

The psilid *Glycaspis brimblecombei* in transition areas Biomes Amazon and Brazilian Savanna

Thaíse Karla Ribeiro Dias^a, Evaldo Martins Pires^b, Carlos Frederico Wilcken^c, Adilson Pacheco Souza^b, Everton Pires Soliman^d, Cátia Cardoso Silva^b

^a Laboratório de Energia e Pragas de Grãos Armazenados. Universidade Federal de Mato Grosso, Sinop, 78557-267, Brasil

^b Programa de Pós graduação em Ciências Ambientais. Universidade Federal de Mato Grosso, Sinop, 78557-267, Brasil.

*evaldo.pires@gmail.com

^c Programa de Pós Graduação em Proteção de Plantas, Universidade Estadual Paulista "Júlio de Mesquita Filho"/FCA, Botucatu, 318.610-307, Brasil.

^d Pesquisador da empresa Suzano Papel e Celulose, Itapetininga, 18207-780, Brazil.

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Abstract

In the state of Mato Grosso, intensive forestry is in the initial phase covering less than 0.2% of the territory. Agribusiness boosted investments for the establishment of populations with forest species, especially the cultivation of *Eucalyptus* sp. *Glycaspis brimblecombei* (red gum lerp psyllid) has become an important pest for eucalyptus cultivation in Brazil. The objective of this research was to report the occurrence of *G. brimblecombei* in the Mato Grosso State in transition areas Biomes Amazon and Brazilian Savanna. In June 2014, adults, egg masses and nymphs of redgum lerp psyllid were observed attacking these Myrtaceae in the cities of Sinop, Sorriso, Lucas do Rio Verde and Feliz Natal. The period that characterizes the dry season in the region is between May to October and due to the high temperatures and low precipitation rates favor the occurrence of this pest. This is the first record of *G. brimblecombei* in the North of Mato Grosso.

Keywords: Adults, *Eucalyptus*, immatures, occurrence, pest.

O psilídeo *Glycaspis brimblecombei* em áreas de transição dos Biomas Amazônia e Cerrado

Resumo

No estado de Mato Grosso, a silvicultura intensiva está na fase inicial cobrindo menos de 0,2% do território. O agronegócio impulsionou investimentos para o estabelecimento de populações com espécies florestais, especialmente o cultivo de *Eucalyptus* sp. *Glycaspis brimblecombei* (psilídeo-de-concha-do-eucalipto) tornou-se uma importante praga para o cultivo de eucalipto no Brasil. O objetivo desta pesquisa foi relatar a ocorrência de *G. brimblecombei* no estado de Mato Grosso, em região de transição dos Biomas Amazônia e Cerrado. Em junho de 2014, observou-se adultos, massas de ovos e ninfas de *G. brimblecombei*, nas áreas de cultivo atacando *Eucalyptus* sp. nas cidades de Sinop, Sorriso, Lucas do Rio Verde e Feliz Natal. O período que caracteriza a estação seca na região é entre maio a outubro e devido às altas temperaturas e baixas taxas de precipitação, o que favorece a ocorrência desta praga. Este é o primeiro registro de *G. brimblecombei* no norte de Mato Grosso.

Palavras-chave: Adultos, *Eucalyptus*, imaturos, ocorrência, praga.

Introduction

Mato Grosso State has shown growth in eucalyptus planted area and this is mainly due to power requirement, this forest essence is a possibility to supply part of this demand which aims to serve the needs of the industrial sector as in grain drying, heating boilers, charcoal production and yet in timber industry (Famato, 2013). About 59,980 hectares of *Eucalyptus* L'Héritier plantations in the state were recorded in 2012 (Abraf, 2013).

The genus *Glycaspis* has high diversity and most of its individuals have been found attacking plants of *Eucalyptus*

sp. This insect presents high dispersal ability owing to its small size which means that this pest has been introduced in many countries, being detected in the USA in 1998 (Brennan et al., 1999), Mexico in 2000 (Paine et al., 2006), Chile in 2002 (Olivares et al., 2004), Argentina (Bouvet et al., 2005), Venezuela (Rosales et al., 2008) and Peru (Burckhardt et al., 2008). In Europe, it was reported in Portugal, Spain in 2007 (Valente and Hodkinson, 2009) and Italy in 2010 (Peris-Felipo et al., 2011). More recently in Tunisia in 2012 (Attia and Rapisarda, 2014), Greece (Tsagkarakis et al., 2014), Turkey and Israel (Karaca et al., 2015; Spodek et al., 2015).

In Brazil, the first report of the redgum lerp psyllid occurred in Mogi Guaçu, São Paulo State, in June 2003, reaching more than 80 cities until September of that year. Its presence was verified in Goiás, Mato Grosso do Sul, Minas Gerais and Paraná (Wilcken et al., 2003; Santana et al., 2003). Its occurrence was reported in Santa Catarina (Lutinski et al., 2006), Rio Grande do Sul (Oliveira et al., 2006), Bahia (Masson et al., 2009), Pernambuco and Mato Grosso (Breda et al., 2010; Silva et al., 2013).

