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FIRST RECORD OF THE EUCALYPTUS GALL WASP, *Leptocybe invasa* Fisher AND La Salle (Hymenoptera: Eulophidae), IN IRAQ

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Abstract

The eucalyptus gall wasp, *Leptocybe invasa* (Hymenoptera: Eulophidae), is a new genus and species recorded for the first time in Duhok city, Kurdistan region, Iraq. *L. invasa* makes galls on petioles, leaf midribs and young branches of *Eucalyptus camaldulensis* saplings and trees. This galling eventually can lead to heavily injured saplings. The average number of galls was 37.23 gall/branch, and major infestation was on leaf midribs with an average of 19.35 galls.

Key words: *Leptocybe invasa*, gall wasps, first record, Iraq.

INTRODUCTION

Since 2000, a new invasive pest has been wreaking havoc on eucalyptus plantations throughout the world. First reported from northern and eastern Africa as well as the Middle East and Mediterranean countries, the pest has expanded its range like wild fire in every continent. Presumed to have originated from Australia, the pest was subsequently identified as a gall wasp new to science and named *Leptocybe invasa* Fisher & La Salle (Hymenoptera: Eulophidae) (Mendel et al. 2004).

L. invasa, the Australian gall wasp, is present in the Mediterranean basin, the Middle East and Africa (Mendel et al. 2007). It was detected in Italy on *Aprostocetus* sp. in 2000 (Bella and Lo Verde, 2002; Sanchez, 2003), in Portugal and Spain in 2003 (Branco et al. 2009; Sanchez, 2003) as well as two years later in Turkey and Iran on *E. camaldulensis* leaves (Donganlar, 2005; Hesami, 2005). In December 2005, it was detected in the south of France (EPPO Reporting Service 2006, 9:9). In Algeria this pest was added to the alert list by the OEPP in 2006 (EPPO Reporting Service 2006, 9:10).

Thelytokous parthenogenetic reproduction is typical of the *L. invasa* female, 1.1-1.4 mm in length (Mendel et al. 2007). It induces galls on petioles, leaf midribs and young branches of several *Eucalyptus* species such as *E. camaldulensis*, *E. tereticornis*, *E. rudis*, *E. grandis*, *E. globules*, and *E. viminalis*. Mendel et al. (2007) reported that under laboratory conditions this wasp lasts 132.6 days from oviposition to adult emergence and may produce two or three generations annually. Intense infestations can lead to deformations of young stems and to reduction of tree growth in the Middle East, Turkey and Italy. Presently, the wasp is reported from Algeria, Iran, Israel, Italy, Jordan, Kenya, Morocco, Spain, Syria, Turkey and Uganda. Suitable hosts for this insect include: *E. camaldulensis, E. globulus, E. gunii, E. grandis, E. botryoides, E. saligna, E. robusta, E. bridgesiana, E. viminalis* and *E. tereticornis.* (Ayter, 2003; Mutitu, 2003; Mendel et al. 2004; Branco et al. 2006; Ayter, 2006; Nyeko et al. 2007; Wiley, 2008).

The adult wasps lay eggs inside tender leaves and stems and the larvae, after hatching out of eggs, remain in a cavity formed within the plant tissues and feed on the plant, while the injury to plant tissues results in the formation of galls. The pest attack was observed in nurseries, coppice shoots and young plantations. The affected seedlings show stunted growth and become unsuitable for planting (Mendel et al. 2004). On heavily attacked young trees, the canopy hangs due to the weight of galls (Mutitu et al. 2008).

MATERIALS AND METHODS

At the beginning of October 2010, I received a number of *Eucalyptus* branches that had been collected in nurseries in Duhok city, Kurdistan region, northern Iraq. All of these branches were infected by the gall wasps.

