ISJ 11: 224-227, 2014 ISSN 1824-307X

SHORT COMMUNICATION

Predation of *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) by *Atopozelus opsimus* (Hemiptera: Reduviidae) in Brazil

TKR Dias[1], CF Wilcken[1], EP Soliman[1], LR Barbosa[2], JE Serrão[3], JC Zanuncio[4]

[1]*Departamento de Proteção Vegetal, Universidade Estadual Paulista Júlio de Mesquita Filho (UNESP), Faculdade de Ciências Agronômicas, 18610-307, Botucatu, SP, Brasil*
[2]*Laboratório de Entomologia Florestal, EMBRAPA Florestas, Colombo, 83411-000, PR, Brasil*
[3]*Departamento de Biologia Geral, Universidade Federal de Viçosa, 36570-900 Viçosa, MG, Brasil*
[4]*Departamento de Entomologia, Universidade Federal de Viçosa, 36570-900 Viçosa, MG, Brasil*

Accepted August 19, 2014

Abstract

The bronze bug *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) is an important pest of eucalyptus in several countries and the strategies for the integrated management of this insect in commercial plantations needs to be investigated. The predatory behavior of *Atopozelus opsimus* (Hemiptera: Reduviidae) on *T. peregrinus* is described. Adults of *A. opsimus* feed on nymphs and adults of the bronze bug and also present phytophagy. *A. opsimus* has potential as a natural enemy for the biological control of *T. peregrinus*.

Key Words: *Atopozelus opsimus*; bronze bug; predator

Introduction

Thaumastocoris peregrinus (Hemiptera: Thaumastocoridae), the bronze bug, is an important pest in *Eucalyptus* plantations (Fig. 1A). This insect is one of the major pest of this culture in Argentina, South Africa, Australia, Chile, Italy, Malawi, Kenya, New Zealand, Uruguay, Zimbabwe and Portugal (Jacobs and Neser, 2005; Carpintero and Dellape, 2006; Martinez and Bianchi, 2010; Nadel *et al*., 2010; Noack *et al*., 2011; Laudonia and Sasso, 2012; Sopow *et al*., 2012; Garcia *et al*., 2013).

The bonze bug was detected in Brazil, in 2008, in São Francisco de Assis, Rio Grande do Sul State, and in Jaguariuna, São Paulo State, and it spread widely and rapidly to other regions with *Eucalyptus* plantations. To date, *T. peregrinus* has been recorded in Minas Gerais, Espírito Santo, Rio de Janeiro, Mato Grosso do Sul, Paraná, Santa Catarina, and Goiás States (Wilcken *et al*., 2010; Barbosa *et al.*, 2010; Savaris *et al*., 2011; Pereira *et al*., 2013). In addition *Eucalyptus urophylla* and *E. grandis,* the most susceptible species for the development and reproduction of *T. peregrinus*, represent the genetic basis of *Eucalyptus* plantations in Brazil (Soliman *et al*., 2012).

Corresponding author:
Thaíse Karla Ribeiro Dias
Departamento de Proteção Vegetal
Universidade Estadual Paulista Júlio de Mesquita Filho (UNESP)
Faculdade de Ciências Agronômicas
18610-307, Botucatu, SP, Brasil
E-mail: thaiserdias@yahoo.com.br

The bronze bug is 2 - 3 mm long, with a flattened body, a head with recurved mandibular plates, antennae with four segments, and red compound eyes. The adults of this insect have a light brown color and an asymmetric male genital capsule, oriented to the right or left side of the body (Carpintero and Dellape, 2006; Noack *et al.,* 2011). The eggs of *T. peregrinus* are black and laid in masses of 60 eggs, on leaves, branches, fruits, and stems of the plant (Button, 2007; Noack and Rosa, 2007). The insect has five instars with 15 days of total nymph period (Noack and Rose, 2007; Soliman *et al*., 2012).

Damage by *T. peregrinus* adults and nymphs is due to sap sucking, which induces leaf fall and decreases the photosynthetic area. Infested trees initially show leaf silvering, followed by tanning, and because of these peculiarities the insect has been called the bronze bug (Jacobs and Neser, 2005; Wilcken *et al*., 2010). High populations of this insect can cause plant death (Wilcken *et al*., 2010).