High populations of *G. brimblecombei* (Moore, 1964) (Hemiptera: Psyllidae) may cause indirect damage to plants mainly due to Sooty mold that interferes with the absorption of photo-assimilated compounds and increases the susceptibility to other opportunistic insects. *G. brimblecombei* causes leaf yellowing and drying of the tops, which reduce the photosynthetic area and compromise the growth of trees (Carne and Taylor, 1984).

G. brimblecombei contains five immature stages and may have several generations during the year (Dreistadt and Dahlsten, 2001). The temperature of 26 °C may be considered the ideal for the development of nymphs and adults of redgum lerp psyllid with average of 22 days for *Eucalyptus camaldulensis* Dehnh and the hybrid *Eucalyptus urophylla* S.T. Blake x *Eucalyptus grandis* Hill ex Maiden (urograndis) (Firmino et al., 2009).

Since its detection in Brazil, this species has been monitored, because, in that way, it is possible to know its infestation levels over time and identify the environmental factors that may influence its population. There is a monitoring system, performed through sticky traps, known as yellow sticky cards, where insects remain attached, and this one has been used in the Savanna and Amazon biome areas in Mato Grosso State. The objective of this research was to report the occurrence of *G. brimblecombei* in the Mato Grosso State in transition areas Biomes Amazon and Brazilian Savanna.

Material and Methods

G. brimblecombei monitoring in Middle North region of Mato Grosso began in May 2014 to May 2016, with yellow sticky traps, measuring 10.0 x 12.0 cm, with adhesive on both sides, installed at a height of 1.80 m from ground level, fixed between two trees with the aid of flat wire (Ferreira-Filho et al, 2008). Two to five-year-old *Eucalyptus* crops, with a spacing 2.5 x 3.0 m, in areas with interface between *Eucalyptus* and native forest and, *Eucalyptus* x *Eucalyptus*, besides seedling nursery has been sampled, totalling an area of 560 ha in the transition region of the Amazon-Savanna Biome (Figure 3).

Two adhesive traps were installed in each sampled area (the points were situated in de municipalities of Sinop, Sorriso, Lucas do Rio Verde and Feliz Natal), that were monthly replaced (Figure 1A) totaling 192 traps. During the removal of the traps, which happened every month, the damage leaves were also collected and taken to the Laboratory of Energy and Pests of Federal University of Mato Grosso, *Campus* of Sinop for evaluation (Figure 1 B).

The identification of *G. brimblecombei* specimens was made following the morphological characterization script and

confirmed by Prof. Dr. Carlos Frederico UNESP FCA (Wilcken et al., 2003).

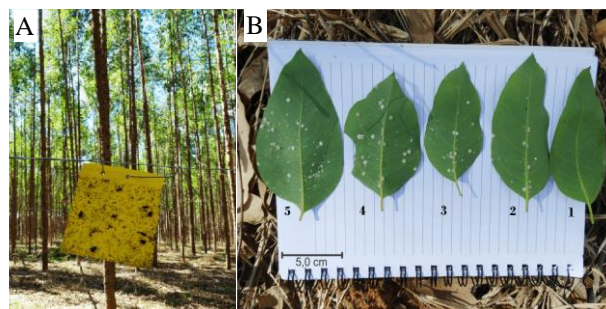


Figure 1. *Glycaspis brimblecombei* monitoring with sticky traps in North of Mato Grosso (A). (B) Usual scale to evaluate the infestation with nymphs of *G. brimblecombei* in leaves of *Eucalyptus*. Leaf 1 = 0%; leaf 2 = 1-25%; leaf 3 = 26-50%; leaf 4 = 51-75% and leaf 5 = 76 to 100%.

Results and Discussion

Adult and immature *G. brimblecombei* were observed attacking plants of hybrid *Eucalyptus* (*E. grandis* x *E. camaldulensis* and *E. urophylla* x *E. grandis*) (Figure 2) located in Sinop, Sorriso, Lucas do Rio Verde and Feliz Natal, which are cities of Mato Grosso State located in the transition region of the Amazon and Savanna Biomes (Figure 3).

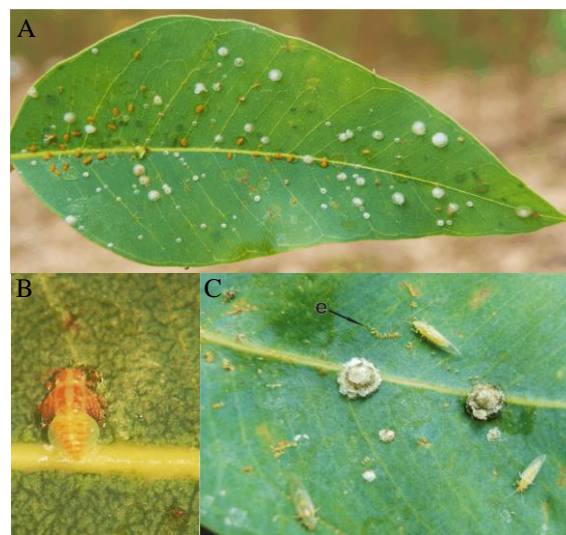


Figure 2. *Glycaspis brimblecombei* (Hemiptera: Aphalaridae). (A) Nymphs and shells; (B) nymphal stage 5; (C) adult (e)-egg-laying.

