

## Rapid assessment of the need for a detailed Pest Risk Analysis for the pink tea mite, *Acaphylla theae*

*Disclaimer: This document provides a rapid assessment of the risks posed by the pest to the UK in order to assist the Plant Health Risk Management Workstream in deciding on the need for a detailed Pest Risk Analysis (PRA). If a detailed PRA is required, it can also be used to help determine whether the PRA area should be the UK or the EU and whether to use the UK or the EPPO PRA scheme. It is not for publication or onwards distribution.*

### **STAGE 1: INITIATION**

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

*Acaphylla theae* (Watt, 1898) (Acarina: Eriophyidae).

The pink tea mite (PTM); the pink tea rust mite or the pink mite. [It does in fact vary in colour from opaque yellow to orange and pink].

#### **Synonymy:**

*Acaphylla steinwedeni* Keifer, 1943, a junior synonym, as indicated by Das and Sengupta (1958) (see Lindquist *et al.*, 1996); *Eriophyes theae* (Watt), *Phyllocoptes theae* (Watt), *Phytoptus theae* Watt (Ecoport, 2001).

There are many references and reports about 'tea mites' in the literature and on the Internet. These are, however, likely to refer to Camellia spider mites such as the southern red spider mite (*Oligonychus ilicis*), the tea red spider mite (*Oligonychus coffeae*) and the two-spotted spider mite (*Tetranychus urticae*). These cause a characteristic bronzing of the leaves - different from the damage caused by the pink tea mite.

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

*Acaphylla theae* (Watt) is not listed in the Annexes of the EC Plant Health Directive 2000/29/EC and is not recommended for regulation as a quarantine pest by EPPO, nor is it on the EPPO Alert List. However, it has been listed by the NPPO for East Africa and Southern Africa, since 2001 (EPPO PQR, 2011).

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

Large numbers of *A. theae* were found on four different cultivars of camellia (*C. japonica*: Dr King and Margaret Davies; *C. x williamsii*: Ruby wedding and Jurys yellow) at a nursery in West Sussex. The mite was formally identified by Fera on 1<sup>st</sup> Sept 2011, but the damage was first seen by the grower some six to 8 weeks previously (during the hot weather in late July 2011). However, the stock originated from another nursery, in Norfolk; plants were supplied as plugs. The pink tea mite was subsequently confirmed as being present on the samples taken from four camellia varieties – cv. Maggi (*C. japonica*), Ruby Wedding, Margaret Davies and Dr King – at the supplying nursery in Norfolk.

## **STAGE 2: RISK ASSESSMENT**

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

As a group, mites are the most serious pests of tea in almost all tea producing countries (Hazarika *et al.*, 2009). *Acaphylla theae* (Watt) – together with another eriophyoid mite, *Calacarus carinatus* (Green) – occur in most of the tea-growing Asian countries, including the former USSR, Georgia, India [Assam, Tamil Nadu, Tripura, West Bengal], Bangladesh, Indonesia [Java, Sumatra], Malaysia, Sri Lanka, Taiwan, Vietnam and China. The pink tea mite has also been recorded in the United States (California), Portugal, Spain (Mansilla Vázquez *et al.*, 2003) and Italy – where it was first detected in Europe in 1980 – probably introduced from the USA (Ferrari *et al.* 1999). There are also reports (of *Acaphylla theae*) in Australia (CSIRO, 2004).

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

Present in a number of glass houses on a nursery in West Sussex, it was brought to the attention of the Plant health service as a result of the appearance of rusty coloured leaves on the underside of *C. japonica* (var. Dr King) plants, causing a puckering of the leaves. There are no previous records of this species occurring in Britain. However, the PTM was found to be present on a Norfolk nursery which supplies plugs and small plants for 'growing-on' to other nurseries and garden centres, by tracing back the original infestation. The PHSI established that this nursery had not imported plant material for 5 or 6 years, was familiar with the symptoms of this pest; and had seen them for many years. This implies that there has been every opportunity for the PTM to spread to other nurseries in the UK.

### **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 main host is tea, *Camellia sinensis* (L.) O. Kuntze (Craemer, 2001). However, Keifer (1943) recorded the species under the name *Acaphylla steinwedeni* in California, USA, on *C. japonica* Hall (1954). The UK findings were made on cultivars of *C. japonica* and *C. x williamsii*. Camellias are popular ornamental plants in the UK and a commercial tea crop is now being grown on an estate in Cornwall (English Tea, 2008).

