

NOTE

First Record of the Bronze Bug, *Thaumastocoris peregrinus* Carpintero & Dellapé 2006 (Hemiptera: Thaumastocoridae), in Mexico¹

Eduardo Jiménez-Quiroz,² Juan Manuel Vanegas-Rico,^{3,5}
Oscar Morales-Martínez,⁴ J. Refugio Lomeli-Flores,³ and
Esteban Rodríguez-Leyva³

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Eucalyptus spp. (Myrtales: Myrtaceae) are a diverse group of fast-growing tree species that are grown in many parts of the world. They are important for the different uses of their wood, cellulose, hemicellulose, and lignin, and for by-products such as honey and resins (Turnbull 1999, 2000, FAO 2007, Hiwale 2015). *Eucalyptus camaldulensis* Dehnhardt is widely planted throughout the temperate and tropical areas of the world (Turnbull 1999). In Mexico, seeds of this species were originally introduced and commercialized for medical purposes between 1860 and 1870 (Vega & Baez 2016). It was also used as an urban tree in several cities over the next few decades. *E. camaldulensis* and other species were subsequently used to reforest degraded and saline soils between 1890 and 1904 (Cervantes et al. 2008). This practice continued decades later when between 1970 and 1994, *E. camaldulensis* and *E. globulus* Labillardière were used to reforest several places in Mexico (Cervantes et al. 2008). Currently, these two species are some of the most common trees in gardens, parks, and along streets in Mexico City (Department of Environmental Protection of Mexico City [SEDEMA], person. comm.) and in other states of Mexico. Commercial plantations of *Eucalyptus* in Mexico are relatively new, with the first plantations being planted in the 1990s and with less than 1000 ha registered for 1995 (Sosa 2012). Nevertheless, by 2014 there were 31,000 ha located mostly in the southeastern portion of the country (National Forestry Commission of Mexico [CONAFOR], person. comm.).

About 15 years ago, the global distribution of pests and pathogens that affect *Eucalyptus* began increasing (Paine et al. 2011, Saavedra et al. 2015a), and in some cases, the effects have been severe because of late detections and management. The *Eucalyptus* bronze bug, *Thaumastocoris peregrinus* Carpintero

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²Laboratorio de Análisis y Referencia en Sanidad Forestal, Dirección General de Gestión Forestal y de Suelos, Secretaría del Medio Ambiente y Recursos Naturales, Av. Progreso No. 3, 04100 Coyoacán, Ciudad de México, México.

³Posgrado en Fitosanidad, Entomología y Acarología, Colegio de Postgraduados, Carretera México- Texcoco km 36.5, Montecillo, 56230 Texcoco, Estado de México, México.

⁴Comisión Nacional Forestal. Periférico Poniente No. 5360, Col. San Juan de Ocotán 45019 Zapopan, Jalisco, México.

⁵Corresponding author: hymenopter@yahoo.com

& Dellapé (Hemiptera: Thaumastocoridae), is an exotic pest with great importance in plantations and reforested sites. This bug feeds on several species and hybrids in the genera *Eucalyptus* and *Corymbia* (Myrtales: Myrtaceae), with 42 species and 9 hybrids being recorded as hosts (Nadel et al. 2010, Soliman et al. 2012, García et al. 2013, Saavedra et al. 2015a). *Thaumastocoris peregrinus* has a high potential as an invasive species, and it has been recorded from countries in Africa, Europe, Oceania, and South America (FAO 2007, Nadel et al. 2010, García et al. 2013, Saavedra et al. 2015a).

The recent record of the eucalyptus gall wasp, *Leptocybe invasa* Fisher & La Salle (Hymenoptera: Eulophidae), in Mexico City (Vanegas-Rico et al. 2015) demonstrated the need to look for other potential eucalyptus pests. For this reason, the present study aimed to monitor the distribution of *T. peregrinus* in Mexico City.