From those places, in Sinop City, which belongs to the Amazon Biome, the attack occurred in a seedling nursery (11°53'10''S, 55°29'76''W) and, the records for the region of the Savanna Biome occurred in commercial plantations in Sorriso City (12°51'98''S, 55°52'93''W) and Lucas do Rio Verde City (12°51'22''S, 55°52'33''W) in the margins of the highway BR-163 and, in Feliz Natal (12°20'67''S, 55°01'06''W), in the margins of highway MT-225. All attack records were made during the months of June to October 2014 and 2015, period that characterizes the dry season in the region,

which caused the defoliation of many plants (Figure 4).

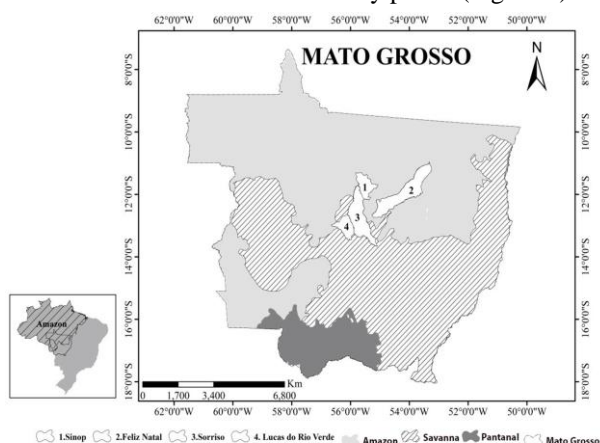


Figure 3. Map of the State of Mato Grosso, its biomes and cities with the occurrence of *Glycaspis brimblecombei* (Hemiptera: Aphalaridae).



Figure 4. Defoliation caused by *Glycaspis brimblecombei* in hibrid *Eucalyptus* (Left: *E. urophylla* x *E. grandis* (urograndis “HUG”). Right: *E. grandis* x *E. camaldulensis*)

It was found that there was an intense defoliation in trees in August and September, especially for hibrido *E. grandis* x *E. camaldulensis* (Gracam ‘HGC’). The highest occurrence of shells on the leaves, on the ground and the death of the trees was possibly aggravated by the lack of water on the ground. The period of occurrence of psyllid in the sampled areas remained in 2015.

Unlike other producing areas of *eucalyptus* (Southeast, South and Northeast), where the months between June and October have milder temperatures, Mato Grosso State records high temperatures, around 35 °C (Souza et al., 2012), however, the water deficit allows the population growth of this insect (Ferreira-Filho et al., 2008), in the region, reaching pest status. Even facing significant defoliation, compromising crop yield, and even in seedling nursery, up to now no control measurement has been conducted in the region, in order to reduce the damage caused by redgum lerp psyllid.

The insect management in forests may be done in several ways. *G. brimblecombei* the high cost and possible environmental contamination, in addition to the requirements for non-use of chemicals by forestry certifiers (Wilcken et al., 2003; Santana and Burckhardt, 2007). The use of species or clones resistant to pests, despite being indicated as a

possibility of control in forests, is still insufficiently studied. However, researches revealed that the species *E. camaldulensis*, *E. urophylla*, *E. grandis*, *E. tereticornis* and the the hybrid ‘urograndis’ offer favorable conditions for biological development of *G. brimblecombei* (Firmino et al., 2009). Biological control using entomopathogenic fungi, parasitoids and predators requires further studies for recommendations in the field, but they are viable alternatives (Ferreira-Filho et al., 2008; Dias et al., 2012; Dal Pogetto et al., 2011).

Yellow sticky traps are effective in *G. brimblecombei* monitoring and the use of this tool enables to elaborate sampling plans and decision-making to control this pest. This record starts a series of researches involving not only redgum lerp psyllid, as well as other sucking pests and their natural enemies present in *Eucalyptus* cultivation in the Middle North region of Mato Grosso, Savanna-Amazon, contributing to the growth of the country’s agribusiness.

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Conclusion

The new occurrence records of the *G. brimblecombei* psyllid in *Eucalyptus* plantations in Mato Grosso State are probably associated with the fact that this insect may be arriving in the region along with the commercial plantations through active and passive dispersion, due to restrictions on deforestation in the planted forests a way to supply local demand with energy for drying grain.

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