

# Rapid assessment of the need for a detailed Pest Risk Analysis for Monterey pine aphid, *Essigella californica*

*Disclaimer: This document provides a rapid assessment of the risks posed by the pest to the UK in order to assist Risk Managers decide on a response to a new or revised pest threat. It does not constitute a detailed Pest Risk Analysis (PRA) but includes advice on whether it would be helpful to develop such a PRA and, if so, whether the PRA area should be the UK or the EU and whether to use the UK or the EPPO PRA scheme.*

## STAGE 1: INITIATION

### 1. What is the name of the pest?

*Essigella californica* (Essig)

Synonyms: *Essigella claremontiana* Hottes, *E. cocheta* Hottes, *E. monelli* Hottes, *E. pineti* Hottes, *E. swaini* Hottes

Common names of the pest: Monterey pine aphid

Taxonomic position:

Kingdom – *Animalia*; Phylum – *Arthropoda*; Class – *Insecta*; Order – Hemiptera;  
Family – Aphididae; Genus – *Essigella*

Special notes on nomenclature or taxonomy: None

### 2. What is the pest's status in the EC Plant Health Directive (Council Directive 2000/29/EC) and in the lists of EPPO?

*Essigella californica* is not recommended for listing by EPPO and is not on the EPPO Alert List or the EPPO Action List. (<http://www.eppo.org/QUARANTINE/quarantine.htm>)

### 3. What is the reason for the rapid assessment?

An *Essigella* species, initially identified as likely, but not confirmed, to be *E. californica*, was found on established *Pinus sylvestris* and *Pinus wallichiana* (Bhutan pine) at the Royal Botanic Gardens at Kew in London in November 2010. It was confirmed in 2013 as

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*E. californica*, the first record of this aphid in the UK. In July 2012, a small population of *E. californica* was found on *Pinus montezumae* at The National Pinetum, Kent; more specimens were found upon re-sampling in September 2012, August 2013 and February 2014 (Reid *et al.*, in preparation).

*Essigella californica* is known to feed on a wide range of *Pinus* species and has been recorded on Douglas-fir (*Pseudotsuga menziesii*). It occurs in other temperate regions of the world (British Columbia, Tasmania and New Zealand) and in south-east Australia *E. californica* is associated with extensive needle yellowing and defoliation of *Pinus radiata*, which has an impact on forest productivity. The aphid therefore, has the potential to establish and spread within the UK, and to cause damage.

This rapid PRA has been undertaken to assess the probability of *E. californica* establishing in the UK and the amount of damage it might cause, and hence whether a full PRA is required.

## STAGE 2: RISK ASSESSMENT

### 4. What is the pest's present geographical distribution?

*Essigella californica* is native to **western North America** where it occurs from southern British Columbia and Alberta south to **Mexico** and east to Nebraska. There is also an isolated (reliable) record from Miami in **Florida** (Sorensen, 1994). It has been introduced into **Australia** (1998), **New Zealand** (1998), southern **Brazil** (2000), **Chile** and **Argentina** (pre-2007) and is now well established throughout the pine growing areas of these countries.

In Europe, *E. californica* has been recorded from **France** (1990), **Spain** (1992), **Madeira** (2001), **Italy** (2005) and **Malta** (2009).

**Table 1** Geographic distribution of *Essigella californica*

Region	Country	Reference
North America	Canada USA	Sorensen, 1994
Central America	Mexico	Sorensen, 1994
South America	Brazil Chile Argentina	Zonta de Carvalho & Noemberg Lazzari, 2000 Espinosa & Acuna, 2007
Caribbean	No record	
Europe	France	Turpeau & Remaudière, 1990

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	Spain Madeira Italy Malta	Seco Fernández & Mier Durante, 1992 Aguiar & Ilharco, 2001 Barbagallo et al., 2005 Mifsud et al., 2009
Africa	No record	
Asia	No record	
Oceania	Australia New Zealand	Carver & Kent, 2000 Flynn et al., 2003 May & Carlyle, 2003 Wharton & Kriticos, 2004

## 5. Is the pest established or transient, or suspected to be established/transient in the UK?

The finding of *E. californica* on established pine trees at RBGK in 2010 is the first record of this species in the UK and the first report of it breeding outdoors in the UK. The population at the National Pinetum in Kent was first detected in 2012, and specimens were found again in 2013 and 2014 (Reid *et al.*, in preparation). A single alate was found in a Rothamsted suction trap in Essex, in November 2009 (Reid *et al.*, in preparation).

