* King, Meliaceae) is an Amazonian tree with has high commercial value wood (CARVALHO, 2007) and is considered as a "hardwood" in many countries. In addition to its economic status, the species is also used ecologically in programs to restore degraded areas and afforestation of cities, and it can form small forests (KURIHARA et al., 2005; CARVALHO, 2007).

Large-scale mahogany cultivation in Brazil is hampered mainly by the presence of the shoot borer *Hypsipyla grandella* Zeller borer (Lepidoptera: Pyralidae), its main pest (LUNZ et al., 2009; CASTRO et al., 2016). However, recently other arthropods have been observed associated with mahogany in Brazil, especially when grown in a greenhouse. *Saissetia miranda* (Cockerel & Parrot) (Hemiptera: Coccidae) and *Phenacoccus solenopsis* Tinsley (Hemiptera: Pseudococcidae) were observed to damage greenhouse mahogany seedlings located in Brasilia, Distrito Federal, Brazil (CASTRO et al., 2018; CASTRO et al., 2019a). In addition to these scaled insects, the mite *Eutetranychus banksi* (McGregor) (Tetranychidae: Tetranychinae) has been reported in mahogany seedlings causing leaf tanning and premature leaf fall, also under greenhouse conditions (CASTRO et al., 2019b).

In this context, the objective of this work is to report the occurrence of another scaled insect in mahogany plants grown in a greenhouse in the region of Brasilia, Brazil.

In November 2017, mahogany seedlings were produced in a greenhouse located in Brasilia, Brazil (S 15°43'49.8" W 47°53'59.1") using twenty seeds from parent trees located in the Distrito Federal, Brazil, to conduct an experiment using endophytic bacteria. The seeds were planted in pots containing a mixture of autoclaved soil with Plantmax® substrate. The seedlings were watered daily and fertilized with Osmocote® fertilizer every four months.

In January 2019, two mahogany plants were observed with scale insects on the trunk, petiole, and leaves. The seedlings were separated for study and no control was applied. The growth and development of insects on the seedlings was followed until March 2019, observing the main symptoms and damage caused to the plants. The average temperature inside the greenhouse was 30 °C and 65% relative humidity. Insect samples were taken from plants, stored in Falcon tubes containing 70% alcohol, and mounted on slides following the methodology adapted and described by Wolff et al. (2014) for identification. The Diaspididae was identified by co-author VRS Wolff according to the morphological characteristics of the six adult females, which are deposited on two permanent slides in the reference collection of the Ramiro Gomes Costa Museum of Entomology (MRGC), Center for Research on Plant Production, DDPA/SEAPDR, Porto Alegre, RS, Brazil.

The greedy scaled insects obtained from *S. macrophylla* plants were identified as *Hemiberlesia rapax* (Comstock) (Hemiptera: Diaspididae) (Figure 1). Both immature and adult *H. rapax* were observed on both

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plants. Apparently, the greedy scales did not damage the trunks and petioles, but the leaves turned yellowish, dried, and fell prematurely (Fig 1a, 1b, 1c, 1d, and 1e). In addition, some leaves were observed with symptoms of sooty mold, possibly caused by the fungus *Capnodium* sp. Similar symptoms were observed by Tiago Neto et al. (2017) in *Adenium obesum* (Forssk.) Roem. & Schult., in Goiás, Brazil. Nevertheless, no growth retardation was observed in both seedlings compared to the other trees.

