

## *Maconellicoccus hirsutus* (Green) Register in Teak Forest Stands in the Mato Grosso State, Brazil

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### ABSTRACT

The pink hibiscus mealybug, *Maconellicoccus hirsutus* Green (Hemiptera, Pseudococcidae) is registered for the first time in teak forest stands, *Tectona grandis*, in the municipality of São José de Quatro Marcos, State of Mato Grosso, Brazil. Information on the geographical distribution, biology, damage and management of this pest is provided.

**Keywords:** pink hibiscus mealybug, exotic pest, *Tectona grandis*.

The pink hibiscus mealybug, *Maconellicoccus hirsutus* (Green) (here abbreviated PHM) (Hemiptera, Pseudococcidae), supposedly of origin in Southeast Asia, is currently widely-distributed in the Afrotropical, Australasia, North America, Central America, South America, Caribbean region, Oceania and the Palaearctic regions (Ben-Dov et al., 2014). In Brazil, it was first registered at the municipalities of Bonfim, Paracaima and at Boa Vista, in the State of Roraima (Culik et al., 2013; Marsaro et al., 2013).

The PHM is highly-polyphagous and was recorded from about 330 plant species that include trees and shrub of economic importance (Williams, 1985; Williams & Willink, 1992; Ben-Dov et al., 2014). The objective of this study is to record the occurrence of *M. hirsutus* in teak stands and also to assess the damage caused by this pest.

The PHM was collected in November 6, 2013 at two plantations of *Tectona grandis* Linn. f. (Lamiaceae), in the municipality of São José de Quatro Marcos, State

of Mato Grosso, Brazil (15°37'17" latitude S; 58°10'35" longitude W). The two areas hold a total of 1,300 ha planted with teak, the area infested in the first property (four years) had about 189 ha, and the second one (six years), about 107 ha.

Sampling was simple random, and five plots were selected for the two areas. Each plot contained 400 m<sup>2</sup> (20 m x 20 m) of area, with a 50 m distance from the edge of the plot. In the first plantation three locations were inspected and at the second property only two, totalizing five plots. In each plot, approximately 40 trees were investigated, and their trunk, branches, leaves and needles analyzed.

The collected material was placed in plastic bags and taken for further study to the Forest Protection laboratory of Forest Engineering College, Federal University of Mato Grosso. The separation of the mealybugs from the plant material was performed by flushing the infested plant material with alcohol 70%,

then, separating then with brush and preserved in 70% alcohol in glass tubes.

The mealybugs were identified by one of the authors (YBD). The specimens were stored in LAPROFLOR and Department of Entomology, Agricultural Research Organization, The Volcani Center, Israel.

The collected material was identified as *M. hirsutus*. At the first inspected property (plot 1) 100% of the trunks and crowns were infested (Figure 1A). At plot 2, 95% of infestation was recorded on trunks and 100% on crowns, and at plot 3, 20% of infestation on trunks and 100% on crowns. In the second property, the two inspected plots, were found to be 100% of infested in the trunks and crowns, and the infested trees were clearly distinguished in reduced twig growth in the crowns, and remarkable drop of leaves (Figure 1B).

The occurrence of *M. hirsutus* in Central America was first reported from the Caribbean Island in Grenada in teak stands and *Hibiscus* trees (Pollard, 1995). Kairo et al. (2000) suggested that the PHM was accidentally introduced into the Caribbean in the early 1990s.

It was reported in 1994. After that, it spread quickly to Caribbean countries, becoming one of the most important pest species. Tambasco et al. (2000) have already indicated that *M. hirsutus* might spread into Brazil because of its presence in South America and the favourable environmental conditions. Eventually it was confirmed by Marsaro et al. (2013) who registered it for the first time in the State of Roraima, Brazil, in the year

2010, on the following nine host-plants, *Annona muricata* L. (Annonaceae), *Glycine max* (L.) Merr. (Fabaceae), *Centrolobium paraensis* Tul. (Fabaceae), *Inga edulis* Mart. (Fabaceae), *Hibiscus rosa-sinensis* L. (Malvaceae), *Psidium guajava* L. (Myrtaceae), *Averrhoa carambola* L. (Oxalidaceae), *Citrus sinensis* (L.) (Rutaceae) and *Solanum lycopersicum* L. (Solanaceae). Also according to the authors, the species *C. paraensis*, *I. edulis* and *C. sinensis* are registered for the first time as a host.

Culik et al. (2013) registered *M. hirsutus* also from the Espírito Santo State, Brazil (which is 3400 km southeastern of Roraima) on plants of Okra, *Abelmoschus esculentus*. Also, according to the authors, this insect is established in Espírito Santo and may become widely established in South America, because *M. hirsutus* is a potential pest plant in these regions and nearby. Agricultural management methods may need to be modified because of its presence.

*Maconellicoccus hirsutus* is a highly-polyphagous mealybugs that attacks some forest plants that has economic importance, such as *Hibiscus elatus*, *Samanea saman*, *Gliricidia* spp. and teak. Assuming that these plant species are highly-susceptible to this pest, it can lead to death plant in case of a high infestation (Sagarra & Peterkin, 1999).

The chemicals commonly used to control pink mealybug have limited effectiveness, due to the habit of settling in cracks on the bark and for presenting the body coated with wax (Williams, 1986). Sprays with mineral oils showed good results in guava (Mani, 1989).



**Figure 1.** *Maconellicoccus hirsutus* infestation in teak stands, *Tectona grandis*, at São José de Quatro Marcos, MT, Brazil, 2013. (A) Detail of infested trunk at locality 1. (B) Crowns of trees infested with a reduced amount of leaves.

The biological control with ladybirds *Cryptolaemus montrouzieri* Mulsant (Coleoptera, Coccinellidae) is an efficient method to control pink mealybug in India (Mani & Krishnamoorthy, 2008) and in Caribe (Kairo et al., 2000). In Egitto, *C. montrouzieri* was unable to survive the harsh winter of the region and did not show satisfactory results, even though the principal agents of biological control were the parasitoids *Anagyrus kamali* Moursi and *Achrysophagus* sp. (Hymenoptera, Encyrtidae) (Bartlett, 1978). *Anagyrus kamali* was also introduced in the Caribbean, to control of *M. hirsutus*. However, the success of the biological control program in the Caribbean can be attributed to the rapid rate of reproduction and to public awareness programs on the reduction of pest control chemicals (Kairo et al., 2000).

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