

BRONZE BUG *THAUMASTOCORIS PEREGRINUS* CARPINTERO AND DELLAPÉ (HEMIPTERA: THAUMASTOCORIDAE) ON *EUCALYPTUS* IN BRAZIL AND ITS DISTRIBUTION

Carlos Federico Wilcken^{1*}, Everton Pires Soliman¹, Luiz Alexandre Nogueira de Sá², Leonardo Rodrigues Barbosa³, Thaise Karla Ribeiro Dias¹, Pedro Jose Ferreira-Filho¹, Ricardo Jose Rodrigues Oliveira¹

¹ São Paulo State University (UNESP), Faculty of Agronomic Sciences, Department of Plant Production
PO Box 237, Zip code 18603-970, Botucatu, SP, Brazil

² Brazilian National Quarantine Laboratory "Costa Lima" – Brazilian National Research Center for Monitoring and Environmental Impact Assessment-CNPMA, Environment Embrapa, PO Box 69, Zip code 13820-000, Jaguariúna, SP, Brazil

³ Forest Entomology Laboratory, Embrapa Forestry, PO Box 319, Zip code 83411-000, Colombo, PR, Brazil

Received: March 24, 2009

Accepted: April 22, 2010

Abstract: The bronze bug *Thaumastocoris peregrinus* Carpintero & Dellapé (Hemiptera: Thaumastocoridae) was detected infesting *Eucalyptus* trees in Brazil in 2008, in the states of Sao Paulo, Rio Grande do Sul and Minas Gerais and in 2009 was found in the state of Espírito Santo, Mato Grosso do Sul, Rio de Janeiro and Paraná. Details about geographical spread, means of introduction, impact in *Eucalyptus* plantations and natural enemies observed in the field are discussed.

Key words: *Eucalyptus*, bronze bug, exotic pest

INTRODUCTION

The productivity of Brazilian *Eucalyptus* plantations have been negatively affected by the recent introduction of exotic pests, such as the red gum lerp psyllid, *Glycaspis brimblecombei* Moore (Hemiptera: Psyllidae) (Wilcken *et al.* 2003) and the gall wasps, *Epichrysocharis burwelli* Schauff and *Leptocybe invasa* Fisher and LaSalle (Hymenoptera: Eulophidae) (Berti-Filho *et al.* 2004; Costa *et al.* 2008). These pests spread through the main *Eucalyptus*-producing states of Brazil and reduces the trees growth and consequently wood production during the dry periods.

In 2008, the bronze bug *Thaumastocoris peregrinus* Carpintero and Dellapé 2006 (Hemiptera: Thaumastocoridae: Thaumastocorinae), a pest also threatening eucalyptus plantations was detected in Brazil. The insect is a small phytophage bug, with a flattened body, specific to *Eucalyptus* trees (Fig. 1a). It is approximately 3 mm long and very agile. The head has developed mandible plates, antenna with four segments, with dark apical segments. Short rostrum and pulvilli absent in the tarsus. Adults are light brown in color with darker areas. The male genital capsule is asymmetrical, with the opening at the right side (Carpintero and Dellapé 2006). It has five instars (Fig. 1b), with a developmental period of about 20 days at temperatures between 17 to 20°C (Noack and Rose 2007). Fecundity is close to 60 eggs. Eggs are black and laid in clusters on leaves and twigs (Fig. 2a). Feeding causes leaf whitening and bronzing (Fig. 2b), followed by drying and falling.