Sampling was conducted in Mexico City during March to July of 2015. Twenty locations were selected throughout the city, which included parks and trees planted along streets and avenues. At each location, 30 trees were selected randomly and four branches of 20 cm length from each tree (one in each of the four cardinal direction) from up to a maximum height of three meters were collected. Each group of four branches was placed in a sealed plastic bag for transportation to the laboratory; additionally, botanic samples were collected for host identification. The material was processed at the Forest Health Analysis and Reference Laboratory (LARSF) of the Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) in Mexico City and at the Laboratory of Biological Control at Colegio de Postgraduados in Texcoco, State of Mexico. Adult *T. peregrinus* were collected and preserved in 70% ethanol and their sex was determined. Later, the genitalia of some of the males were removed and taxonomic determinations were made (Noack et al. 2011). Some specimens were sent for species confirmation to Harry U. Brailovsky Alperowitz at the Institute of Biology of the Autonomous National University of Mexico (UNAM). Species of *Eucalyptus* were determined using taxonomic keys (Gutierrez et al. 2006). The incidence of *T. peregrinus* was estimated by the proportion of trees infested within the group of trees that were sampled.

We collected 1992 hemipterans, all of which were *T. peregrinus*. They were present in 12 of 20 sample locations, with an overall incidence of 11% (79/625 eucalyptus trees) and an average of 5.8 ± 0.2 adults/branch. The main host was *E. camaldulensis* (77 positive trees), which is the major *Eucalyptus* planted in Mexico City. The bug also was collected in two samples of *E. globulus*. The main incidence of *T. peregrinus* was concentrated in the northeastern portion of Mexico City, where four of the 16 counties (Gustavo A. Madero, Iztacalco, Iztapalapa, and Venustiano Carranza), accounted for 73% of the infested trees (Table 1). Although Nadel et al. (2015) and Martínez et al. (2010) found that sampling from the middle of the canopy was most efficient for determining the presence and abundance of *T. peregrinus*, the majority of trees sampled were taller than eight meters and their location on busy streets impeded the use of a telescopic lift table. Therefore, the presence and abundance of *T. peregrinus* may have been underestimated.

The climate of Mexico City with average temperatures of 18°C (temperature typically varies from 6°C to 27°C and is rarely below 2°C or above 30°C) is within the acceptable ranges for *T. peregrinus* development (Saavedra et al. 2015a).

Table 1. Incidence of *Thaumastocoris peregrinus* in counties within Mexico City.

County (cardinal position)	Coordinate north	Coordinate west	Altitude (m)	Incidence ^a (%)	Abundance ^b (average ± SE)
Azcapotzalco (NW)	19.4878	-99.1894	2250	5%	3.5 ± 0.4
Coyoacán (S)	19.3228	-99.1731	2281	4%	5.5 ± 0.8
Cuauhtémoc (downtown)	19.4461	-99.1508	2239	3%	1.9 ± 0.5
Gustavo A. Madero (NE)	19.4636	-99.4611	2253	23%	6.1 ± 0.5
Iztacalco (E)	19.4050	-99.1197	2257	10%	7.1 ± 0.8
Iztapalapa (E)	19.3564	-99.0897	2266	25%	7.4 ± 0.5
Miguel Hidalgo (NW)	19.4192	-99.2092	2262	2%	3.0 ± 1.1
Venustiano Carranza (E)	19.4197	-99.1186	2237	19%	5.6 ± 0.4
Xochimilco (S)	19.2556	-99.1097	2255	10%	4.6 ± 0.2

^aIncidence is based on the proportion of infested trees within the sampled trees.

^bAbundance is the average number of *T. peregrinus* adults per branch (20 cm).

T. peregrinus was more abundant in the eastern and northeastern portions of Mexico City, and it presented a similar spread to *L. invasa* (Vanegas-Rico et al. 2015).

The presence of *T. peregrinus* in Mexico City represents the sixth record of this species in the Western Hemisphere, and the first record in North America. Previous reports were from Argentina, Brazil, Chile, Paraguay, and Uruguay (Carpintero & Dellape 2006, Martínez & Bianchi 2010, Wilken et al. 2010, Ide et al. 2011, Souza et al. 2012, Benítez et al. 2013). This new distribution of *T. peregrinus* is consistent with recent estimations on the potential for world dispersion of this pest (Saavedra et al. 2015a). Currently, in Mexico there are commercial plantations with at least eleven species of *Eucalyptus*. They are *E. camaldulensis*, *E. globulus*, *E. creba* F. Muell., *E. dunnii* Maiden, *E. grandis* Hill ex Maiden, *E. macarthurii* Deane & Maiden, *E. nitens* (Deane & Maiden) Maiden, *E. pellita* F. Muell., *E. sideroxylon* Cunn. ex Woolls var. *rosea*, *E. torrelliana* F. Muell., *E. urograndis* (*E. urophylla* x *E. grandis*), and *E. urophylla* S. T. Blake (CONAFOR, personal communication). Most of these *Eucalyptus* species are suitable hosts for the development of *T. peregrinus* (Soliman et al. 2012, Saavedra et al. 2015b), and some of them have a wide distribution over Mexico because they are used as ornamental plants in many cities and along highways. It is estimated that Mexico City has nearly seven million red eucalyptus trees and two million blue eucalyptus trees, mainly *E. camaldulensis* and *E. globulus*, respectively (SEDEMA, personal communication). *Eucalyptus* trees are an essential element of vegetal composition in many parks and reforested areas. In most of these parks, there have been infestations of non-native forest pests, such as *L. invasa*