In March 2011, branches with mature galls were collected from *E. camaldulensis* stands. These samples were placed in transparent polyethylene bags, making fine pores to allow transpiration and avoid an excess of moisture. They were maintained at room temperature until wasp emergence. Soon after their emergence, wasps were collected and sent for identification to the Iraqi natural research center and museum at the Baghdad University. The examined specimens were deposited in the collection of the Insect Museum of the Plant Protection Department, Agriculture and Forestry Faculty.

To determine the population density of galls on trees, 40 branches 50 cm in length were randomly selected weekly, and then the number of galls was counted on petioles, leaf midribs and stems.

A binocular Olympus microscope 228091 (Japan) with 20x magnification and a Leitz wetzlar microscope 545139 (Germany) with 50x magnification were used to describe the adults. Adult measurements were taken by a graticule micrometer slide inserted into the eyepiece of the microscope. A Canon camera (Japan) was used to take photographs.

To determine the gall development stages, 4 females were placed in a small plastic container with a thin cotton cloth as cover. They were supplied with non-infested small branches of *Eucalyptus* put inside a glass jar that was filled with water to keep the branches fresh. Keen observations were made from time to time from the females laying eggs until adult emergence to follow the gall formation.

RESULTS AND DISCUSSION

The examined *Leptocybe invasa* specimens that reared on the branches of *E. camaldulensis* collected from Duhok is a new genus and species which is recorded for the first time in Iraq. The wasp specimens (Fig. 1) were identified by the Iraq natural research center and museum under the scientific name of *Leptocybe invasa*, according to order No. 196, and the identification was also done by the present author by comparing them with the description given by M e n d e l et al. (2004).