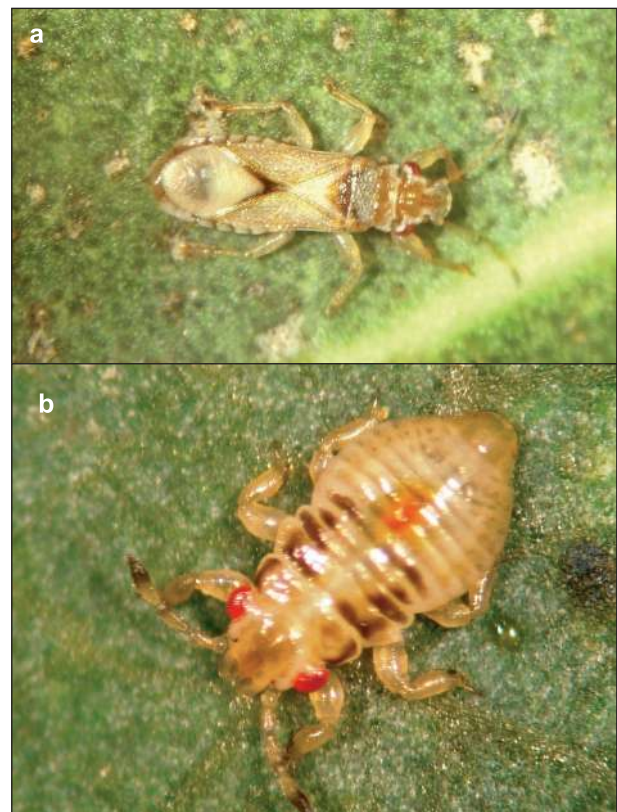


Fig. 1. *T. peregrinus*: a) adult, b) nymph

*Corresponding address: cwilcken@fca.unesp.br



Fig. 2. a) egg cluster; b) symptoms of *T. peregrinus* damage on *Eucalyptus* leaves

Thaumastocoris occurs in Australia, where are four known species, and *T. peregrinus* is the only described species outside Australia (Carpintero and Dellapé 2006).

In South Africa, the occurrence of *T. australicus* was reported in 2003 when one female specimen was collected on *Croton gratissimus* (Euphorbiaceae) in Pretoria (Jacobs and Nesar 2005). In Argentina, *T. australicus* was detected near Buenos Aires, in November 2005 (Noack and Coviella 2006). However, Carpintero and Dellapé (2006) showed that both reports were actually *T. peregrinus*, correcting the earlier work, and illustrating that both species were morphologically similar. *T. peregrinus* was detected in Uruguay by Martínez-Crosa (2008), thought to have spread from the Argentina border.

The bronze bug was observed in February 2008 in

Eucalyptus globulus, *E. grandis*, *E. camaldulensis* and *E. viminalis* trees (Martínez-Crosa 2008), and is now established in Australia (*Eucalyptus nicholli*, *E. scoparia*, *E. benthamii*, *E. globulus globulus*, *E. globulus bicostata* and *E. maidenii*), South Africa (*E. botryoides*, *E. camaldulensis*, *E. dorrigoensis*, *E. grandis*, *E. paniculata*, *E. saligna*, *E. scoparia*, *E. smithii*, *E. syderoxyylon*, *E. tereticornis*, *E. viminalis*, *E. grandis* x *camaldulensis* and *E. grandis* x *urophylla*), Zimbabwe, Argentina (*Eucalyptus camaldulensis*, *E. tereticornis* and *E. viminalis*), Uruguay (Carpintero and Dellapé 2006; Button 2007; FAO 2007; Martínez-Crosa 2008) and Brazil. *E. camaldulensis*, *E. tereticornis*, *E. viminalis*, *E. nicholli*, *E. scoparia* and *E. grandis* x *E. camaldulensis* hybrid were the most susceptible (Jacobs and Nesar 2005; Noack and Coviella 2006).

Then, this paper aimed record the occurrence and distribution of *T. peregrinus* in *Eucalyptus* in Brazil and its natural enemies observed in field.

MATERIALS AND METHODS

Due the pest proximity to Brazil, extensive surveys were made in Southern States, through sending a specific form to forest companies and farmers and field visits, sampling branches of *Eucalyptus* trees along main roads and plantations near airports.

