Rapid Assessment of the need for a detailed Pest Risk Analysis for *Parthenolecanium fletcheri* (Cockerell)

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?

Parthenolecanium fletcheri (Cockerell) (Hemiptera: Coccidae)
Fletcher scale, Arborvitae soft scale, Thuja soft scale

Synonym: *Lecanium fletcheri* Cockerell, 1893

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

Parthenolecanium fletcheri is not listed in the EC Plant Health Directive and is not recommended for regulation as a quarantine pest by EPPO, nor is it on the EPPO Alert List.

3. What is the reason for the Rapid Assessment?

Parthenolecanium fletcheri is a North American pest of *Thuja* and *Taxus*. A breeding population (adult females, eggs and hundreds of first instars) was found on a mature Western red cedar (*Thuja plicata*) in Pimlico, London, in June 2011 (Malumphy, Eyre & Cannon, 2011; Malumphy, *in press*). This is the first time that this insect has been found breeding in Britain. A Rapid Assessment was commissioned in order to determine the most appropriate action and assist the formulation of policy.

STAGE 2: RISK ASSESSMENT

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

Parthenolecanium fletcheri is native to North America and occurs widely in the temperate areas of USA, particularly in the East and Mid-West, and parts of Canada. It was accidentally introduced to Europe, being first recorded in Poland in the 1930s (Kawecki, 1935). It occurs widely in Europe (Ben-Dov, 1993, 2011; Malumphy *et al*., 2008) from Bulgaria, and Serbia and Montenegro in the south; to Latvia, North West Russia and Sweden, in the north; France in the west and Uzbekistan in the East. It has clearly demonstrated a capacity to invade new geographical areas.
It was found in the UK on a plant imported from Italy, although it has not been reported from Italy.

North America: Canada; USA.
Central America: absent.
South America: absent.
Caribbean: absent.
Europe: Austria; Bulgaria; Czech Republic; Denmark; France; Georgia; Germany; Hungary; Latvia; Lithuania; Netherlands; Poland; Romania; Russia; Serbia and Montenegro; Sweden; Switzerland; Ukraine.
Africa: absent.

Middle East: absent.
Asia: Armenia; Uzbekistan.
Oceania: absent.

5. Is the pest established or transient, or suspected to be established/transient in the UK?
Parthenolecanium fletcheri is only known to occur on a single Western cedar tree in London, where it appears to have been present for seven years (the infested tree was imported from Italy in 2004). *Parthenolecanium fletcheri* is highly cryptic, particularly when the population density is low, and is therefore easily overlooked. The possibility that it occurs elsewhere in the UK cannot be ruled out.

6. What are the pest's natural and experimental host plants; of these, which are of economic and/or environmental importance in the UK?
It is oligophagous on Cupressaceae (Ben-Dov, 1993, 2011; Kosztarab, 1996; Kosztarab & Kozár, 1988) and most frequently recorded on *Thuja*. In North America it is also common on *Taxus* sp. (Taxaceae). However, it is the opinion of the authors that the host range is poorly known due to difficulties in identifying Cupreassaceae to species.

Table 1: Hosts plants of *Parthenolecanium fletcheri*

Plant family	Host plant	Common names
Cupressaceae	*Cupressus* sp.	
	Juniperus virginiana L.	Eastern red-cedar
	Juniperus sp.	
	Platycladus orientalis (L.) Franco	Chinese arborvitae
	Thuja occidentalis L.	Eastern arborvitae
	Thuja sp.	
	Tsuga canadensis (L.) Carrière	Eastern hemlock
	Tsuga sp.	
Taxaceae	*Taxus* sp.	yew

The genera of economic importance for the horticultural industry in the UK include *Cupressus, Juniperus, Thuja, Tsuga* and *Taxus*; with *Juniperus* and *Taxus* also being of environmental importance (BSBI, 2011).

7. If the pest needs a vector, is it present in the UK?
Parthenolecanium fletcheri does not need a vector.

8. What are the pathways on which the pest is likely to move and how likely is the pest to enter[1] the UK? (*By pathway*):

Pathway 1. Growing plants from the EU and third countries where *P. fletcheri* occurs
The movement of its host plants within the EU is unregulated, so a pathway of introduction from Continental Europe exists. However, it has only been found on one occasion despite the popularity of Cupressaceae in the horticultural trade.

Very unlikely		Unlikely	x	Moderately likely		Likely		Very likely	

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

Fletcher scale has the potential to naturalise widely in England and Wales, wherever its host plants occur, as it has been breeding outdoors in London for seven years and is present in

[1] Entry includes transfer to a suitable host

Canada and Scandinavia. The winters of 2009/10 and 2010/11 were the coldest in southern England for decades but the scale survived outdoors.

It has been found infesting young potted *Tsuga* and *Thuja* plants in a glasshouse in Lithuania (Malumphy *et al.*, 2008), although it is not recorded as established on indoor plantings in North America or Europe. However if infested stock was brought in for growing on under protection there appears to be no reason why this pest could not establish under protection in the UK.

	Very unlikely	Unlikely	Moderately likely	Likely	Very likely
Outdoors					X
Under protection			X		

10. How quickly could the pest spread in the UK?
There is no specific data available on the dispersal rate of *P. fletcheri*. The main dispersal stage is the first instar which can actively crawl over short distances or be carried in air currents or on other animals (birds, other insects). Long distance dispersal is likely to be in trade.