Strategies for the management of *T. peregrinus* in commercial plantations are scarce, but the systemic insecticide imidacloprid, injected into the tree trunks has been effective in controlling this insect in the urban areas of Australia (Noack *et al*., 2009). However, chemical control in commercial plantations in Brazil cannot be implemented, because there is no registered insecticide for this insect. Furthermore, the use of chemical insecticides is restricted on commercial plantations in Brazil due to environmental concerns (Zanuncio *et al*., 1994).

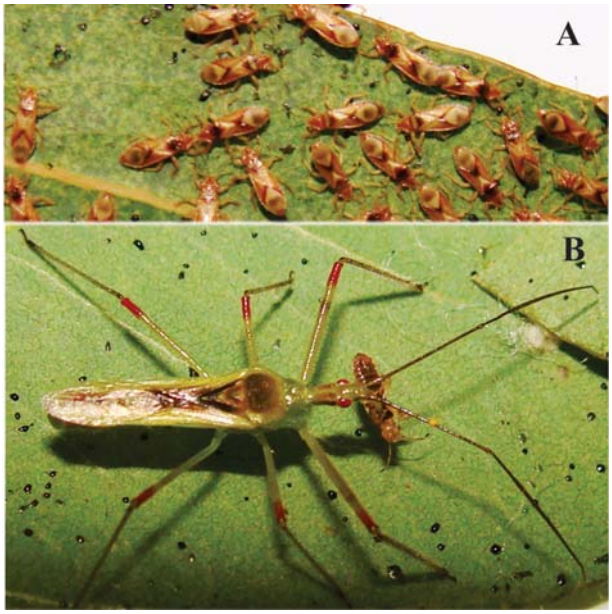

Fig. 1 *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) of eucalyptus leaf (A). *Atopozelus opsimus* (Hemiptera: Reduviidae) preying on *T. peregrinus* (B).

Biological control with fungi, parasitoids, and predators is an alternative to the integrated management of *T. peregrinus*. The egg parasitoid *Cleruchoides noackae* (Hymenoptera: Mymaridae), the predatory bug and the lacewings *Hemerobius bolivari* (Neuroptera: Hemerobiidae) and *Chysoperla externa* (Neuroptera: Chrysopidae) have been reported as natural enemies of the bronze bug (Barbosa *et al.,* 2010; Souza *et al*., 2012; Garcia *et al*., 2013).

Atopozelus opsimus (Hemiptera: Reduviidae) is a bug predator zoophytophagous and consumes nymphs and adults of *Glycaspis brimblecombei* (Hemiptera: Aphalaridae), an important pest on Brazilian *Eucalyptus* plantations (Dias *et al.,* 2012). It is native to the Americas and recorded in Brazil in São Paulo, Minas Gerais, Rio de Janeiro and Mato Grosso States (Elkins, 1954; Dias *et al.,* 2012).

The importance of the forest sector to the Brazilian economy and the introduction of *T. peregrinus* in the country make it necessary to use natural and native resources to reduce problems with this pest. This study reports the predatory behavior of *A. opsimus* on *T. peregrinus*.

Material and Methods

The predator *A. opsimus* and the prey *T. peregrinus* were obtained from the Biological Control of Forest Pests Laboratory (LCBPF) of the Plant Protection Department, Faculty of Agricultural Sciences/UNESP in Botucatu, São Paulo State, Brazil. The experiment was performed at 25 ± 2 °C, 70 ± 10 % RH, and a 12-h photophase. The insects were placed in Gearbox-type boxes (11x11x3.5 cm), covered with plastic, containing a *Eucalyptus* leaf and a moistened cotton ball. The experiment was conducted with 10 replications, with one *A. opsimus* adult each and five prey (*T. peregrinus* adults). The insects were observed for one hour, being recorded the number of *T. peregrinus* preyed and the behavioral predation actions prior and after the predator attack.