Specimens were collected, fixed in 70% alcohol and sent to Dr. Diego L. Carpintero (Argentina) for species identification. Specimens were deposited at the Entomological Collection of the Department of Plant Production, FCA/UNESP, Campus of Botucatu and at the Museum of Universidad Nacional de La Plata (Argentina).

RESULTS

The bronze bug was detected on 23 June 2008, at Monte Carmelo farm, Environmental Embrapa, in Jaguariúna, state of São Paulo, on isolated trees of *E. camaldulensis*. Eggs, nymphs and adults were collected on leaves and branches. The attacked trees showed bronze leaves and defoliation of severely infested branches.

This insect was also reported in São Francisco de Assis, state of Rio Grande do Sul (Fig. 3), in May 2008, on a hybrid clone of *E. grandis* x *E. urophylla*. However, after the cold fronts during the end of May and early June, the insect was no longer observed. By January 2009, the pest was found in Rosário do Sul, Alegrete, Caçapava do Sul, São Sepé, São Gabriel, Bagé, Pinheiro Machado, Piratini and Arroio Grande. The spread of the insect has probably occurred naturally, moving across the borders of neighboring countries (Argentina and Uruguay). In December, 2008, the bronze bug was confirmed in Belo Oriente and Curvelo, Minas Gerais state and in July, 2009 it was detected in Linhares, Espírito Santo state. In October, 2009 *T. peregrinus* was confirmed in Resende, Rio de Janeiro state, Curitiba, Parana State and in Nova Andradina and Tres Lagoas, Mato Grosso do Sul state (Fig. 3).

In the state of São Paulo, the bronze bug may have arrived by airplanes, because the insect was found in *Eucalyptus* trees near to the international airports of Viracopos, in Campinas, and Guarulhos, in the metropolitan region of São Paulo city.



Fig. 3. Geographic distribution of *T. peregrinus* (Hemiptera: Thaumastocoridae) in Brazil. October, 2009 (SP: Sao Paulo; RS: Rio Grande do Sul, PR: Parana, MG: Minas Gerais, RJ: Rio de Janeiro, ES: Espírito Santo and MS: Mato Grosso do Sul)