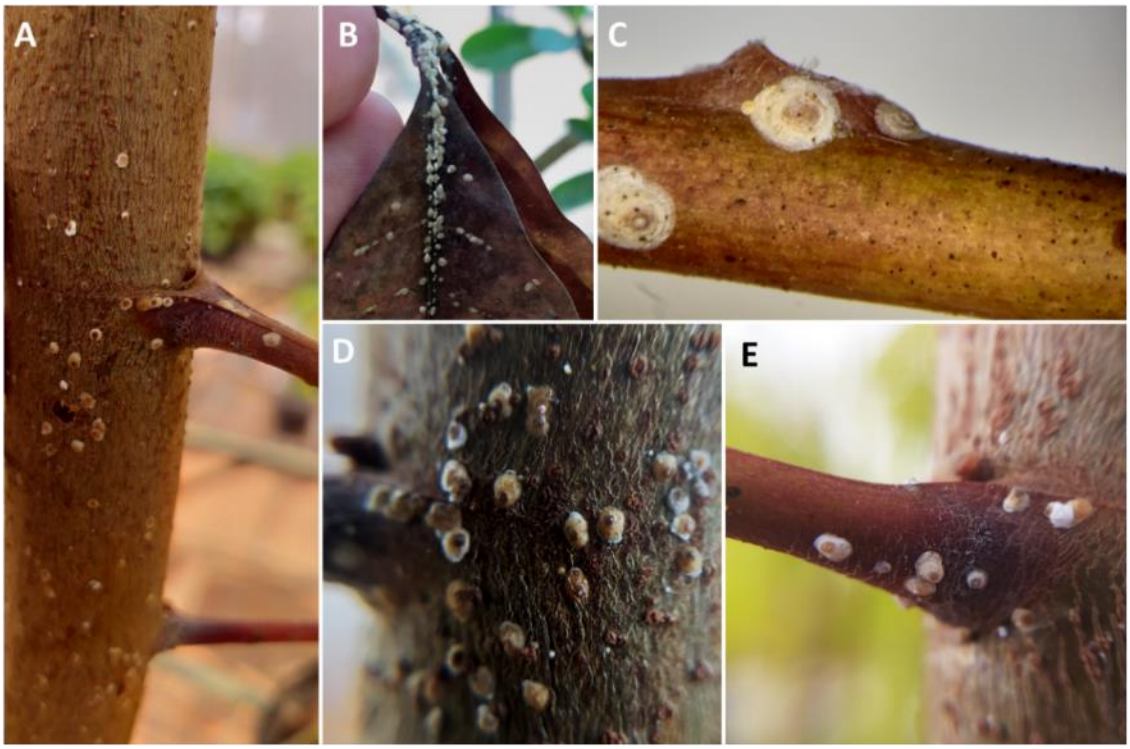

Figure 1. *Hemiberlesia rapax* (Hemiptera: Diaspididae) on *Swietenia macrophylla*. a) Scale insects infesting stem and petiole of mahogany seedling conducted under greenhouse conditions in Brazil. b) Leaves infested by *H. rapax*. c) and d) Detail of the macroscopic characteristic of *H. rapax*. e) *H. rapax* infesting petiole of mahogany seedling.

The genus *Hemiberlesia* Cockerell has 49 species distributed throughout the globe, with seven species occurring in Brazil (CLAPS et al., 2001; GARCÍA MORALES et al., 2016; MONTEIRO et al., 2019). *Hemiberlesia rapax* is a cosmopolitan species parasitizing about 80 families and 189 plant genera, most commonly found in ornamental plants (DAVIDSON e MILLER, 1990; GARCÍA MORALES et al., 2016) and is a major pest in Kiwi crops in many countries (BERRY et al. 1989; LO e BLANK 1989). According to Watson

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(2002), this insect is frequently reported in greenhouses, but usually does not cause major damage, corroborating the present study, although the number of mahogany plants that were attacked by the greedy scales was low.

Within the Meliaceae family, *H. rapax* has already been reported in *Cedrela* sp. in Australia (BRIMBLECOMBE, 1968), in *Dysoxylum spectabile* (G.Forst.) Hook.f. in New Zealand (HENDERSON, 2011), and in *Melia azedarach* L. in France (Balachowsky, 1932) and the United States (WILSON, 1917). In Brazil, *H. rapax* has been found in about 40 host plants, but none from the Meliaceae family, and is distributed in the South, Southeast, and Central-West (CLAPS e WOLFF, 2003; GARCÍA MORALES et al.; 2016, TIAGO NETO et al., 2017). Therefore, this is the first occurrence of *H. rapax* in *S. macrophylla* in the world.

References

BERRY, J.A.; MORALES, C.P.; HILL, M.G.; LOFROTH B.J.; ALLAN, D.J. The incidence of three diaspid scales on kiwifruit in New Zealand. **Proceedings of the 42rul New Zealand Weed and Pest Control Conference**, p. 182-186, 1989.

BRIMBLECOMBE, A.R. Studies of the Coccoidea. 14. The genera *Aspidiotus*, *Diaspidiotus* and *Hemiberlesia* in Queensland. **Queensland Journal of Agricultural and Animal Sciences**, v. 25, p. 39-56, 1968.

CARVALHO, P.E.R. Mogno – *Swietenia macrophylla*. Colombo, Paraná, Embrapa Florestas. Circular Técnico 140, 2007. 12 p.

CASTRO, M.T.; MONTALVÃO, S.C.L.; MONNERAT, R.G. Breeding and biology of *Hypsipyla grandella* Zeller (Lepidoptera: Pyralidae) fed with mahogany seeds (*Swietenia macrophylla* King). **Journal of Asia-Pacific Entomology**, v. 19, p. 217-221, 2016. DOI: https://doi.org/10.1016/j.aspen.2016.01.008.

CASTRO, M.T.; MONTALVÃO, S.C.L.; MONNERAT, R.G.; PRADO, E.; PICANÇO, M.C.; PERONTI, A.L.B.G. First report of *Saissetia miranda* (Cockerell & Parrott) (Hemiptera: Coccidae) in Brazil: occurrence on mahogany seedlings. **Florida Entomologist**, v. 101, p. 324-326, 2018. DOI: https://doi.org/10.1653/024.101.0227.