As *E. californica* has been found at the Kent locality both in 2012 and 2013, its status is best described as: **Present: limited distribution.**

## 6. What are the pest's natural and experimental host plants; of these, which are of economic and/or environmental importance in the UK?

The most common host record is Monterey pine (= Radiata pine, *Pinus radiata*), but *Essigella californica* has a wide host range amongst the Pinaceae and has been recorded from a large number of *Pinus* species. There are also records of *E. californica* feeding on Douglas-fir (*Pseudotsuga menziesii*) (Sorensen, 1994).

Table 2 Host plants of *Essigella californica*

Host plant			
Scientific name	Common name	Country	Reference
<i>Pinus albicaulis</i>		USA	Sorensen, 1994
<i>Pinus attenuata</i>		USA	Sorensen, 1994
<i>Pinus contorta</i>		USA	infrequent on <i>P. contorta</i> var. <i>latifolia</i> ; Sorensen, 1994.

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<i>Pinus coulteri</i>		USA	Sorensen, 1994
<i>Pinus engelmannii</i>	Englemann pine	USA	Sorensen, 1994
<i>Pinus flexilis</i>		USA	Sorensen, 1994
<i>Pinus griffithi</i>		France	Turpeau & Remaudière, 1990;
<i>Pinus halepensis</i>	Aleppo pine	Malta	Mifsud et al., 2009
<i>Pinus jeffreyi</i>		USA	Sorensen, 1994
<i>Pinus lambertiana</i>		USA	infrequent host ; Sorensen, 1994
<i>Pinus leiophylla</i>		USA	Sorensen, 1994
<i>Pinus michoacana</i>	Michoacan pine	Mexico	Sorensen, 1994
<i>Pinus muricata</i>	Bishop pine	California	Sorensen, 1994
<i>Pinus montezumae</i>	Montezuma pine	Mexico	Sorensen, 1994
<i>Pinus monticola</i>		USA	Sorensen, 1994
<i>Pinus muricata</i>		USA	Sorensen, 1994
<i>Pinus patula</i>	Mexican pine	California, Mexico	Sorensen, 1994 ; Flynn et al. 2003
<i>Pinus pinaster</i>	Maritime pine	Madeira	Aguiar & Ilharco, 2001; Flynn et al. 2003
<i>Pinus pinea</i>	Stone pine	France	Turpeau & Remaudière, 1990
<i>Pinus ponderosa</i>	Ponderosa pine	USA	Sorensen, 1994
<i>Pinus radiata</i>	Monterey pine Radiata pine	California Australia, New Zealand, Italy	Sorensen, 1994 ; Turpeau & Remaudière, 1990; Carver & Kent, 2000; Flynn et al., 2003; Barbagallo et al., 2005
<i>Pinus rigida</i>		France	Turpeau & Remaudière, 1990;
<i>Pinus sabiniana</i>		USA	Sorensen, 1994
<i>Pinus strobiformis</i>		USA	infrequent host ; Sorensen, 1994
<i>Pinus strobus</i>	Eastern white pine, Weymouth pine	France, Italy	Turpeau & Remaudière, 1990; Barbagallo et al., 2005
<i>Pinus taeda</i>		France	Turpeau & Remaudière, 1990;
<i>Pinus torreyana</i>		USA	Sorensen, 1994
<i>Pinus washoensis</i>		USA	infrequent host; Sorensen, 1994

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<i>Pseudotsuga menziesii</i>	Douglas-fir	North America	infrequent host; Sorensen, 1994
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Sorensen (1994) did not find *E. californica* on *P. cembroides*, *P. edulis*, *P. monophylla*, *P. quadrifolia*, *P. balfouriana*, *P. aristata*, *P. contorta* var *contorta*, *P. contorta* var *murrayana* or *P. contorta* var *bolanderi*.