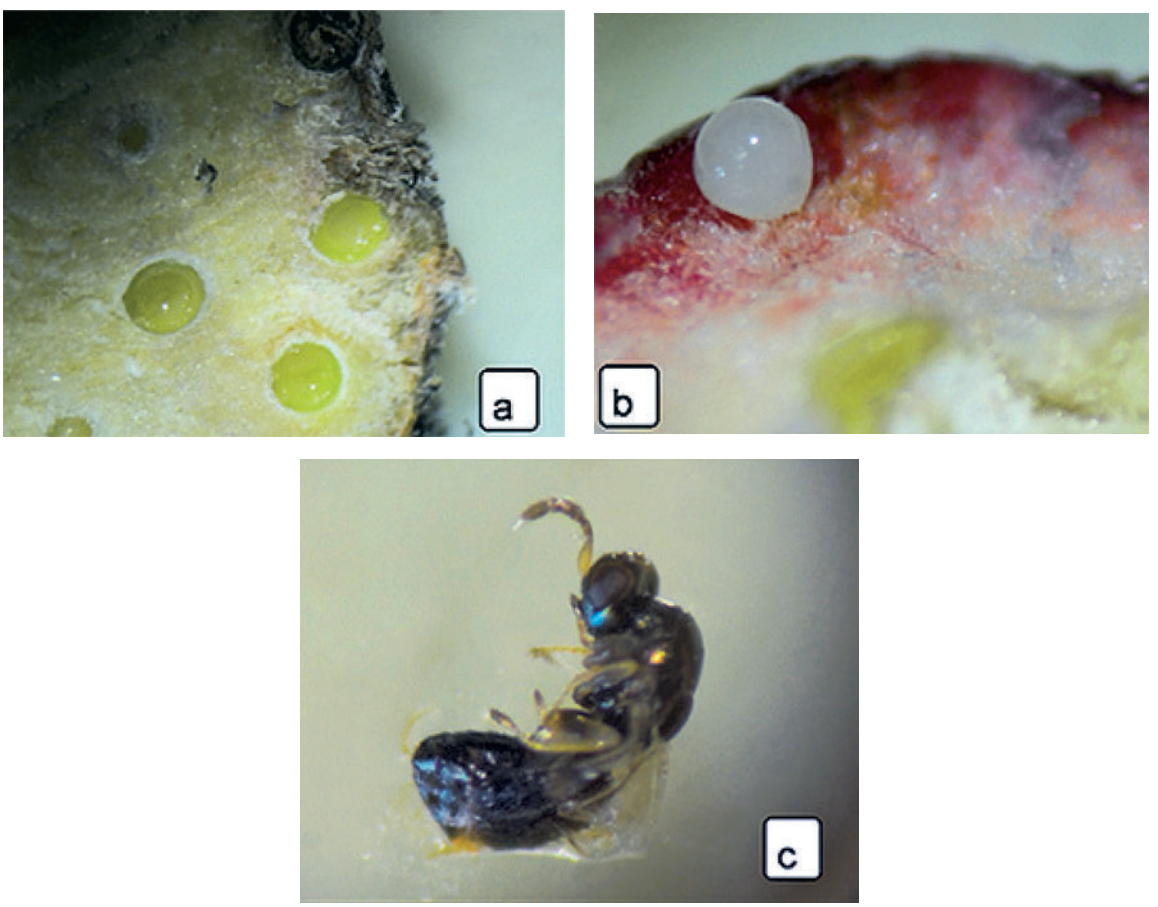

Fig. 1. (a,b) Gall cut open to show *L. invasa* larvae; (c) *L. invasa* adult

The Iraqi specimens have all body parts very similar to those given by M e n d e l et al. (2004). Female length ranged from 1.1-1.4 mm. The head and body were brown with slight to distinct blue to green metallic shine; mouth margin light brown to yellow. Fore coxa yellow, middle and hind coxae the same colour as the body; legs and tarsi yellow, last tarsal segment brown apically. Antenna with scape yellow (darkened apically); funicle and club brown to light brown. Wings hyaline or very faintly and evenly infumated, veins light brown. Male unknown.

In the plantation in Malta, Duhok city, where the present study was conducted, in general the number of galls was 1489 (from 40 branch samples with a length of 50 cm), with an average of 37.23 gall/branch. The number of galls varied among petioles, leaf midribs and the stem, ranging 2-93 gall/branch, and 34.07% of branches had 31-40 galls. It was found that most infestation was on the leaf midribs. The average number of galls was 19.35, 15.2 and 2.68 galls on leaf midribs, petioles and the stem of Eucalyptus branches, respectively.

Fig. 2. Heavily infested *Eucalyptus camaldulensis* branches from Duhok city.

M e n d e l et al. (2004) classified gall development into five different stages, *viz.* the first stage (1-2 weeks after oviposition) with a symptom of cork tissue appearing at the egg insertion spot. This stage is characterized by a small change in the morphology of the attacked tissue; the cork scar becomes bigger and the section of the midrib that carries the eggs often changes its colour from green to pink. Towards the end of the stage, the galls are easily recognized by their spherical appearance, their colour is glossy green, and each of the galls can easily be separated from the others. The second stage is characterized by the development of the typical bump shape and the galls reach their maximum size (width=2.7±0.5 mm). The third stage is characterized by the fading of the green colour on the surface that tends to change to pink while retaining its typical gloss. The fourth stage is characterized by the loss of the glossiness of the gall surface, with colour change to light or dark red. The fifth stage was recognized as soon as emergence holes of the wasps were noticed. The colour was light brown when displayed on the leaf and red-brown on the stem, and the same trend was followed in our study (Fig. 2; 3 a-c)

