

CSL PEST RISK ANALYSIS FOR *STEPHANITIS TAKEYAI*

STAGE 1: PRA INITIATION

1. What is the name of the pest?

Stephanitis takeyai Drake & Maa, Hemiptera, Tingidae, andromeda lace bug*

Synonym = *Stephanitis globulifera*

2. What is the reason for the PRA?

A PRA was first initiated in January 1998 after eggs and immature specimens were collected from established *Pieris* sp. (Ericaceae) growing outdoors in South East England. The *Pieris* plants that were infested had been bought from the Netherlands between January and June 1996 (Plant Health Service internal reference 36316/2/1). The species is now more widespread and considered established in the UK. This PRA has been updated to summarise the current (2006) situation.

3. What is the PRA area?

This PRA considers the UK as the PRA area since it is established on continental Europe (e.g. in Poland and Germany (Soika & Labanowski, 1999; Hommes *et al.*, 2003)). It has also been reported from Italy and the Netherlands (EPPO, 2004).

STAGE 2: PEST RISK ASSESSMENT

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

Stephanitis takeyai occurs in the UK.

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

Yes. When infested plants at nurseries are treated or if plants are examined and deemed free from *S. takeyai*, they are soon colonised by *S. takeyai* from surrounding gardens.

6. What is the pest's status in the Plant Health Directive (Council Directive 2000/29/EC¹) ?

Not listed.

¹ http://europa.eu.int/eur-lex/en/consleg/pdf/2000/en_2000L0029_do_001.pdf

7. What is the 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
Not listed.

S. takeyai was added to the EPPO Alert List in April 1998 after the UK notified the EPPO secretariat of a limited outbreak. Since it was not possible to eradicate the UK outbreak and infested plants at nurseries were soon reinfested after treatment, the organism is now considered as established in the UK. After taking the experience of the UK into account and considering that sufficient alert had been given, *S. takeyai* was removed from the EPPO Alert List in March 2004 (Barlett, 2004).

8. What are the pests' host plants?

Oligophagous. In Honshu, Japan, *S. takeyai* alternates between its two main hosts, feeding on *Pieris japonica* during the winter and *Lyonia elliptica* during the summer. If *Lyonia elliptica* is scarce, *S. takeyai* may continue to feed on *P. japonica* (Tsukada, 1994b).

Table 1: *Stephanitis takeyai* host plants.

Family	Plant	Common name	Grown as an ornamental in the UK?
Ericaceae	<i>Pieris japonica</i> *	-	Yes (widely)
	<i>Lyonia elliptica</i> *	-	-
	<i>Rhododendron</i> spp.	includes azaleas	Yes (widely)
Illiciaceae	<i>Illicium religiosum</i>	Chinese onise	Yes
Lauraceae	<i>Lindera benzoin</i>	spicebush	Yes
	<i>Cinnamomum camphora</i>	camphor tree	Yes
	<i>Sassafras albidum</i>	sassafras	Yes
Styracaceae	-	storax family	-
Ebenaceae	<i>Diospyros kaki</i>	keg fig	Yes
Pinaceae	<i>Pinus densiflora</i>	Japanese red pine	-
	<i>Pinus thunbergii</i>	Japanese black pine	-

* = favoured hosts. References: Neal (1988), Wheeler (1977), Tsukada (1994c), Lord (1993).

Soika & Labanowski (1999) suggest that plants within the Hippocastanaceae, Magnoliaceae, Rosaceae, Saxifragaceae and Styracaceae are also hosts. In the USA, *S. takeyai* attacks ornamental Ericaceae, especially *Rhododendron* spp., *Pieris japonica* and has spread to feed on *Lindera benzoin* and *Sassafras albidum*. Alternative food-plants, less favourable than *P. japonica*, are *P. floribunda* and the hybrid *P. floribunda* X *japonica* (Dunbar & Beard, 1974).

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

See Table 1. Note especially *Pieris japonica*. This is a medium sized shrub with attractive, glossy foliage and white waxy flowers. It is native to China and Japan and was first cultivated in the UK in about 1870 (Anon., 1992). There are now over 50 cultivated varieties, some of which are widely available from garden centres and nurseries in the UK (Lord, 1993). Other plants at risk in the UK include *Rhododendron* sp. (rhododendrons and azaleas).

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?

Stephanitis takeyai is native to Japan, but has spread to the USA, where in 1967 it was present in Connecticut, New Jersey, Delaware, Rhode Island and Pennsylvania (Anon., 1967). It has also been recorded in West Virginia (Torres-Miller, 1989).

Within Europe it is present in Poland, Germany (Soika & Labanowski, 1999; Hommes *et al.*, 2003), the Netherlands and perhaps Italy (EPPO, 2004).

