



CSL PEST RISK ANALYSIS FOR *OPHELIMUS MASKELLI*

STAGE 1: PRA INITIATION

1. What is the name of the pest?

Ophelimus maskelli (Ashmead, 1900) Hymenoptera Eulophidae A gall wasp of *Eucalyptus*

Notes on taxonomy:

Originally described as *Pteroptrix maskelli* by Ashmead in 1900, this organism was reclassified within the primitive Genus *Ophelimus* as part of the extensive revision of Australasian Chalcidoidea by Boucek (1988). The biology and taxonomy of *Ophelimus* is little studied and poorly known. *Ophelimus* is a very large genus with lots of undescribed species and no one has produced a key to species (Protasov *et al.*, 2007). Specimens found spreading around the Mediterranean previously identified as *O. eucalypti* (e.g. Viggiani & Nicotina, 2001) are actually *O. maskelli* (Tilbury & Jukes, 2006; Protasov *et al.*, 2007).

2. What is the reason for the PRA?

In November 2004, *Eucalyptus* trees at a retail plant nursery in Yorkshire were found to have leaves infested with galls, suspected as either *O. eucalypti*, *O. maskelli* or *Leptocybe invasa*. Since no adults were present with the sample, the diagnosis could not be taken further (CSL unpublished data).

In April 2005 a species of gall-causing eulophid wasp, new to the UK, was found in private gardens in London (Lambeth and Wimbledon) (Tilbury & Jukes, 2006). The identity of the organism has not been confirmed but it is very similar to *O. maskelli* and it could be an intraspecific variant of *O. maskelli* or an undescribed species of *Ophelimus*¹. This PRA assumes that the organism in London will be confirmed as *O. maskelli* or has such similar biology that the risk it presents is no different to that presented by *O. maskelli*.

3. What is the PRA area?

O. maskelli is present in Europe (see 11) so this PRA considers the UK as the PRA area.

STAGE 2: PEST RISK ASSESSMENT

4. Does the pest occur in the PRA area or does it arrive regularly as a natural migrant?

Yes, *Ophelimus maskelli* occurs in the PRA area (London, see 2.)

¹ A distinguishing taxonomic feature of *O. maskelli* is that it has a single seta on the submarginal vein, all other species in the Genus have at least two, but usually three or more setae on this vein. Specimens from the UK all had more than one setae.

5. Is there any other reason to suspect that the pest is already established in the PRA area?

Yes. An infested tree in Lambeth, now approximately 6m tall, had been bought from a nursery six years before the galls were noticed in April 2005, hence the tree was originally purchased in 1999 (Tilbury & Jukes, 2006). It is likely that the tree was infested when originally imported, and other infested *Eucalyptus* could also have been in the same consignment. In the seven or eight years since the trees were at the nursery, infested trees could have been distributed widely within the PRA area, carrying *O. maskelli* with them. If the pest has survived on such trees, as the specimens in London have survived, then we suspect that *O. maskelli* is already established in the PRA area.

6. What is the pest's status in the Plant Health Directive (Council Directive 2000/29/EC²)?

Ophelimus maskelli is not included in the Plant Health Directive.

7. What is the recommended quarantine status of the pest in the lists of the European and Mediterranean Plant Protection Organisation (EPPO)? (www.eppo.org)

EPPO List: A1 regulated pest list A2 regulated pest list Action list Alert list

Ophelimus maskelli is not included in any EPPO pest lists.

It is worth noting that the related *Leptocybe invasa* Fisher & La Salle, 2004 (Hymenoptera: Eulophidae), a relatively recently described species is currently spreading in many countries around the Mediterranean Basin and in Africa, causing damage to young *Eucalyptus* plantations and nurseries. It was added to the EPPO Alert List in September 2006 (EPPO, 2006).

8. What are the pests' host plants?

Ophelimus maskelli feeds only on *Eucalyptus*. Of 84 *Eucalyptus* species tested, 14 were found to be suitable hosts (*E. botryoides*, *E. bridgesiana*, *E. camaldulensis*, *E. cinerea*, *E. globulus*, *E. grandis*, *E. gunnii*, *E. nicholii*, *E. pulverulenta*, *E. robusta*, *E. rudis*, *E. saligna*, *E. tereticornis* and *E. viminalis*) (Protasov *et al.*, 2007).

E. camaldulensis is a particularly favoured host and is also the most important *Eucalyptus* species planted in the Mediterranean region and the Middle East (CABI, 2005).