(Vanegas-Rico et al. 2015), *Glycaspis brimblecombei* Moore (Hemiptera: Spondyliaspidae) (Cibrián et al. 2001), and *Stenomacra marginella* Stål (Hemiptera: Largidae) (Báez-Santacruz et al. 2013). We observed that all of these pests could be found feeding on the same tree and sometimes on the same leaf. Because of this complexity of insect damage in several sampling places, we were not able to estimate a specific damage for *T. peregrinus*. The presence of *T. peregrinus* is added to the pest list for the first time for Mexico, and this and other phytophagous insects could negatively affect the eucalyptus growth. Therefore, it is important to begin a national monitoring system for pest outbreaks on *Eucalyptus* trees to identify their dispersion and impact, and to avoid significant economic losses in both commercial and urban areas of the country.

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References Cited

- Báez-Santacruz, J., L. Cervantes-Peredo & J. Ponce-Saavedra. 2013.** Life history of *Stenomacra marginella* (Hemiptera: Heteroptera: Largidae). *Rev. Mex. Biodiv.* 84: 1292–1297.
- Benítez, E. A., R. Sosa & D. Godziewski. 2013.** Consideraciones sobre dos nuevas plagas del eucalipto en Paraguay, el psílido de la concha o escudo *Glycaspis brimblecombei* (Hemiptera: Psyllidae) y la chinche marrón *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae). *Bol. Museo Hist. Nat. Paraguay* 17: 72–75.
- Carpintero, D. L. & P. M. Dellapé. 2006.** A new species of *Thaumastocoris* Kirkaldy from Argentina (Heteroptera: Thaumastocoridae: Thaumastocorinae). *Zootaxa* 1228: 61–68.
- Cervantes, V., J. Carabias & V. Arriaga. 2008.** Evolución de las políticas públicas de restauración ambiental, en capital natural de México, pp. 155–226. *In* Vol. III, Políticas públicas y perspectivas de sustentabilidad. Conabio, México.
- Cibrián, T. D., G. Íñiguez & D. L. Dahlsten. 2001.** Conchuela del eucalipto *Glycaspis brimblecombei* Moore (Homoptera: Psylloidea; Spondyliaspidae) Una nueva plaga del eucalipto introducida a México. *Memorias del XXXVI Congreso Nacional de Entomología*. Santiago de Querétaro, Querétaro. 2001, 95 pp.
- FAO. 2007.** State of the world's forest 2007. FAO, Rome, Italy, 144 pp.
- García, A., E. Figueiredo, C. Valente, V. J. Monserrat & M. Branco. 2013.** First record of *Thaumastocoris peregrinus* in Portugal and of neotropical predator *Hemerobius bolivari* in Europe. *Bull. Insectol.* 66: 251–256.
- Gutiérrez, M., G. Sánchez & L. Sandoval. 2006.** Eucaliptos que habitan en el norte y centro de México: manual para su identificación. Centro de Investigación Regional Norte Centro, Campo Experimental Pabellón. INIFAP Libro técnico No. 3, 110 pp.
- Hiwale, S. 2015.** Eucalyptus (*Eucalyptus* sp.), pp. 301–309. *In* S. Hiwale [Ed.], Sustainable Horticulture in Semiarid Dry Lands. Springer India, India.
- Ide, S. M., C. G. Ruiz, A. C. Sandoval & J. E. Valenzuela. 2011.** Detection of *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) associated to *Eucalyptus* spp. in Chile. *Bosque (Valdivia)* 32: 309–313.
- Martínez, G. & M. Bianchi. 2010.** Primer registro para Uruguay de la chinche del eucalipto, *Thaumastocoris peregrinus* Carpintero y Dellapé, 2006 (Heteroptera: Thaumastocoridae). *Agrociencia* 14: 15–18.

