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Research note

First record of eucalyptus gall wasp *Leptocybe invasa* (Hymenoptera: Eulophidae) in Mexico

*Primer registro de la avispa agalladora del eucalipto *Leptocybe invasa* (Hymenoptera: Eulophidae) en México*

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Abstract

The presence of the invader eucalyptus gall wasp *Leptocybe invasa* Fischer & La Salle (Hymenoptera: Eulophidae) is recorded for the first time in Mexico. This forest pest has been detected in northern México City, at an elevation of $\approx 2,240$ m, with an average temperature of 17.9°C . It has also been detected in the areas of Nezahualcóyotl and Texcoco, State of México; Cuautla, Morelos; Guadalajara, Jalisco and Ciudad Victoria, Tamaulipas. In these states, *L. invasa* attacked *Eucalyptus camaldulensis* Dehnh. About 2.6% of the *E. camaldulensis* trees reported in México City had infestations in about 27% of the twigs. In addition, 25% of the leaves had galls, with an average of 23.5 ± 4.8 galls per branches of 20 cm in length.

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Keywords: Forest pest; *Eucalyptus camaldulensis*

Resumen

Se reporta por primera vez para México la avispa agalladora del eucalipto, *Leptocybe invasa* Fischer y La Salle (Hymenoptera: Eulophidae), plaga de importancia forestal. Esta plaga se ha detectado principalmente en el norte de la Ciudad de México a $\approx 2,240$ m snm, a una temperatura promedio de 17.9°C . También se detectó en Nezahualcóyotl y Texcoco, Estado de México; Cuautla, Morelos; Guadalajara, Jalisco y Ciudad Victoria, Tamaulipas. En estos estados, *L. invasa* atacó a *Eucalyptus camaldulensis* Dehnh. La incidencia de esta plaga en el arbolado urbano de la ciudad de México fue 2.6%, con una severidad de 27% en ramas. Un 25% de las hojas presentaron agallas, con un promedio de 23.5 ± 4.8 agallas por rama de 20 cm.

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Palabras clave: Plaga forestal; *Eucalyptus camaldulensis*

Leptocybe invasa Fisher & La Salle (Hymenoptera: Eulophidae) is a chalcidoid wasp of Australian origin that was originally detected inducing galls on eucalyptus trees in the Middle East (Mendel, Protasov, Fisher, & La Salle, 2004). To date, this galler species occurs in 34 countries (FAO, 2009; Zheng et al., 2014).

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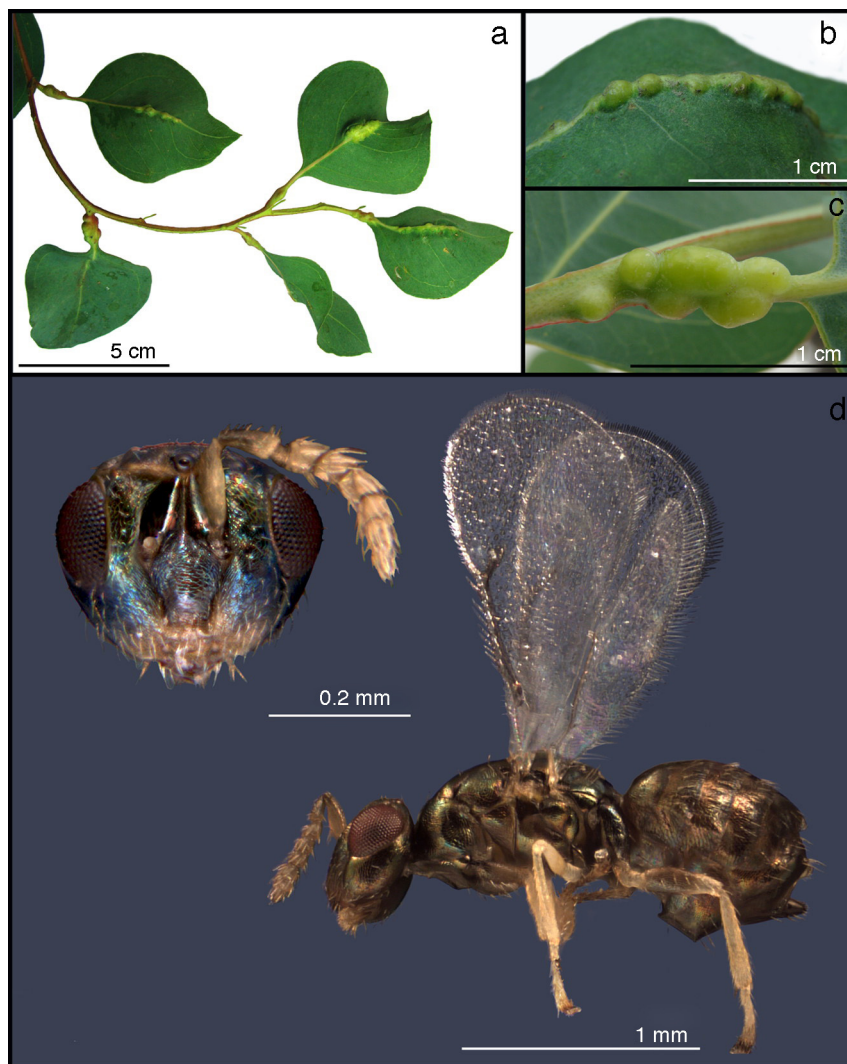


Figure 1. Damage of *Leptocybe invasa* in *Eucalyptus camaldulensis*. (a) Branch with galls; (b) leaf gall; (c) petiole gall; (d) *L. invasa* lateral view, frontal detail of the head.