² http://europa.eu.int/eur-lex/en/consleg/pdf/2000/en_2000L0029_do_001.pdf

9. What hosts are of economic and/or environmental importance in the PRA area?

Eucalyptus trees are grown in nurseries in the UK for planting as ornamentals. At least 64 species of *Eucalyptus* are available from UK nurseries (Eucalyptus nurseries website, 2007).

Outside the PRA area, elsewhere in Europe, over half a million hectares of *E. camaldulensis* plantations have been established, mainly in the Mediterranean region and particularly in Spain and Morocco. Within the EU, *E. camaldulensis* is planted for forestry in Cyprus, Greece, Italy, Malta, Portugal and Spain (CABI, 2005). Portugal has 550,000 ha of *Eucalyptus* forests (FAO, 1997). Globally, *E. camaldulensis* is perhaps the most widely used tree for planting in arid and semi-arid regions (CABI, 2005).

10. If the pest needs a vector, is it present in the PRA area?

No vector is required. This is a free-living organism.

11. What is the pest’s present geographical distribution?

Table 1: Distribution of *Ophelimus maskelli*

North America:	No records - assumed Absent
Central America:	No records - assumed Absent
South America:	No records - assumed Absent
Europe:	Present - France, Greece, Italy, Spain
Africa:	Present – Morocco (EPPO, 2006a)
Asia:	Present – Israel (Protasov <i>et al.</i> , 2007)
Oceania:	Australia, New Zealand (Boucek, 1988)

The gall wasp now recognised as *Ophelimus maskelli* was first recorded in Europe in Italy where it was first reported in 2000 (Arzone & Alma, 2000; Bella & Loverde, 2002). It was subsequently recorded in Greece (first noted in 2002, Kavallieratos *et al.*, 2006), Spain (Pujade-Villar & Riba Flinch, 2004) and more recently in the south of France (EPPO, 2006a).

12. How likely is the pest to enter the PRA area³?

Very unlikely Unlikely Moderately likely Likely Very likely

Ophelimus maskelli is present in the PRA area. It probably arrived via the import of its host (*Eucalyptus* spp.) from Australia (Lawson, 2007) or Israel. It is very likely that this organism will enter new parts of the PRA area via trade in its host plants.

13. How likely is the pest to establish outdoors in the PRA area?

Very unlikely Unlikely Moderately likely Likely Very likely

³ Pest entry includes an assessment of the likelihood of transfer to a suitable host (ISPM No. 11, FAO, Rome)

Ophelimus maskelli has been present in the southern PRA area (London) at least for a few years. It is therefore capable of establishment outdoors in the PRA area.

In Israel there are three generations per year. The first (spring) generation is seen between mid-March and late July, the second (summer) generation is seen between July and September. The third (autumn) generation lives from October to March the following year. Larvae overwinter within galls. *Eucalyptus* in forests, agroforestry plantations, forest nurseries and public gardens has been found to host *O. maskelli* (Protasov *et al.*, 2007).

In Italy, Viggiani & Nicotina (2001) noted that larvae overwintered and adults emerged in April (slightly later than the spring generation in Israel). They suggested that *O. maskelli* had one generation per year although this was not supported by any observations. Depending upon climatic conditions, it is more likely that there are two or three generations of *O. maskelli* each year in Italy.

One or two generations could be expected each year in the UK.

14. How likely is the pest to establish in protected environments in the PRA area?

Very unlikely Unlikely Moderately likely Likely Very likely

Hosts (*Eucalyptus* spp.) are not generally grown in protection.

15. How quickly could the pest spread⁴ within the PRA area?

Very slowly Slowly Moderate pace Quickly Very Quickly

The first reports of *O. eucalypti* (= *O. maskelli*) from Italy in 2000, Greece in 2002, Spain in 2003 and France in 2006, suggest that *O. maskelli* can spread relatively quickly within the PRA area. (See 11).

16. What is the pest’s potential to cause economic and/or environmental damage in the PRA area?

Very small Small Medium Large Very large

Females attack immature leaves of between 15 and 90 days old in the lower canopy where the leaves are relatively large while still green. Each female lays an average of 109 eggs. Each egg induces a gall. There can be 11 to 36 galls cm⁻² leaf (Protasov *et al.*, 2007). Under epidemic conditions, the entire

⁴ ISPM No 5. defines spread as the expansion of the geographic distribution of a pest within an area. Note that just because an organism can move or be transported quickly, does not mean that it will spread quickly, since it may not be able to establish in areas that it moves to.

upper leaf surface can be densely covered with galls. It is difficult to quantify the impact of galls when a non-reproductive organ is attacked. Nevertheless heavy leaf galling by *O. maskelli* can cause severe damage to eucalyptus leaves and result in premature leaf drop. In Israel where infested trees are close to humans, mass emergence of the spring population can cause a nuisance by forming ‘clouds’ of wasps (Protasov *et al.*, 2007). 80-year-old *Eucalyptus* trees have almost completely lost their foliage as a consequence of being attacked by *O. maskelli* (Protasov *et al.*, 2007). Further planting of *E. camaldulensis* in Israel was stopped by gall wasps (Mendel *et al.*, 2004).