Natural dispersal	Very slowly	Slowly	Moderate pace	Quickly	Very Quickly
	X				

Trade	Very slowly	Slowly	Moderate pace	Quickly	Very Quickly
		X			

11. What is the area endangered by the pest?
The endangered area is likely to be the whole of Britain.

12. What is the pest's economic, environmental or social impact within its existing distribution?
Parthenolecanium fletcheri is a damaging pest of *Taxus* and *Thuja* in the USA (Kosztarab, 1996). Infested plants lose vigour, leaves turn yellow, wilt and drop, and sooty moulds develop on the eliminated honeydew (Westcott, 1973). It has occasionally been reported to damage ornamental *Thuja* in urban areas in the Czech Republic (Prihoda, 1986), Kazakhstan (Dzhadaibaev & Parshina, 1974), Poland (Golan, 2003) and the Caucasus region (Yanin, 1975). Large populations were found on young *Thuja* and *Tsuga* plants grown under protection at a commercial nursery in Lithuania (Malumphy *et al*., 2008). However, it is rarely recorded in Western Europe and does not appear to be an economically important pest there.

Very small	Small	Medium	Large	Very large
	X			

13. What is the pest's potential to cause economic, environmental or social impacts in the UK?
Parthenolecanium fletcheri may lower the aesthetic appearance and therefore market value of ornamental plants although the potential losses are likely to be small. There are several closely related species of *Parthenolecanium* already present in Britain which are controlled by a complex of naturally-occurring parasitic wasps, insect predators and entomopathogenic fungi. *Parthenolecanium fletcheri* is likely to be controlled, at least partially, by these same natural enemies already present in the UK, so control measures are unlikely to be necessary

unless severe infestations occur on individual plants. The population found in Britain was already being controlled to some degree by hymenopteran parasitoids.

Very small		Small		Medium		Large		Very large	
	X								

14. What is the pest's potential as a vector of plant pathogens?
Parthenolecanium fletcheri is not known to be a vector.

STAGE 3: PEST RISK MANAGEMENT

15. What are the risk management options for the UK? *(Consider exclusion, eradication, containment, and non-statutory controls; under protection and/or outdoors).*
Exclusion is unlikely as there is no effective control over the main pathway of introduction (on ornamental Cupressaceae imported from Europe). The simplest and most straightforward way of achieving eradication would be destruction of infested plants and precautionary treatment of those remaining. Non-statutory control of scales is usually difficult in practice, but both contact and systemic insecticides could be used. All treatments are most effective if applied when the active first-nymphal instars (or crawlers) are present, but determining the period of egg hatch is difficult and may occur over several weeks.

16. Summary and conclusion of rapid assessment.
This rapid assessment shows:

Risk of entry – unlikely

The main route of entry is likely to be on growing ornamental plants from countries where the scale has been reported. It has, however, it has only been found on one occasion despite the popularity of Cupressaceae in the horticultural trade. Detection of early instars is difficult, particularly when present at low density. The scale may only be observed when mature specimens are present or numbers have built up to such a density that they are already causing conspicuous damage.

Risk of establishment – on Cupreassaceae outdoors is very likely, on protected plants moderately likely.

Fletcher scale has the potential to naturalise widely in England and Wales, wherever its host plants occur, as it has been breeding outdoors in London for seven years and is present in Canada and Scandinavia. The winters of 2009/10 and 2010/11 were the coldest in southern England for decades but the scale survived outdoors. It has been found infesting protected potted plants in Lithuania and there appears to be no reason why it could not establish under protection in the UK.

Rate of spread – very slow naturally, slow in trade

Spread is most likely to be with infested plants in trade.

Economic impact – may have a small impact to indoor ornamentals

It is recorded as a pest of *Taxus* and *Thuja* in N. America, but does not appear to be an economic pest in western Europe. It may have a small impact on the aesthetic quality and market value of Cupreassaceae but there is little data available to quantify the economic implications.

Endangered area – outdoors throughout Britain

Risk management – may be controlled by using the same products used for other coccids

In the absence of phytosanitary measures the scale is likely to continue to enter the UK. It may be controlled using the same products used for other soft scales already present in the UK. The population found in Britain was already being controlled to some degree by hymenopteran parasitoids.

17. Is there a need for a detailed PRA? If yes, select the PRA area (UK or EU) and the PRA scheme (UK or EPPO) to be used.

With the information that we currently have available on the scale it is not of sufficient concern to the UK to justify a more detailed assessment.

No	X				
Yes		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 ?

Yes Statutory action		No Statutory action	X

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IMAGES OF PEST AND SYMPTOMS

Parthenolecanium fletcheri adults on *Thuja*

Parthenolecanium fletcheri close up of adult female on *Thuja*

Parthenolecanium fletcheri adult female with parasitoid emergence holes

Parthenolecanium fletcheri teneral adults with a dorsal longitudinal pale stripe, on *Thuja* © David Shetlar

Parthenolecanium fletcheri first instars massing in the concave ventral surface of an adult female

Parthenolecanium fletcheri first instars

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