## 7. If the pest needs a vector, is it present in the UK?

No vector required.

## 8. What are the pathways on which the pest is likely to move and how likely is the pest to enter the UK?

The most likely pathway for introduction is on live conifer plants, particularly pines, or on recently-cut conifer foliage. The aphid also appears to be capable of incidental transportation on other commodities. For example, the first detection of *E. californica* in Australia was of live aphids imported into the country in a consignment of avocado fruit from New Zealand (Flynn et al., 2003).

The presence of *E. californica* populations in France suggests that pines in the UK could also become colonised through natural dispersal of winged individuals, especially if dispersal was assisted by southerly or south-easterly winds. There is very little evidence however, that natural dispersal into the UK has taken place and the current very localised distribution suggests accidental importation. However, the Whittle suction trap run by Rothamsted Research caught a single alate *E. californica* in 2009 (Reid et al., in preparation), and this individual may have originated in France.

Plants for planting	Very unlikely		Unlikely		Moderately likely		Likely	X	Very likely	
Cut conifer foliage	Very unlikely		Unlikely		Moderately likely	X	Likely		Very likely	
Hitchhiker						X				
Natural spread:	Very unlikely		Unlikely	X	Moderately likely		Likely		Very likely	

## 9. How likely is the pest to establish outdoors or under protection in the UK?

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CLIMEX modelling by Wharton & Kriticos (2004) indicates that all of Europe, including the UK, has a climate that is suitable for *E. californica* and the aphid would be expected to persist outdoors and spread.

Suitable hosts are not grown under protected cultivation.

Outdoors:	Very unlikely	<input type="checkbox"/>	Unlikely	<input type="checkbox"/>	Moderately likely	<input type="checkbox"/>	Likely	<input type="checkbox"/>	Very likely	<input checked="" type="checkbox"/>
Under protection:	Very unlikely	<input checked="" type="checkbox"/>	Unlikely	<input type="checkbox"/>	Moderately likely	<input type="checkbox"/>	Likely	<input type="checkbox"/>	Very likely	<input type="checkbox"/>

## 10. How quickly could the pest spread in the UK?

Natural spread:	Very slowly	<input type="checkbox"/>	Slowly	<input type="checkbox"/>	Moderate pace	<input checked="" type="checkbox"/>	Quickly	<input type="checkbox"/>	Very quickly	<input type="checkbox"/>
In trade:	Very slowly	<input type="checkbox"/>	Slowly	<input type="checkbox"/>	Moderate pace	<input checked="" type="checkbox"/>	Quickly	<input type="checkbox"/>	Very quickly	<input type="checkbox"/>

## 11. What is the area endangered by the pest?

The aphid could colonise Scots pine (*Pinus sylvestris*) and Corsican pine (*P. nigra*) in all areas of the UK where these species are grown, and other pine species where they occur. However, the aphid might reach its climatic limits in the far north of the country, especially at higher altitudes. Lodgepole pine (*P. contorta*) appears not to be a host, or is attacked only very infrequently.

## 12. What is the pest's economic, environmental or social impact within its existing distribution?

Economic:	Very small	<input type="checkbox"/>	Small	<input checked="" type="checkbox"/>	Medium	<input type="checkbox"/>	Large	<input type="checkbox"/>	Very large	<input type="checkbox"/>
Environmental:	Very small	<input type="checkbox"/>	Small	<input checked="" type="checkbox"/>	Medium	<input type="checkbox"/>	Large	<input type="checkbox"/>	Very large	<input type="checkbox"/>
Social:	Very small	<input type="checkbox"/>	Small	<input checked="" type="checkbox"/>	Medium	<input type="checkbox"/>	Large	<input type="checkbox"/>	Very Large	<input type="checkbox"/>

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*Essigella californica* is not regarded as a significant economic pest in its native habitat in North America, or in New Zealand or South America (Appleton & Gresham 2003; Teulon et al. 2003; Espinosa & Acuna, 2007; Watson et al., 2008). In California, it occasionally causes aesthetic problems on ornamental *P. radiata*, due to the copious production of honeydew, which leads to the growth of sooty mould (Ohmart, 1981). *Essigella californica* has also been reported as a minor pest of Christmas tree plantations in central California, causing aesthetic damage (Glatz et al., 2010)

In France, *E. californica* has been associated with localised needle yellowing on *P. radiata*, which might sometimes affect a whole branch, but it is not an economically important pest (Turpeau & Remaudière, 1990).

