

Rapid Assessment of the need for a detailed Pest Risk Analysis for *Crenidorsum aroidephagus*

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?

Crenidorsum aroidephagus Martin & Aguiar (Hemiptera: Aleyrodidae)

Aroid whitefly (EPPO PQR).

Crenidorsum includes 21 described species (Martin, 2005)

Synonymy:

None. Species first described in 2001 (Martin *et al.*, 2001). Before this it was known as *Crenidorsum sp.*

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

Crenidorsum aroidephagus is not listed in the EC Plant Health Directive and does not appear in the EPPO lists of quarantine pests or on their alert list. It is a quarantine pest in Japan (Revisions of the Enforcement Ordinance of the Plant Protection Law G/SPS/N, 2011) and listed as an exotic regulated pest in Australia (Walker, 2008).

3. What is the reason for the Rapid Assessment?

The pest has been intercepted by the PHSI on six occasions since 2006, with statutory action being taken twice. It is found in Central and South America and also southern USA, and appears to have spread in plant trade; recorded in Hawaii (since 1978), Maderia (since 1997), Germany (since 2000) and France (since 2003) (Martin *et al.*, 2001; Streito, 2004). UK interceptions were made on plants from Malaysia, Mauritius and Singapore, which are all first records for these countries and it is suspected it may be more widespread than reported in the literature as the puparia are translucent and difficult to detect. The rapid assessment is being carried out to determine whether this pest should be notifiable and if statutory action against it should continue.

STAGE 2: RISK ASSESSMENT

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

Crenidorsum aroidephagus is native to the Neotropical region, but was only described in 2001 after reports in Germany (Martin *et al.*, 2001). The German findings date from 2000, when it was found at the Berlin Botanic Gardens. It has since been eradicated there, but has also been found under protection in a Potsdam park (Biosphaerenreservat), near Berlin. It was found in France in the Botanic Garden of Orleans between 2003 and 2005. Its current status here is unknown.

In the UK it has been intercepted on six occasions on plant material imported from Malaysia, Mauritius and Singapore, all first records from these countries. There is an unconfirmed

report of a US port interception on plant material from Australia. However, it is listed as an exotic pest in Australia (Evans, 2007; Walker 2008).

North America: Mexico; USA (California; Florida)

Central America: Belize; Costa Rica; Guatemala; Panama

South America: Brazil; Columbia; Venezuela

Caribbean: Barbados; Cuba; Dominica; Dominican Republic; Puerto Rico; Trinidad and Tobago.

Europe: France – present under protected conditions; Germany – present under protected conditions; Madeira.

Africa: absent.

Middle East: absent.

Asia: India. Interceptions in UK on plant material from Malaysia, Mauritius and Singapore.

Oceania: American Samoa; Fiji; Philippines; USA (Hawaii).

Martin *et al.*, 2001; Streito, 2004; Evans, 2007

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

This pest has been intercepted by the PHSI on six occasions. The first occasion was in 2006 on *Anthurium* leaves imported from Mauritius for an exhibition in Chelsea, with foliage either being destroyed after the show, or made into bouquets for public sale, from which there was considered a very low risk to growing crops. The second sample was on *Alocasia* leaves from Malaysia. No action was taken as the puparia were dead. In September 2011, it was found for the first time on *Syngonium* from Singapore, together with *Bemisia tabaci*, with three further samples being found in October from the same source. This pest is not considered to be established or transient, but the early instars of the whitefly are translucent and almost impossible to see so it may be entering the UK (and other EU member states) more often than recorded.

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

C. aroidephagus feeds exclusively on the plant family Araceae. This plant family includes many popular, economically important, ornamental plants grown for their attractive foliage, including species in the genera: *Anthurium*, *Culcasia*, *Epipremnum*, *Monstera*, *Nephtytis*, *Philodendron*, *Rhaphidophora*, *Spathiphyllum*, *Syngonium* and *Xanthosoma*. Some of these are common household plants in the UK (Martin *et al.*, 2001; Evans, 2007).

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

Crenidorsum aroidephagus 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 enter¹ the UK? (By pathway):

Pale puparia, which do not secrete visible waxy material and are usually scattered over the underside of leaves (Martin *et al.*, 2001) – means that this pest is often difficult to detect. Recent findings in the UK have been made on plant material sent in for examination of another suspected pest. The host family, Araceae, comprises many common household ornamental plants and imports of both cut flowers / foliage and plants for planting may provide a pathway. However, transfer to growing hosts from cut flowers is unlikely, except in the confinement of private households. It is the sale of plants for planting that is most likely to allow the pest to transfer to other hosts.

Pathway 1 Cut flowers

¹ Entry includes transfer to a suitable host

Very unlikely Unlikely Moderately likely Likely Very likely

Pathway 2. Plants for planting

Very unlikely Unlikely Moderately likely Likely Very likely

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

Very few of the known host genera are grown outdoors in the UK, being mostly unable to survive harsh winters. *Zantedeschia* is one exception (BSBI, 2011), but is grown mostly in sheltered urban areas.

They are mainly kept as household ornamental plants and the pest is therefore most likely to find hosts under protection.

The biology of the pest i.e. its optimum conditions for development (23.4°C, 70% humidity and light/dark ratio of 14:10), suggests that areas most at risk would be botanical collections with ‘tropical glasshouses’, their optimum humidity being higher than would normally be found in domestic situations (Peter Baufield, pers. comm., 2011).