In Israel, both *O. maskelli* and *L. invasa* occur at epidemic levels and galls of the two species are often found on the same leaves. Observations tend to suggest that *O. maskelli* is a better competitor that could displace *L. invasa*.

17. What is the pest’s potential as a vector of plant pathogens?

Ophelimus maskelli is not recorded as a vector of plant pathogens.

STAGE 3: PEST RISK MANAGEMENT

18. How likely is the pest to continue to be excluded from the PRA area?

Outdoors: Very likely Likely Moderately likely Unlikely Very unlikely

O. maskelli appears established in London.

In protection: Very likely Likely Moderately likely Unlikely Very Unlikely

Host plants are generally grown outdoors.

19. How likely are outbreaks to be eradicated?

Very likely Likely Moderately likely Unlikely Very unlikely

In areas where this pest has spread to, no attempts to eradicate it have been made. No suggestions for chemical control are provided in the literature. This suggests that by the time the pest is detected it is already too widely distributed for eradication to be worthwhile.

20. What management options are available for containment and control?

The hymenopteran parasitoids *Stethynium ophelimi*, *S. breviovipositor* and *Closterocerus* sp. were considered for introduction into Israel for biological control of *Ophelimus maskelli* (Huber *et al.*, 2006; Protasov *et al.*, 2007). *Closterocerus* was released and rapidly spread and seems to have achieved

effective biological control (Protasov *et al.*, 2007). Release of *Closterocerus* could be considered within the PRA area.

21. Conclusions

Ophelimus maskelli may be more widely distributed in the UK than is currently known. Although damaging to some *Eucalyptus* species *O. maskelli* does not present a major threat to UK plant health.

Ophelimus maskelli is a more significant pest for southern EU MS, since it can be a serious pest to the widely grown *E. camaldulensis* that is planted for forestry in Cyprus, Greece, Italy, Malta, Portugal and Spain (CABI, 2005). Southern MS could consider investigating the release of *Closterocerus* to control *O. maskelli*.

Further work that would reduce uncertainties

Area of PRA	Uncertainties	Further work that would reduce uncertainty
Taxonomy	<i>Ophelimus</i> has been little studied and early European reports mistakenly refer to <i>O. eucalypti</i> .	Development of a taxonomic key to <i>Ophelimus</i> .
Pathway	How did <i>O. maskelli</i> reach Europe?	Examine trade of <i>Eucalyptus</i> from Australia (and Israel)
Distribution	Exact distribution of <i>O. maskelli</i> in Europe is unknown.	Survey <i>Eucalyptus</i> plantations
Establishment	Whilst the organism is still spreading, the limit of its establishment potential remains unknown.	Studies on the thermal biology of the pest to predict its natural range.
Spread	Rate of spread	Annual surveys to measure rate of spread.
Impact	Value of <i>Eucalyptus</i> Economic impact of gall damage	Measure impacts
	Can chemicals provide control Can <i>Closterocerus</i> be released in Europe? Will <i>Closterocerus</i> spread from Israel?	Investigate chemical control options.

22. Summary

A species of gall forming wasp, new to the UK, has been found in a few private gardens in the southeast of England and the same species, or similar closely related species, has been found at a plant nursery in Yorkshire. The identity of the organism has not been confirmed but it is very similar to *Ophelimus maskelli* an Australian species and pest of *Eucalyptus* that has established in Israel and in southern EU Member States, e.g. France, Greece, Italy and Spain. Very high densities of galls can occur on young leaves. Severe damage can result and mature trees can lose almost all leaves.

Ophelimus maskelli is most likely to establish more widely in southern Europe where *Eucalyptus* hosts occur widely as forestry and amenity trees. Damage is to be expected. The climate of the UK is probably less suitable and it is likely that populations in the UK will be smaller, hence less damaging.

No chemical control measures are described in the literature. A hymenopteran parasitoid biological control agent has shown some success at controlling this pest in Israel.

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