*Essigella californica* is of concern however, in south-eastern Australia. In this region, in New South Wales and Victoria, aphid infestations have been associated with widespread needle yellowing and defoliation of *P. radiata* plantations and a reduction in productivity (May & Carlyle, 2003; Wharton & Kriticos, 2004; Hopmans et al., 2008; Eyles et al., 2011). The greater impact of the aphid appears to be linked to low rainfall that also causes needle loss and probably provides conditions particularly suitable for aphid population development. This part of Australia has been suffering a major drought since 2001. In some areas, the impact of aphid infestation and drought has been exacerbated by nutrient deficiency (N and P), which prevents the trees from fully replacing their canopy between bouts of defoliation.

## 13. What is the pest's potential to cause economic, environmental or social impacts in the UK?

It would appear that *E. californica* is only likely to be a threat to the health of pine trees in areas of southern Europe and the Mediterranean that experience severe moisture stress during the summer months. The aphid, on its own, is unlikely to cause any significant damage in north-western and northern Europe, including the UK, except perhaps in drought prone areas in very dry years. Aesthetic damage to Christmas trees is considered unlikely to have much impact in the UK, as *Pinus* spp. are not commonly used for this purpose; most UK Christmas trees are *Abies* or *Picea* spp., neither of which are recorded hosts of this aphid. If the aphid was present in high numbers on amenity trees (such as those in gardens), needle discolouration, honeydew and the associated sooty moulds may cause additional social impacts.

There is the potential however, for *E. californica* to interact with red band needle blight of pine, which is caused by *Dothistoma* spp.. This needle disease is currently causing severe defoliation of Corsican pine (*P. nigra* var. *maritima*) in the UK, and has also been found on Scots pine and lodgepole pine. In New Zealand, *Essigella californica* was associated with a higher incidence of the needle cast fungus *Cyclaneusma minus*,

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suggesting a possible relationship between the two organisms and greater impact when combined (Watson et al., 2008).

Economic:	Very small		Small	X	Medium		Large		Very large	
Environmental:	Very small		Small	X	Medium		Large		Very large	
Social:	Very small		Small	X	Medium		Large		Very large	

## 14. What is the pest's potential as a vector of plant pathogens?

*Essigella californica* is not known to be a vector of plant pathogens.

## STAGE 3: PEST RISK MANAGEMENT

## 15. What are the risk management options for the UK?

Spraying the infested trees with an appropriate insecticide might eliminate localised infestations, as long as the aphids have not already spread to other pine hosts in the area. However, spraying mature trees will be extremely difficult, if not impossible.

## 16. Summary and conclusion of rapid assessment.

This rapid assessment shows:

*Likelihood of entry was:* LIKELY on plants for planting, taking into account the fact the aphid has arrived and was found on a small number of trees at one locality in west London, and a second population is established at a location in Kent. Entry was UNLIKELY or MODERATELY LIKELY for the other three pathways considered.

*Likelihood of establishment is:* HIGH

The climate of the UK is suitable for establishment and spread, and all *Pinus* species can act as hosts.

*Economic impact is expected to be:* LOW, but there is potential for interaction with red band needle blight.

*Endangered area:* all of the UK, except perhaps the far north and higher altitudes.

*Risk management:* Infested trees could be sprayed with insecticide, but this is only likely to be practical for smaller trees.

## 17. Is there a need for a detailed PRA?



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Yes ☐ No ☒

If yes, select the PRA area (UK or EU) and the PRA scheme (UK or EPPO) to be used.

PRA area: UK or EU?  PRA scheme: UK or EPPO?

18. Given the information assembled within the time scale required, is statutory action considered appropriate / justified?

Statutory action Yes ☐ No ☒

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