Table 2: Distribution of *Stephanitis takeyai*

North America:	USA (Connecticut, New Jersey, Delaware, Rhode Island, Pennsylvania, West Virginia).
Central America:	Presumed absent – no records
South America:	Presumed absent – no records
Europe:	Present (DE, IT, NL, PL UK)
Africa:	Presumed absent – no records
Asia:	Japan
Oceania:	Presumed absent – no records

12. How likely is the pest to enter the PRA area²?

very Unlikely Unlikely Moderate likelihood Likely very Likely

There have been many finds of this organism in the UK on propagating material from the Netherlands.

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

very Unlikely Unlikely Moderate likelihood Likely very Likely

Eggs and immature specimens have been collected from established *Pieris* sp. (Ericaceae) plants growing outdoors in South East England.

² Pest entry includes an assessment of the likelihood of transfer to a suitable host (ISPM No. 11, FAO, Rome)

Eggs are laid in the leaves of hosts where they overwinter (Tsukada, 1994a). Of six leaves submitted to CSL, there were 12 to 280 eggs per leaf (DOMERO ref 36316/4/1/1). Nymphs hatch from overwintered eggs at the end of April. In the eastern United States there can be up to four generations per year and adults are found until mid-December (Dunbar & Beard, 1974).

At 25 °C, the egg stage lasts 9 to 14 days with the five nymphal instars taking 12 to 15 days. The duration of development from egg to adult is therefore about 23 days, with the preoviposition and oviposition periods 6.6 and 14.8 days, respectively. Adult females live for up to 44 days and males 63 days, with females laying up to 378 eggs (Dunbar & Beard, 1974).

Details of thermal requirements for development are given in Table 3.

Table 3: Development data for female *Stephanitis takeyai* on *Pieris japonica*.
(source : Tsukada, 1994c)

Life stage	Threshold for development T _o (°C)	Degree days above T _o required for development	Rate of development	r ²
Egg	6.95	226.3	y= 0.004419x - 0.03066	0.95
Nymph	9.60	206.1	y= 0.004853x - 0.04647	0.98

y = rate of development x = temp (°C)

Based on the data in Table 3, three or four generations per year should be possible in the south of England.

Two generations of the pest occur in Poland each year. Eggs are the overwintering stage (Soika & Labanowski, 1999)

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

very Unlikely x Unlikely Moderate likelihood Likely very Likely

This is not a pest of protected crops.

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

very Slowly Slowly Moderate pace x Quickly very Quickly

This organism has been found on a number of occasions at plant nurseries and is transported in horticultural trade (unpublished Plant Health Service data).

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

very Small Small Medium x Large very Large

These bugs cause injury when nymphs and adults suck sap from the lower surface of hosts leaves, causing unsightly mottling and sometimes death of the plants (Dunbar & Beard, 1974). During the 2005-2006 outbreaks, gardeners noticed bronzing of infected *Pieris* plants leaves; symptoms that are typical of feeding damage by lace bugs. Some of the damaged plants were removed and destroyed. PHSI reported infected plants had severe speckling and excretory products on the leaves (Plant Health Service reference 36316/2/1).

In North America, the Tingidae or lace bugs are a very important family causing much damage to woody ornamentals. There are several pest species in the genus *Stephanitis*, for example, *S. pyrioides* on *Rhododendron* spp., *S. pyri* on woody Rosaceae including *Crataegus*, *Malus*, *Prunus* and *Pyrus*; and *S. typica* on a wide range of tropical and subtropical crops (Malumphy pers. comm.).

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

Not a virus vector.

STAGE 3: PEST RISK MANAGEMENT

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

Outdoors: | very Likely | Likely | Moderate likelihood | Unlikely | very Unlikely

Propagating material from other EU MS could carry the organism into the UK undetected.

In protection | very Likely | Likely | Moderate likelihood | Unlikely | very Unlikely

19. How likely are outbreaks to be eradicated?

very Likely | Likely | Moderate likelihood | Unlikely | very Unlikely

Although infested plants can be identified, labelled then pruned, bagged and burned, clean plants are soon infested, presumably from local *S. takeyai* populations close by.

It is worth noting that a related species, *Stephanitis rhododendri* commonly known as the Rhododendron bug, was introduced at the beginning of the Twentieth Century and originally became a common and widespread pest of *Rhododendron* in England, Wales and southern Scotland. Today, however, it is less common and is only a local pest (C. Malumphy, pers. comm.)

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

Despite efforts to eradicate and contain this organism, no measures appear practical.

Further work that would reduce uncertainties

Area of PRA	Uncertainties	Further work that would reduce uncertainty
Taxonomy		
Pathway		
Distribution		
Establishment		
Spread		
Impact		
Management		

21. Summary

Stephanitis takeyai is native to Japan and has spread to the USA. It has also spread to Europe and there have been many finds by PHSI on ornamental propagating material from the EU.

S. takeyai appears to have been present in at least one public garden in South East England for at least 10 years (since 1996) and has been found at approximately 30 plant centres across England since 1998. It has a limited number of host plants in the UK although hosts are ornamentals that are widely grown and may be of high value.

Despite efforts to eradicate and contain this organism, measures taken have not proved a success. *Stephanitis takeyai* could now be considered as naturalised (established) in the UK.

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