- Martínez, G., A. González, S. Simeto & G. Balmelli. 2010.** Monitoring the bronze bug, *Thaumastocoris peregrinus* (Heteroptera: Thaumastocoridae): effect of trap placement. *Internat. For. Rev.* 12: 360.
- Nadel, R. L., B. Slippers, M. C. Scholes, S. A. Lawson, A. E. Noack, C. F. Wilcken, J. P. Bouvet & M. J. Wingfield. 2010.** DNA bar-coding reveals source and patterns of *Thaumastocoris peregrinus* invasions in South Africa and South America. *Biol. Invas.* 12: 1067–1077.
- Nadel, R. L., M. J. Wingfield, M. C. Scholes, J. R. Garnas, S. A. Lawson & B. Slippers. 2015.** Population dynamics of *Thaumastocoris peregrinus* in *Eucalyptus* plantations of South Africa. *J. Pest Sci.* 88: 97–106.
- Noack, A. E., G. Cassis & H. A. Rose. 2011.** Systematic Revision of *Thaumastocoris* Kirkaldy (Hemiptera: Thaumastocoridae). *Zootaxa* 3121: 1–60.
- Paine, D. T., M. J. Steinbauer & S. A. Lawson. 2011.** Native and exotic pests of *Eucalyptus*: a worldwide perspective. *Annu. Rev. Entomol.* 56: 181–201.
- Saavedra, M. C., G. A. Avila, T. M. Withers & G. I. Holwell. 2015a.** The potential global distribution of the bronze bug *Thaumastocoris peregrinus* Carpintero and Dellapé (Hemiptera: Thaumastocoridae). *Agric. For. Entomol.* 17: 375–388.
- Saavedra, M. C., T. M. Withers & G. I. Holwell. 2015b.** Susceptibility of four *Eucalyptus* host species for the development of *Thaumastocoris peregrinus* Carpintero and Dellapé (Hemiptera: Thaumastocoridae). *Forest Ecol. Managem.* 336: 210–216.
- Soliman, E. P., C. F. Wilcken, J. M. Pereira, T. K. R. Dias, B. Zaché, M. H. F. A. Dal Pogetto & L. R. Barbosa. 2012.** Biology of *Thaumastocoris peregrinus* in different eucalyptus species and hybrids. *Phytoparasitica* 40: 223–230.
- Sosa, V. E. 2012.** Introducción. In M. Fierros [Ed.], Programa de Desarrollo de Plantaciones Forestales Comerciales: a 15 años de su creación. CONAFOR, Jalisco, México.
- Souza, G. K., T. G. Pikart, F. C. Pikart, J. E. Serrao, C. F. Wilcken & J. C. Zanuncio. 2012.** First record of a native heteropteran preying on the introduced eucalyptus pest, *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) in Brazil. *Fla. Entomol.* 95: 517–520.
- Turnbull, J. W. 1999.** Eucalypt plantations. *New Forest* 17: 37–52.
- Turnbull, J. W. 2000.** Economic and social importance of Eucalypts, pp. 1–9. In P. J. Keane, G. A. Kile, F. D. Podger & B. N. Brown [Eds.], *Diseases and Pathogens of Eucalypts*. CSIRO Publishing, Queensland, Australia.
- Vanegas-Rico, J. M., J. R. Lomeli-Flores, E. Rodríguez-Leyva, E. Jiménez-Quiroz & J. Pujade-Villar. 2015.** First record of eucalyptus gall wasp *Leptocybe invasa* (Hymenoptera: Eulophidae) in Mexico. *Rev. Mex. Biodiv.* 86: 1095–1098.
- Vega, R. A. & O. Baez. 2016.** Ciencia y ambiente en la aclimatación del eucalipto en el Valle de México a través de la prensa, 1869–1880. *Hist. Sociedad* 30: 237–264.
- Wilcken, C. F., E. P. Soliman, L. A. N. De Sá, L. R. Barbosa, T. K. R. Dias, P. J. Ferreira-Filho & R. J. R. Oliveira. 2010.** Bronze bug *Thaumastocoris peregrinus* Carpintero and Dellapé (Hemiptera: Thaumastocoridae) on *Eucalyptus* in Brazil and its distribution. *J. Plant Prot. Res.* 50: 201–205.
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