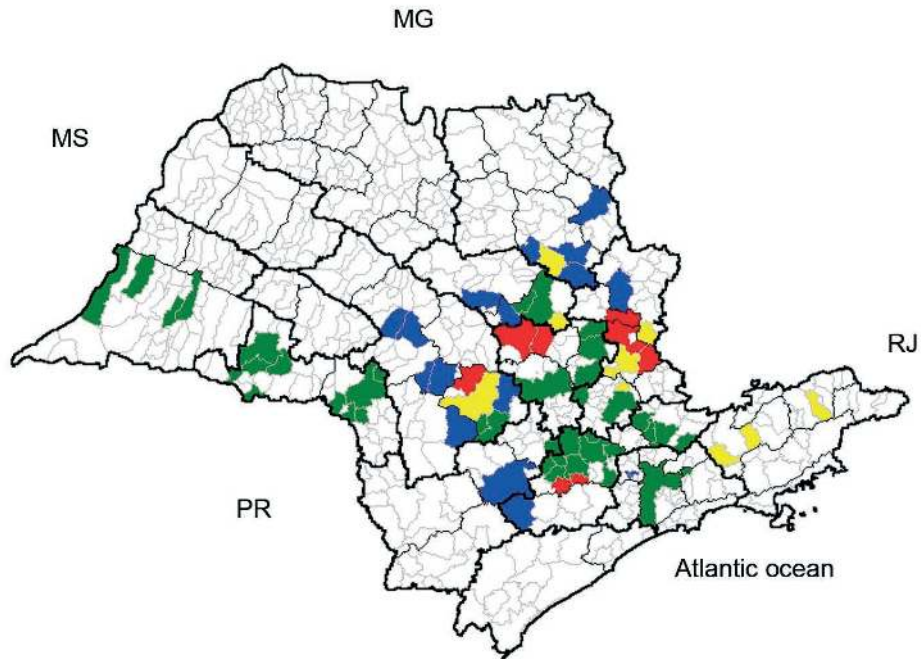


Fig. 4. Geographic distribution of *T. peregrinus* (Hemiptera: Thaumastocoridae) in State of São Paulo and infestation classification. Brazil. January, 2009
 Explanation – green (insect present in isolated or windbreak trees); blue (insect present in plantations, with no visible damages); yellow (medium to high infestation in plantations, with initial damage symptoms) and red (high infestation, with medium to high damage); MG – Minas Gerais; RJ – Rio de Janeiro; PR – Parana; MS – Mato Grosso do Sal

By August 2009, *T. peregrinus* was detected in 74 municipalities of the State of São Paulo. For a pest infestation, classification was used that considered the following classes by color: green (insect present in isolated or windbreak trees; blue (insect present in *Eucalyptus* plantations, with no visible damages); yellow (medium to high infestation in plantations, with initial damage symptoms – chlorosis) and red (high infestation, with medium to high damage – bronzing canopy and defoliation) (Fig. 4). *T. peregrinus* was found in Brazil on the following hosts: *E. camaldulensis*, *E. tereticornis*, *E. urophylla*, *E. viminalis* and different hybrid clones of *E. grandis* × *E. urophylla*, *E. grandis* × *E. camaldulensis* and *E. urophylla* × *E. camaldulensis*.

The bronze bug is spreading fast and it may be influenced by man, because initial detections have been come from isolated or windbreak trees close to the main highways of São Paulo. It is possible that the insect is being spread by trucks carrying *Eucalyptus* logs, which still have leaves and branches. Thus, the pest could reach other neighboring states, Santa Catarina (SC) and Bahia (BA) in next years.

Regarding behavior, it has been shown to be gregarious, both in field and laboratory conditions. Eggs, nymphs and adults were presented often on the same leaf. Eggs were black with a light concavity central area and were arranged in clusters (Fig. 2a), mainly in protected places such as deformities on the leaf blade and twigs. In the laboratory females were observed laying at least one egg per day and eggs might be found singly or in clusters. New emerged nymphs moved quickly over leaves, until they begin feeding. In Argentina and Uruguay, extensive surveys were made to delimit areas of pest occurrence and damage, where a standard form was used to record pest data and yellow stick traps were used to evaluate adult infestation.

There is no effective control method recommended. As an exotic pest, classical biological control with the introduction of specific natural enemies has the most potential. The most likely candidate is the egg parasitoid *Cleruchoides noackae* Lin and Huber (Hymenoptera: Mymaridae), reported from Australia (Lin *et al.* 2007). However, *Chrysoperla externa* (Hagen) (Neuroptera: Chrysopidae) (identified by Dr. Sérgio de Freitas – UNESP, Campus of Jaboticabal) was the first predatory insect preying on *T. peregrinus* nymphs in Salto de Pirapora, São Paulo State).

CONCLUSIONS

The detection of *T. peregrinus* in Brazil shows the vulnerability of South America to exotic pests and the necessity to invest on phytosanitary measures in ports and airports, and in informative campaigns to Brazilian and foreign tourists and technical personnel. Research on pest bioecology, host range preference, survey techniques and evaluation of control methods are in progress, aiming to develop an integrated pest management approach.

ACKNOWLEDGEMENTS

Our thanks to biologist Juan Pedro Bouvet, researcher of INTA (National Institute of Agriculture Technology (Argentina) for information about pest geographic distribution and tree damage in Argentina, Dr Diego L. Carpintero, of Universidad Nacional de La Plata (Argentina), for the identification of *T. peregrinus*, Prof. Dr. Sérgio de Freitas, of FCAV – UNESP, Campus of Jaboticabal, SP (Brazil) for the identification of green lacewing species and Brett Hurley, Entomology research officer, of TCPC, FABI (Forest and Agriculture Biotechnology Institute), University of Pretoria (South Africa), for the critical review of the manuscript.