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

No vector needed.

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

This was the first finding of the pest in the UK and the most likely entry was on imported plant material some years ago. Another eriophyoid mite of tea, the Camellia rust mite, or purple mite, *C. carinatus* – which also attacks both *C. sinensis* and *C. japonica* – was introduced into New Zealand: first recorded in 1958 (Manson, 1959). Keifer (1952) is quoted as stating that "apparently tea and camellia trade mites indiscriminately". It seems likely that the PTM has been introduced to the United States, and appears to have been present in Europe since at least 1980 (Italy) and is now widespread in NE Spain (Galicia) and Portugal.

However, there is little data on the level of trade in camellias. The nursery in Norfolk, where the pest was traced back to in the UK, has not imported any plant material for five or six years. It must have been imported into the UK at some date prior to 2005. The pest is impossible to detect by eye, in the absence of symptoms. Eriophyoid mites such as the PTM

therefore, probably travel undetected most of the time, unless symptoms are obvious. More information on the movement of camellias, within and into the UK and the EU would help establish the probability of future entry.

Camellia plants for planting	Very unlikely	<input type="checkbox"/>	Unlikely	<input type="checkbox"/>	Moderately likely	<input checked="" type="checkbox"/>	Likely	<input type="checkbox"/>	Very likely	<input type="checkbox"/>
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### 9. How likely is the pest to establish outdoors or under protection in the UK?

The fact that the pest has been discovered in glasshouses on two nurseries in the UK suggests that it survives indoors, and that it has done so for some years. It may be widely distributed under glass in the UK, although, to date, symptoms have only been noticed on camellia plants grown under glass at the two infested nurseries. Its ability to establish outdoors in the UK is unknown, but it is probably unlikely, apart perhaps from sheltered locations in highly favourable sites for camellias, such as in Cornwall or the Scilly Isles.

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

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

The pest could spread quickly indoors, given the availability of suitable hosts and probably aided by human transfer. Outside spread would again be aided by human transfer and also wind.

Very slowly	<input type="checkbox"/>	Slowly	<input type="checkbox"/>	Moderate pace	<input checked="" type="checkbox"/>	Quickly	<input type="checkbox"/>	Very Quickly	<input type="checkbox"/>
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### 11. What is the area endangered by the pest?

Camellias (both *C. sinensis* and *C. japonica* as well as other *Camellia* spp.) are grown as ornamentals both outdoors and indoors in the UK. Tea (*C. sinensis*) is both grown and manufactured, on a small scale, in the UK, e.g. on the Tregothnan Estate in Cornwall. Other camellia species, such as *C. japonica*'s, are widely grown indoors, and some cold hardy varieties are grown outdoors in acid soils. There is a so-called camellia growing belt in the USA: from Virginia to Florida, Eastern Texas and over to California. Outside of this belt, only cold hardy camellias can be grown. The UK is probably also largely outside an equivalent belt in Europe, apart from sheltered locations and favourable climates such as Cornwall.

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

The pink tea mite – together with some other eriophyoid mite species such as the purple mite, *Calacarus carinatus* (Green) (Keifer, 1952) – is an important pest of tea (*C. sinensis*) in Asia, causing discoloration of the leaves and debilitation of the plant (resulting in crop losses). It is, however, one of at least five species of eriophyoid mites which have been reported as occurring on tea (*C. sinensis*) in different parts of the world [and possibly more from other camellia species?]

Very small ☐ Small ☐ Medium ☒ Large ☐ Very large ☐

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

The pest causes the distinctive rust/discolouration symptoms on the foliage which renders them unmarketable, although a single application of abamectin (Dynamec) appears to have provided adequate control at growers in the UK. However, there are many other similar pests of camellias, including spider mites, other rust mites, and camellia scale. So, distinguishing the impact of this particular eriophyoid mite is rather difficult, especially since severe outbreaks of the other tea mite (and scale) pests will be treated. Nevertheless, all of these pests will probably be controlled by generic control measures for camellia pests.