L. invasa attacks several eucalyptus species and hybrid clones, inducing galls on leaves, petioles and 1-year-old branches, which reduces the vigor of the host and affects its growth, which may inflict serious economic losses (FAO, 2007; Mendel et al., 2004).

In August 2014, galls were detected on urban eucalyptus trees in the northern part of México City. Samples were taken from 1,100 trees distributed in areas where galls were detected. Sampling trees were selected at random at different points in the city. The sampling period lasted from December 2014 to March 2015. Tree species were identified using the key adapted by Gutiérrez, Sánchez, and Sandoval (2006). The presence or absence of galls was estimated for all of the selected trees, and 4 branches of 20 cm long each were removed at random from each infested tree. Severity was estimated using the following scale: null = 0%, light = <25%, moderate = 25–50%, severe = >50% of the samples exhibiting galls (Nyeko, Mutitu, & Day, 2009; Petro, Madfore, & Iddi, 2014).

The plant material collected was labeled and placed in hermetically sealed plastic bags for transport to the Biological

Control Laboratory of the Colegio de Postgraduados, Texcoco, State of México. The material was kept in the laboratory at room temperature ($20 \pm 5^\circ\text{C}$), and the number of galls on leaves, petioles and branches were counted. The organisms that emerged from each sample were kept in 70% ethanol and identified by J. Pujade-Villar. Reference specimens were deposited at the Universitat de Barcelona, Spain, and the Colegio de Postgraduados, Mexico.

The hymenopteran species attacking the eucalyptus trees was identified as *L. invasa* (Fig. 1), and their host tree was identified as *Eucalyptus camaldulensis* Dehnh (Myrtales: Myrtaceae). This tree is abundant in México City (Cuello, Andorno, Hernández, Dell’Arciprete, & Botto, 2014; Dittrich-Schröder, Wingfield, Hurley, & Slippers, 2012; PAOT, 2013), and also has been recorded as a susceptible host attacked by this pest in different areas (Mendel et al., 2004; Nyeko et al., 2009; Petro et al., 2014). The incidence of *L. invasa* on *E. camaldulensis* was 2.6%, mostly occurring in the northern area of México City. The branch severity was light (<25%), with an average of 23.5 ± 4.8 galls per branch.

Table 1
Records of *Leptocybe invasa* in Mexico, July 2015.

State	County	Latitude	Longitude	m asl
Distrito Federal (México City)	Coyoacán	19°19'22"	99°10'32"	2,281
	Gustavo A. Madero	19°27'47"	99°04'20"	2,239
	Iztacalco	19°24'18"	99°07'11"	2,257
	Iztapalapa	19°21'14"	99°05'20"	2,282
	Venustiano Carranza	19°27'09"	99°06'52"	2,246
	Xochimilco	19°15'14"	99°06'30"	2,257
Jalisco	Guadalajara ^a	20°38'55"	103°20'09"	1,570
Morelos	Cuatla ^a	18°51'47"	98°57'41"	1,296
State of México	Nezahualcóyotl	19°28'44"	99°03'30"	2,237
	Texcoco	19°20'00"	98°52'32"	2,250
Tamaulipas	Ciudad Victoria ^a	23°42'32"	99°03'02"	321

^a The material was collected by technicians of the Comisión Nacional Forestal (Conafor), Mexico.

Recently, a pest alert was emitted by the Secretaría del Medio Ambiente y Recursos Naturales (Semarnat) in Mexico for detection of this gall wasp on eucalyptus trees in the country (Semarnat, 2015). The first inspection recorded the presence of *L. invasa* in other localities (Table 1), though the incidence and severity were not evaluated. Actually, a national integrated management program is being developed for this plague, the introduction of parasitoids is being considered, since natural enemies of *L. invasa* have not been collected in Mexico. The damage inflicted by this gall wasp varies according to the different eucalyptus producing regions (Nyeko, Mutitu, Otieno, Ngae, & Day, 2010; Petro et al., 2014), probably due to a combination of factors such as host susceptibility, host age and altitude of the area where the trees are cultivated (Dittrich-Schröder et al., 2012; Nyeko et al., 2009; Petro et al., 2014). The highest altitude where the pest has been documented was in Uganda at 2,000 m (Mutitu, Nyeko, Day, Otieno, & Oeba, 2007). For this reason, it is likely that the altitude (2,236–2,290 m) and temperature ($17.9 \pm 0.3^\circ\text{C}$) of México City, and the age of the infested trees of *E. camaldulensis* (>10 years) negatively affect *L. invasa* infestation.

This represents the first record of *L. invasa* for the Mexican territory, and it is the seventh report of this wasp species in the American continent. Previously, it had been reported in Brazil (Costa et al., 2008), USA (Wiley & Skelley, 2009), Argentina (Aquino, Botto, Loíacono, & Pathauer, 2011), Chile (Wylie & Speight, 2012), Uruguay (Jorge, Gómez, & Martínez-Crosa, 2014) and Paraguay (Benítez, Costa, de Moraes, & Godziewsky, 2014). Moreover, our records for Mexico represent the first occurrence of this species at an altitude higher than 2,000 m. So far, *L. invasa* has been mostly detected in northern México City. This report remarks the importance to carry out sanitary inspection programs of the urban wooded areas in México City, and to monitor the main eucalyptus producing regions of this country, which together comprise 31,000 ha distributed along the coasts of both the Gulf of Mexico (59%) and the Pacific (36%) (Conafor, 2014).

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