

Full Length Research Paper

First report of *Leptocybe invasa* Fisher and La'Salle (Hymenoptera:Eulophidae) in Mozambique

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The existence of gall wasp, *Leptocybe invasa*, in Mozambique was first recorded and reported in July, 2011 in the forestry nursery from the Forestry Investigation Center (CIF) and the forestry plantations of the districts of Marracuene and Namaacha (in the province of Maputo), respectively. The formation of galls on the eucalyptus seedlings was observed through the samples collected and sent to the Agricultural Research Council Landbounavorsingsraad – Plant Protection Research Institute in South Africa for identification. *L. invasa* is the insect that causes galls on eucalyptus (causes leaves malformation); its occurrence on the central nervure and petiole defoliates and dries the plant.

Key words: *Eucalyptus*, gall wasp, *Leptocybe invasa*, quarantine pest.

INTRODUCTION

The trees from the *Eucalyptus* genus (Myrtaceae) have enormous economic importance in tropical countries (like Mozambique) due to its fast growth, low costs of establishment of its plantations and fewer demands for climatic conditions, such as the precipitation quantity (Lamprecht, 1989). Kassab (2011) reported the fact that the species of *Eucalyptus* genus have fast growth, productive capacity, ability to adapt to several different environments and their varieties can be grown in large scale (monoculture) makes it a great demand in the segment of forestry products. However, Oliveira et al.

(2001) reported that monoculture (cultivation of eucalyptus) can favor pest presence; therefore, it is necessary to develop appropriate techniques to reduce the damage caused by these pests.

The implementation of monoculture as a homogeneous massive plantation favors the presence of many plague-insects populations due to food availability which may affect the forest enterprise (Ohmart and Edwards, 1991). Despite the facts that *Eucalyptus* spp. forests have their main issues with the native pests, in Brazil, such as the leaf-cutting ants, the termites and

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Figure 1. *Eucalyptus camaldulensis* seedling attacked on the forestry nursery from the Forestry Research Centre (CIF) with typical symptoms of attack of *L. invasa* in the District of Marracuene, Mozambique, 2011. Photo: Cacilda J. Chirinzane.

the defoliating caterpillars; in the last few years, many quarantined pests were also reported across the globe, for examples, the red gum lepp psyllid *glycaspis brimblecombei* (Hemiptera: Psyllidae), the bronze bug *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) and *Leptocybe invasa*, gall wasp (Hymenoptera: Eulophidae), which was reported in many countries (Wilcken et al., 2011).

The gall wasp, *L. invasa*, is originally from Australia; it is dark-colored, very shiny and cannot be bigger than 1 to 5 mm; its females are very common, but only a male has been reported in Turkey (Doganlar, 2005). According to Mendel et al. (2004), it is an oviparous insect that reproduces by parthenogenesis (which means females are able to reproduce without the need of a male); the adult female lays eggs in vegetal organs (preferentially, on the central vein, on the leaves petiole, in the stem and on the apical buds of branches), which swell to form galls when the larva hatches. According to Wilcken and Berti-Filho (2008), these galls cause leaf deformation on the central vein and the petiole and defoliates and dries the pointing of the leaf on the thinner branches. These galls are caused by some substances injected by the egg-layer of the female, which block the sap flux and lead to the falling of the leaves. The authors are yet to affirm that these damages can affect the growth of the seedlings and the trees, the productivity of clones or susceptible species.

This insect has already been found in many continents, such as Asia (India, China, Thailand, Lebanon, Iraq,

Israel, Jordan, Syria, Turkey, Vietnam and Iran); Europe (Portugal, Spain, France, Greece and Italy); South America (Brazil) and Africa (South Africa, Morocco, Uganda, Tanzania, Ethiopia, Algeria and Kenya) (Mendel et al., 2004; Doganlar, 2005; Mendel et al., 2007; Wilcken and Berti-Filho, 2008; FAO 2009; Hassan, 2012). This study aimed to register the first occurrence of the gall wasp in *Eucalyptus* species planted on the province of Maputo in Mozambique.

MATERIALS AND METHODS

In November 2009, the formation of galls could be observed in seedlings and forest plantings of *Eucalyptus saligna* in the district of Namaacha, province of Maputo in Mozambique; in February 2011, it was also reported on *Eucalyptus camaldulensis* seedlings in the forestry nursery from the Forestry Investigation Centre (CIF) in the District of Marracuene, province of Maputo, with 100% of attacked seedlings (Figure 1).

