

## SHORT COMMUNICATION

**Predation of *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) by *Atopozelus opsimus* (Hemiptera: Reduviidae) in Brazil**TKR Dias<sup>1</sup>, CF Wilcken<sup>1</sup>, EP Soliman<sup>1</sup>, LR Barbosa<sup>2</sup>, JE Serrão<sup>3</sup>, JC Zanuncio<sup>4</sup><sup>1</sup>*Departamento de Proteção Vegetal, Universidade Estadual Paulista Júlio de Mesquita Filho (UNESP), Faculdade de Ciências Agrônomicas, 18610-307, Botucatu, SP, Brasil*<sup>2</sup>*Laboratório de Entomologia Florestal, EMBRAPA Florestas, Colombo, 83411-000, PR, Brasil*<sup>3</sup>*Departamento de Biologia Geral, Universidade Federal de Viçosa, 36570-900 Viçosa, MG, Brasil*<sup>4</sup>*Departamento de Entomologia, Universidade Federal de Viçosa, 36570-900 Viçosa, MG, Brasil*

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**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 Nesar, 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 bronze 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).

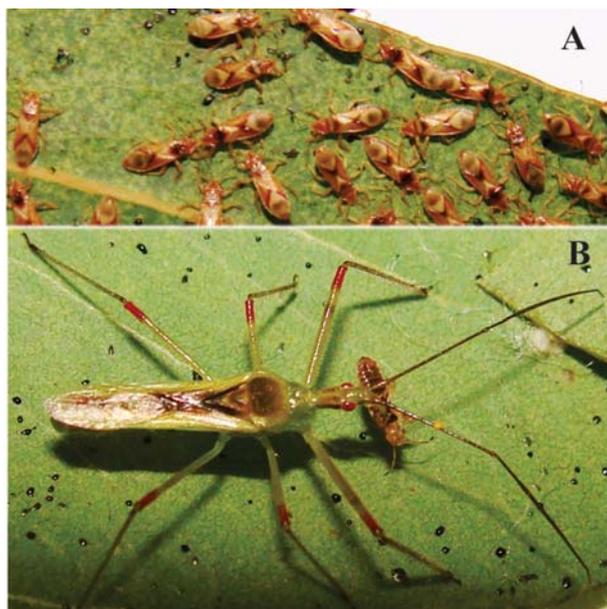
The bronze bug is 2 - 3 mm long, with a flattened body, a head with recurved mandibular plates, antennae with four segments, and red compound eyes. The adults of this insect have a light brown color and an asymmetric male genital capsule, oriented to the right or left side of the body (Carpintero and 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 Nesar, 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).

*Corresponding author:*

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



**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 *Chrysoperla 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  $25 \pm 2$  °C,  $70 \pm 10$  % 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  $2.0 \pm 0.81$  *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  $10.26 \pm 1.58$  (Barbosa *et al.*, 2010) and  $10.43 \pm 0.51$  (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*.

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