REFERENCES

- Berti Filho E., Costa V.A., Lasalle J. 2004. Primeiro registro da vespa de galha *Epichrysocharis burwelli* (Hymenoptera: Eulophidae) em *Corymbia (Eucalyptus) citriodora* (Myrtaceae) no Brasil. *Rev. de Agricultura* 79: 363–364.
- Button G. 2007. *Thaumastocoris peregrinus*. Forest Facts. 2p. Available in <http://www.nctforest.com/showpage.asp?id=44&contentid=423&catid=24>. Access in 06/05/2008.
- Carpintero D.L., Dellapé P.M. 2006. A new species of *Thaumastocoris* Kirkaldy from Argentina (Heteroptera: Thaumastocoridae: Thaumastocorinae). *Zootaxa* 1228: 61–68.
- Costa V.A., Berti Filho E., Wilcken C.F., Stape J.L., Lasalle J., Teixeira L.D. 2008. Eucalyptus gall wasp, *Leptocybe invasa* Fisher & LaSalle (Hymenoptera: Eulophidae) in Brazil: New forest pest reaches the New World. *Rev. de Agricultura* 83 (2): 136–139.
- FAO 2007. Overview of Forest Pests, South Africa. FAO Forestry Dept, Working Paper FBS/30E, p. 35.
- Jacobs D.H., Nesar S. 2005. *Thaumastocoris australicus* Kirkaldy (Heteroptera: Thaumastocoridae): a new insect arrival in South Africa, damaging to *Eucalyptus* trees: research in action. *S. Afri. J. Sci.* 101 (5): 233–236.
- Lin N.Q., Huber J.T., LaSalle J. 2007. The Australian Genera of Mymaridae (Hymenoptera: Chalcidoidea). *Zootaxa* 1596: 1–111.
- Martinez-Crosa G. 2008. *Thaumastocoris peregrinus* Carpintero & Delappé, 2005 (Heteroptera: Thaumastocoridae): new pest found in eucalyptus in Uruguay. p. 32–33. In: IUFRO Recent Advances in Forest Entomology, Pretoria, South Africa.
- Noack A.E., Coviella C.E. 2006. *Thaumastocoris australicus* Kirkaldy (Hemiptera: Thaumastocoridae): first record of this invasive pest of *Eucalyptus* in the Americas. *Gen. Appl. Entomol.* 35: 13–15.
- Noack A., Rose H.A. 2007. Life-history of *Thaumastocoris peregrinus* and *Thaumastocoris* sp. in the laboratory with some observations on behaviour. *Gen. Appl. Entomol.* 36: 27–33.
- Wilcken C.F., Couto E.B. do, Orlato C., Ferreira Filho P.J., Firmiano D.C. 2003. Ocorrência do psíldeo-de-concha (*Glycaspis brimblecombei*) (Hemiptera: Psyllidae) em florestas de eucalipto no Brasil. *Circular Técnica IPEF* (201): 1–11.

POLISH SUMMARY**WYSTĘPOWANIE *THAUMASTOCORIS PEREGRINUS* CARPINTERO AND DELLAPE (HEMIPTERA: THAUMASTOCORIDAE) NA DRZEWACH EUKALIPTUSA W BRAZYLII**

W 2008 roku stwierdzono występowanie *Thaumastocoris peregrinus* Carpintero and Dellapé (Hemiptera: Thaumastocoridae) na drzewach eukaliptusa w Brazylii,

w stanach: Sao Paulo, Rio Grande do Sul i Minas Gerais, a w 2009 roku w stanie Espirito Santo. W pracy badano rozpowszechnienie, średnie występowania, wpływ na plantacje eukaliptusa oraz naturalnych wrogów szkodnika.