In order to capture the insect responsible for causing the galls, all parts of the plant that had holes and galls were collected and conserved into bowls (30 cm in length x 25 cm wide x 10 depth cm) and covered with a very fine mesh to facilitate ventilation. On a daily basis, the outbreak of the adult insect could be observed; the insect was collected and put into a flask containing 70% alcohol using an entomological brush. Ten insects were collected from each of the two districts in the Maputo province; a total of 20 insects were put in a 70% alcohol flask and later sent to the Agricultural Research Council Landbounavorsingsraad – Plant Protection Research Institute in South Africa for identification.

RESULTS AND DISCUSSION

According to the Agricultural Research Council Landbounavorsingsraad – Plant Protection Research Institute, the eucalyptus plants from the Maputo province were attacked by an exotic pest, *L. invasa*, commonly known as eucalyptus gall wasp (Figure 2). This insect was first reported and identified on July, 8th 2011 in the country. On severe infestations of the pest, it reduces the development of the plants, blocks the normal flux of the sap, causes deformation (twisting) and drying of the leaves and affects the production and quality of the wood (Mendel et al., 2004). The same symptoms were observed and verified from the samples collected in Mozambique.

In young plants (trees), the insect preferentially attacks the central vein of the leaves; consequently, causing their curving (Figure 3C and D).

The insect has severely attacked *Eucalyptus saligna* and *Eucalyptus camaldulensis* plants; caused the death of 2% of the plantation due to the formation of many galls on the plant (Figure 4A and B).

Visually, the *E. camaldulensis* showed higher amount of seedlings attacked in the nursery than the *E. saligna*; according to Wilcken et al. (2011), *E. camaldulensis* and hybrid clones are very susceptible to the attack of the gall wasp, which endangers its initial



Figure 2. Adult of *Leptocybe invasa* on *Eucalyptus camaldulensis* leaf collected in the district of Marracuene. Forestry Research Centre (CIF), Mozambique, 2011. Photo: Cacilda J. Chirinzane.



Figure 3. Attack symptoms of *Leptocybe invasa* in *Eucalyptus camaldulensis*, at different stages of development (A) Sowings attacks in CIF; (B) Seedlings in CIF; (C) Clear cutting showing attacks on the Seeds Production Area (Marracuene); (D) Leaf attacked on the forestry planting. CIF, Mozambique, 2011. Photos: Cacilda J. Chirinzane.

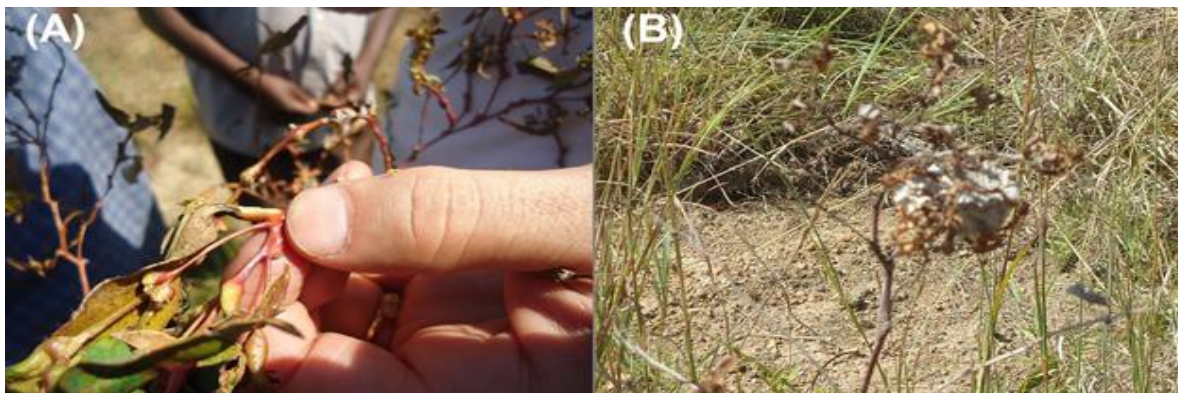


Figure 4. *Eucalyptus saligna* plants attacked by *Leptocybe invasa*. (A) Initial symptoms of vegetal dry and yellowish leaves; (B) Dead plant completely dry. Namaacha, Mozambique, 2011. Photos: Cacilda J. Chirinane.

development (from planting to 2 years old) and causes growth reduction in height with loss of apical dominance. Thus, the use of this genetic material must be conducted in a very selective way. Wilcken and Berti-Filho (2008), also reported the susceptibility of *E. camaldulensis* to the gall wasp attack.

Conclusion

The climatic condition of Mozambique is favorable for the exotic pest, *L. invasa*, therefore, the monitoring and management of this pest is not only important but also urgent, especially in *E. camaldulensis* plantings on the region, more than 100 000 ha, and related places, the infestation levels and losses caused by the pest are required to be studied as ways to understand and elaborate the control measures and reduce the damage caused by this insect in the region.

Conflict of Interest

The authors have not declared any conflict of interest.

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