PESQ. AGROP. GAÚCHA, v.26, n.1, p. 1-6, 2020
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CASTRO M.T.; MONTALVÃO, S.C.L.; PERONTI, A.L.B.G.; MONNERAT, R.G. Ocorrência da cochonilha *Phenacoccus solenopsis* Tinsley (Hemiptera: Pseudococcidae) em mudas de mogno (*Swietenia macrophylla* King). **EntomoBrasilis**, v. 12, p. 41-43, 2019a. DOI: https://doi.org/10.12741/ebrasilis.v12i1.791

CASTRO, M.T.; MONTALVÃO, S.C.L.; NAVIA, D.; FLECHTMANN, C.H.W.; MONNERAT, R.G. First report of *Eutetranychus banksi* (McGregor) on mahogany (*Swietenia macrophylla* King). **Floresta e Ambiente**, v. 26, p. 1-4, 2019b. DOI: https://doi.org/10.1590/2179-8087.119617

CLAPS, L.E.; WOLFF, V.R.S.; GONZÁLEZ, R.H. Catálogo de las Diaspididae (Hemiptera: Coccoidea) exóticas de la Argentina, Brasil y Chile. [Catalog of the exotic species of Diaspididae (Hemiptera: Coccoidea) from Argentina, Brazil and Chile.] **Revista de la Sociedad Entomológica Argentina**, v. 60, p. 9-34, 2001.

CLAPS, L.E.; WOLFF, V.R.S. Cochinillas Diaspididae (Hemiptera: Coccoidea) frecuentes em plantas de importancia económica de la Argentina y Brasil. **Revista de la Sociedad Entomológica Argentina**, v. 3, p. 1-59, 2003.

DAVIDSON, J.A.; MILLER, D.R. **Ornamental plants**. In: ROSEN, D. Armoured scale insects, their biology, natural enemies and control. 4. ed. Amsterdam, Netherlands: Elsevier, v. 4b, p. 603-632, 1990.

GARCÍA MORALES, M.; DENNO, B.D.; MILLER, D.R.; MILLER, G.L.; BEN-DOV, Y.; HARDY, N.B. **ScaleNet: A literature-based model of scale insect biology and systematics.** Database. 2016. DOI: http://dx.doi.org/10.1093/database/bav118. http://scalenet.info.

HENDERSON, R.C. Diaspididae (Insecta: Hemiptera: Coccoidea), Fauna of New Zealand, Lincoln Canterbury, New Zealand, v. 275, n. 66, 2011.

KURIHARA, D.L.; IMAÑA-ENCINAS, J.; PAULA, J.E. Levantamento da Arborização do Campus da Universidade de Brasília. **Cerne**, v. 11, p. 127-136, 2005.

LO, P.L.; BLANK, R.H. A survey of armoured scale species (Hemiptera: Diaspididae) in kiwifruit orchards. **New Zealand Entomologist**, v. 12, p. 1-4, 1989.

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LUNZ, A.M.; THOMAZINI, M.J.; MORAES, M.C.B.; NEVES, E.J.M.; BATISTA, T.F.C.; DEGENHARDT, J.; SOUSA, L.A.; OHASHI, O.S. *Hypsipyla grandella* em Mogno (Swietenia macrophylla): situação atual e perspectivas. **Pesquisa Florestal Brasileira**, v. 59, p. 45-55, 2009. DOI: http://dx.doi.org/10.4336/2009.pfb.59.45

MONTEIRO, G.G.; WOLFF, V.R.S.; PERONTI, A.L.B.G.; MARTINELLI, N.M.; DOS ANJOS, I.A. First Record of *Hemiberlesia musae* Takagi & Yamamoto, 1974 and *Duplachionaspis divergens* (Green, 1899) (Hemiptera: Diaspididae) on Sugarcane in Greenhouse in Brazil. **Journal of Agricultural Science**, v. 11, p. 392-396, 2019. DOI: https://doi.org/10.5539/jas.v11n2p392

TIAGO NETO, L.J.; RODRIGUES, O.D.; TSAI, H.M.; ESTEVAM, J.T.; PEREIRA, J.M.; SELEGUINI, A. Ocorrência de insetos fitófagos em *Adenium obesum* (Forssk.) Roem. & Schult no estado de Goiás. **Revista Agro@mbiente**, v. 11, p. 379-384, 2017. DOI: https://doi.org/10.18227/1982-8470ragro.v11i4.4222

WATSON, G.W. Arthropods of economic importance: Diaspididae of the world. An illustrated identification guide and information source. CD-ROM. Expert Center for Taxonomic Identification (ETI), University of Amsterdam, The Netherlands. ISBN N° 90-75000-48-0, 2002.

WILSON, C.E. Some Florida scale-insects. **Quarterly Bulletin of the Florida State Plant Board**, v. 2, p. 2-65, 1917.

WOLFF, V.R.S.; BOTTON, M.; SILVA, D.C. Diaspidídeos e parasitoides associados ao cultivo da videira no Rio Grande do Sul, Brasil. **Revista Brasileira de Fruticultura**, v. 36, p. 835-840, 2014. DOI: http://dx.doi.org/10.1590/0100-2945-145/13

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