Results and Discussion

It was verified that the stink bug *A. opsimus* feeds on *T. peregrinus* (Fig. 1). The first actions before each predation were the antennae and prothoracic legs cleaning to all of observed predators. Due to prey movement on the leaves, the predator walked during the chase and search. In capturing were used the antennae and prothoracic legs to surround, hold and manipulate the prey. The viscous and adhesive secretion present on the body and appendixes of *A. opsimus* facilitated the capture of *T. peregrinus*, hindering scape of the prey during predation. The predator sucks all the internal contents and moves the prey with tarsus help, in circular movement seeking more fluids.

A. opsimus made phytophagy and some bugs inserted their stylet into the leaf nervures of *Eucalyptus* to suck sap. This is a common behavior to this species, which also consume sugary products, coming from extrafloral nectaries and sugary shell that protects *G. brimblecombei*. The predators phytophagy are related to the production of viscous and adhesive essence (Zhang and Weirauch, 2013), that, in *A. opsimus*, helps on the prey capture (Dias *et al.,* 2012).

The stylet of *A. opsimus* was preferentially inserted into the thorax of *T. peregrinus*, dorsally,

then ventrally.

Adult prey in mating were predated more easily, especially the male over the female. The attack in this condition was more frequent, always through the back and did not allow the prey any defense. The exoskeleton of *T. peregrinus* preyed was released next to the others consumed ones, after the intern content suction. *A. opsimus* showed agility and moved rapidly toward the prey.

A. opsimus showed a consumption of 2.0 ± 0.81 *T. peregrinus* individuals per h. The nymphs of *Supputius cincticeps* (Heteroptera: Pentatomidae) and of *C. externa* larvae also preyed on the bronze bug, with a consumption of 10.26 ± 1.58 (Barbosa *et al*., 2010) and 10.43 ± 0.51 (Souza *et al*., 2012) individuals in 24 h, respectively. These preliminary findings suggest that the efficiency of *A. opsimus* preying on *T. peregrinus* was higher than that of *S. cincticeps* and *C. externa*.

A. opsimus was found in the field preying on nymphs and adults of *T. peregrinus* on the *Eucalyptus* plants, where both species take refuge and shelter.

The sequence of the predatory behavior of *A. opsimus* with cleaning actions of antennae and legs, walking - chase and search, capture, prey immobilization, fluids suction and later disposal of prey exoskeleton together with others *T. peregrinus* before consumed. It was similar to that reported for this predator on *G. brimblecombei*, an exotic insect pest also introduced in Brazilian eucalypt plantations (Dias *et al*., 2012). Both insects are small and are easily preyed on by *A. opsimus*.

Conclusion

A. opsimus is a native predator of *T. peregrinus*, an important sucking prey on *Eucalyptus* plantations in Brazil. The bioecology and the effectiveness of *A. opsimus* need to be better studied to use this natural enemy for the biological control of the bronze bug *T. peregrinus*.

Acknowledgements

To “Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)”, “Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)” and “Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG)” for financial support. Global Edico Services edited and proofread this manuscript.

References

Barbosa LR, Santos F, Barddal HPO, Machado BO, Wilcken CF, Soliman EP. Predação de *Thaumastocoris peregrinus* por *Chrysoperla externa*. Embrapa Florestas, Comun. Técn. 257, 2010.

Barbosa LR, Santos F, Wilcken CF, Soliman, EP. Registro de *Thaumastocoris peregrinus* (Hemiptera: *Thaumastocoridae*) no estado do Paraná. Pesqui. Florest. Bras. 30: 75-77, 2010.

Button G. *Thaumastocoris peregrinus*. In: Forest facts. 2007. http://www.nc t forest. com/showpage.asp?id044 &contentid0423&ca tid024>. Accessed 14 Set 2013.

Carpintero DL, Dellapé PM. A new species of *Thaumastocoris* Kirkaldt from Argentina (Heteroptera*:* Thaumastocoridae: Thaumastocorinae). Zootaxa 1228: 61-68, 2006.

Dias TKR, Wilcken CF, Soliman EP, Gil-Santana H, Zaché B. Occurrence of *Atopozelus opsimus* preying on nymphs and adults of *Glycaspis brimblecombei*. Phytoparasitica 40: 137-141, 2012.