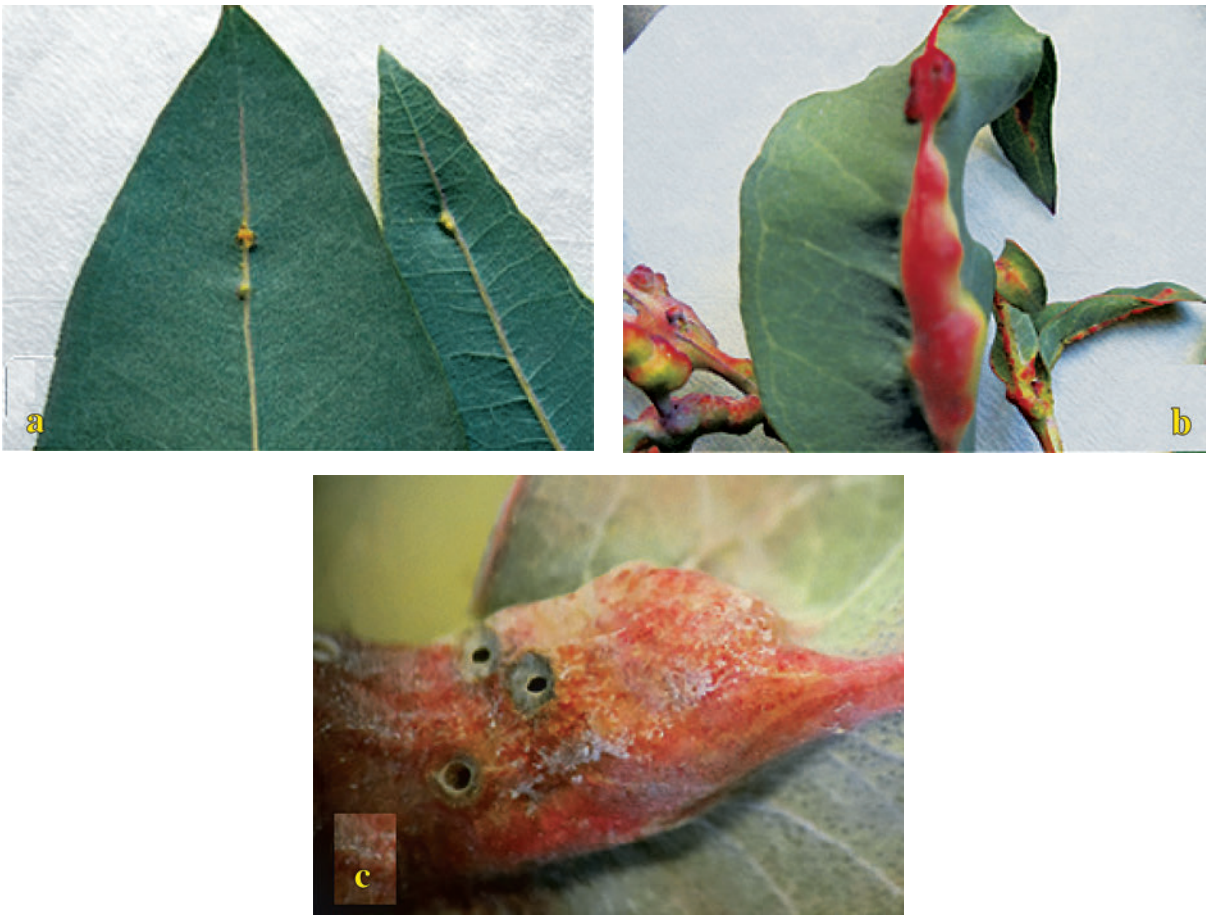

Fig. 3. (a) Leaf after a few weeks showing early stages of gall formation; (b, c) mature galls, exit holes.

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Pierwsze doniesienia o występowaniu w Iraku galasówki eukaliptusowej, *Leptocybe invasa* Fisher and La Salle (Hymenoptera: Eulophidae)

Streszczenie

Galasówka eukaliptusowa, *Leptocybe invasa* (Hymenoptera: Eulophidae), jest nowym rodzajem i gatunkiem zaobserwowanym po raz pierwszy w mieście Duhok leżącym w regionie Kurdystanu w Iraku. *L. invasa* powoduje powstawanie galasów na ogonkach i nerwach liściowych oraz na młodych gałęziach drzew *Eucalyptus camaldulensis*. Powstawanie galasów może ostatecznie doprowadzić do poważnego uszkodzenia. Średnia liczba galasów wynosiła 37,23 na gałąź, a porażenie występowało głównie na nerwach liścia, gdzie średnia liczba galasów wynosiła 19,35.