Very small ☐ Small ☒ Medium ☐ Large ☐ Very large ☐

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

Nil

**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).**

In areas where the pink tea mite is a pest, such as India, it is only one of an assemblage of species which are controlled using a variety of different insecticides. Tea pest control has relied on almost all groups of insecticides, including neonicotinoids, spinosyns, avermectins, pyrazoles, and oxadizines (Hazarika *et al.*, 2009). Extensive use of synthetic pyrethroids has reportedly resulted in the build-up of tea mites and the use of pyrethroids is now restricted in tea (Muraleedharan, 1992). Acaricides such as pyridaben, accquinocyle, diafenthiuron, etoxazole, spiroticlofen, and bifenzile are now more widely used in tea growing areas, according to Hazarika *et al.* (2009). Of these, however, only etoxazole and spiroticlofen are registered for use on protected ornamentals in the UK (Liason database). There may be other effective chemicals but there is no additional information available for this pest.

In general, eriophyoid mites are relatively straightforward to control in ornamental plants (Graham *et al.*, 2004). Infected leaves and twigs can be pruned off to eliminate adult mites and remove infected tissues. Trees should be pruned in early spring when the tree is dormant and the mites are overwintering. All infected branches should be removed to avoid the possibility of reinfestation.

Heavy infestations can also be controlled with insecticides, but spraying plants will of course, not get rid of the damage produced by the mites. Chemical treatments (see above), horticultural oils (vegetable oil extracts are approved in the UK), and insecticidal soaps may be effective against eriophyoid mites.

In the UK, infected cultivars were sprayed with abamectin (Dynamec) when the damage was first observed at the nursery in Sussex, which appeared to effectively reduce the mite population, compared to another house where no treatment was applied. Treatments have been applied on a non-statutory basis (not under Notice).

The Norfolk nursery was aware that they had a low level mite problem (but were not aware of a new pest) and had a spray program in place to control it. They reportedly have had occasional mite problems for many years and were aware that other growers also have the

same problems, although the identities of the mites causing the problems were not determined. The mites tend to flare up in late August and early September on a few of the more susceptible varieties of camellia.

## 16. Summary and conclusion of rapid assessment.

(Highlight key uncertainties and topics that will require particular emphasis in a detailed PRA)

This rapid assessment shows:

*Risk of entry* Probability of entry is given as moderately likely on imported plant material, but this is highly difficult to assess without more information on the movement of camellias.

*Risk of establishment* Very likely indoors, based on evidence that it has been under protection in the UK for some years. Unknown outdoors, but unlikely to survive harsh winters given its native distribution, although tea can be grown at relatively high altitudes in the tropics.

*Economic impact* For camellia growers, the impact could potentially be high in the absence of any control measures. The impact is, however, expected to be small overall, as control measures for other camellia pests would probably be effective against this species.

*Endangered area* All camellias grown indoors in the UK.

*Risk management* On the basis of existing reports, the PTM is relatively straightforward to control, and as it is one of an assemblage of mites and insect pests on camellias, it will probably be controlled by generic control measures for camellia pests. Although not all such camellia pests occur in the UK, spray programs appear to have successfully controlled the PTM where it has occurred to date.

## 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.

No	X				
Yes		PRA area: UK or EU	UK	PRA scheme: UK or EPPO	

## Conclusions

There are many aspects of the biology of this species – such as the damage caused in its current distribution, its host range, cold hardiness and host plant preferences – which could be investigated in more detail, but given the fact that the pest is now established in at least four European countries, and probably goes un-noticed in others, it is not a high priority. Nevertheless, the PTM is not the only pest of camellias which has appeared in Europe recently; other mite pests of camellias are also spreading, e.g. *Oligonychus coffea* was reported on green house camellias in the Netherlands in August 2011. The significance of this particular pest, the pink tea mite – as an invasive species outside its native range – could be examined therefore, in the context of all potential quarantine pests of camellias. In particular, the extent of the distribution of the pest under glass in the UK (more samples required); the taxonomy and synonymy of the mite; its ability to survive outdoors in the UK; and whether there is any other information concerning the spread and impact of this species on ornamental camellias (e.g. known to acarologists around the world). Given that i) the pest appears to have been present in the UK for a number of years, ii) has already had the opportunity to spread widely; iii) is very likely to be present (undetected) at other camellia growers in the UK; iv) is present in other parts of the EU; and v) is very difficult to detect because of its small size; it would be very difficult to prevent spread of this pest. Our

recommendation is therefore, that statutory action against *Acaphylla theae* is not appropriate.

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

Yes ☐  
Statutory action

No ☒  
Statutory action

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## IMAGES OF PEST AND SYMPTOMS



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