Garcia A, Figueiredo E, Valente C, Monserrat VJ, Branco M. First record of *Thaumastocoris peregrinus* in Portugal and of the neotropical predator *Hemerobius bolivari* in Europe. Bull. Insectol. 66: 251-256, 2013.

Jacobs DH, Neser S. *Thaumastocoris australicus* Kirkaldy (Heteroptera: *Thaumastocoridae*): a new insect arrival in South Africa, damaging to Eucalyptus trees: research in action. S. Afr. J. Sci. 101: 233-236, 2005.

Laudonia S, Sasso R. The bronze bug, *Thaumastocoris peregrinus:* a new insect recorded in Italy, damaging to *Eucalyptus* trees. Bull. Insectol. 65: 89-93, 2012.

Martínez G, Bianchi m. Primer registro para Uruguay de la chinche del eucalipto, *Thaumastocoris peregrinus* Carpintero y Dellappé, 2006 (Hemipera; *Thaumastocoridae*). Agrociencia 14: 15-18, 2010.

Nadel RL, Slippers B, Scholes MC, Lawson SA, Noack AE, Wilcken CF *et al*. DNA bar-coding reveals source and patterns of *Thaumastocoris peregrinus* invasions in South Africa and South America. Biol. Invasions 12: 1067-1077, 2010.

Noack AE, Rose HA. Life-history of *Thaumastocoris peregrinus* and *Thaumastocoris* sp. in the laboratory with some observations on behavior. Gen. Appl. Entomol. 36:27-33, 2007.

Noack AE, Cassis G, Rose HA. Systematic revision of *Thaumastocoris* Kirkaldy (Hemiptera: Heteroptera: Thaumastocoridae). *Zootaxa* 3121**:** 01-60, 2011.

Noack AE, Kaapro J, Bartimote-Aufflick K, Mans-Field S, Rose HA. Efficacy of imidacloprid in the control of *Thaumastocoris peregrinus* on *Eucalyptus scoparia* in Sydney. Arboriculture & Urban Forestry 35: 192-196, 2009.

Pereira JM, Melo AP, Fernande PM, Soliman EP. Ocorrência de *Thaumastocoris peregrinus* Carpintero & Dellapé (Hemiptera: Thaumastocoridae) no Estado de Goiás. Cienc. Rural. 43: 254-257. 2013.

Savaris M, Lampert S, Pereira PRVS, Salvadori JR. Primeiro registro de *Thaumastocoris peregrinus* para o estado de Santa Catarina, e novas áreas de ocorrência para o Rio Grande do Sul, Brasil. Cienc. Rural 41: 1874-1876, 2011.

Soliman EP, Wilcken CF, Pereira JM, Dias TKR, Zaché B, Mário DAL, *et al*. Biology of *Thaumastocoris peregrinus* in different eucalyptus species and hybrids. Phytoparasitica 40: 223-230, 2012.

Sopow S, George S, Ward N. Bronze bug, *Thaumastocoris peregrinus*: a new *Eucalyptus* pest in New Zealand. Surveillance 39: 43-46, 2012.

Souza GK, Pikart TG, Pikart FC, Serrão JE, Wilcken CF, Zanuncio JC. First record of a native heteropteran preying on the introduced eucalyptus pest, *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae), in Brazil. Fla. Entomol. 95: 517-520, 2012.

Wilcken CF, Soliman EP, Nogueira de Sá La, Barbosa LR, Dias TKR, Ferreira-Filho PJ, *et al*. Bronze bug *Thaumastocoris peregrines* Carpintero and Dellapé (Hemiptera: *Thaumastocoridae*) on *Eucalyptus* in Brazil and its distribution. J. Plant Prot. 50: 210-205, 2010.

Zhang G, Weirauch C. Sticky predators: a comparative study of sticky glands in *harpactorinae* assassin bugs (Insecta: Hemiptera: Reduviidae). Acta Zool. 94: 1-10, 2013.

Zanuncio JC, Nascimento EC, Garcia JF, Zanuncio T V. Major lepidopterous defoliators of eucalyptus, in the Southeast Brazil. Forest. Ecol. Manag. 65: 53-63, 1994.