Outdoors	Very unlikely	<input checked="" type="checkbox"/>	Unlikely	<input 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 checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

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

Generally, adult whiteflies are poor fliers and have a low natural dispersal potential. Most developmental stages are sessile and remain firmly attached to the host plant.

Spread is likely to be in trade.

Natural dispersal

Very slowly Slowly Moderate pace Quickly Very Quickly

Trade

Very slowly Slowly Moderate pace Quickly Very Quickly

11. What is the area endangered by the pest?

Ornamental trade in plants of this family (Araceae). Plants in botanic gardens, particularly ‘tropical houses’.

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

In native areas puparia of this species tend to occur sparsely on the underside of its hosts leaves and are difficult to find. In areas of new introductions larger populations have been found until it is brought under control (Martin, 2005). Minor problem for growers of ornamental-foilage plants (Martin *et al.*, 2001), causing chlorotic spots and localised necrosis, as well as reducing plant vigour. As with other whitefly, honeydew is deposited by the insects and this serves as a medium for the growth of sooty moulds, which reduces the photosynthetic area and lowers the value of ornamental plants. Reports from laboratory studies in Germany suggest that under optimal conditions (23.4°C, 70% humidity and light/dark ratio of 14:10) this pest can damage Araceae, but also note that even then the

species abundance builds up slowly and that such conditions are not present in botanic gardens in western Europe, especially in winter (Peter Baufield, pers. comm., 2011).

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 data from Germany suggests that despite the likelihood of entry of this pest undetected it is very unlikely to cause significant impact.

Very small Small Medium Large Very large

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

C. aroidephagus is not known to be a virus vector, though should be noted that very little is known about its biology.

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).

From the paucity of literature that exists on this organism, no specific management options are available.

Exclusion is probably impossible without a complete ban on known hosts as the pest is very difficult to detect and it is unclear how often it has entered the UK without interception. Many of the UK findings have been made on plant material initially intercepted for the presence of another pest.

Several puparia collected in Maderia have been found to be parasitised by *Cales noacki* or *Encarsia hispida* (Martin et al., 2001). However work in Germany did not find a suitable biological control option (EPPO Reporting Service, 2001; Peter Baufield, pers. comm., 2011). Eradication at one location in Germany was achieved through the removal of all infested plant material, although this was not carried out solely due to the presence of this pest.

Insecticides currently available for the control of other whitefly pest species in the UK are expected to be effective against *C. aroidephagus*. Similarly, commonly used biological control agents (such as *Encarsia formosa*), which are effective against other common whitefly pests, may also be effective against this species (Malumphy & Matthews, 2006; Evans, 2007).

16. Summary and conclusion of rapid assessment.

This rapid assessment shows:

Risk of entry – unlikely (on cut flowers), likely (on plants for planting)

Risk of establishment – in protected ornamentals is likely

It is very unlikely to naturalise and overwinter outdoors in Britain but could establish on indoor plantings where conditions are most favourable, e.g. 'tropical houses'.

Rate of spread - moderate

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

Economic impact – very small impact to indoor ornamentals

The data from Germany suggests that despite the likelihood of entry of this pest undetected it is very unlikely to cause significant impact.

Endangered area – protected ornamentals and botanic gardens, particularly ‘tropical houses’.

Risk management - Insecticides currently available for the control of whitefly in the UK are expected to be effective against C. aroidephagus.

IMAGES OF PEST AND SYMPTOMS

Fig 1. Fera, 2011: *C. aroidephagus* on *Syngonium podophyllum*



Fig 2: *C. aroidephagus* damage on Araceae. Courtesy of P. Baufield, JKI, Germany



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 this whitefly 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

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Author (s): Helen Anderson & Chris Malumphy

References

BSBI (2011) Botanical society of the British Isles: Vascular plant atlas update project. Available online at: <http://www.bsbimaps.org.uk/atlas/>

EPPO PQR (2011) EPPO Plant Quarantine Data Retrieval System (version 5.0). Available to download at: <http://www.eppo.org/DATABASES/pqr/pqr.htm>

EPPO Reporting Service (2001) Outbreak of a potential pest in Germany: *Crenidorsum aroidephagus*: 2001/133. Available online at: <http://archives.eppo.org/EPPOreporting/2001/Rse-0107.pdf>

Evans, G.A. (2007) *The whiteflies (Hemiptera: Aleyrodidae) of the world and their host plants and natural enemies*. USDA/APHIS

Martin, J.H., Aguiar, A.M.F. & Baufeld, P. (2001) *Crenidorsum aroidephagus* Martin & Aguiar sp. nov. (Sternorrhyncha: Aleyrodidae), a New World whitefly species now colonising cultivated Araceae in Europe, Macaronesia and The Pacific Region. *ZOOTAXA*, 4, 1-8.

Martin, J.H. (2005). Whiteflies of Belize (Hemiptera: Aleyrodidae) Part 2—a review of the subfamily Aleyrodinae Westwood. *Zootaxa* 1098: 1–116.

Malumphy, C & Matthews, L (2006) Plant Pest Notice: Anthurium whitefly *Crenidorsum aroidephagus*, Central Science Laboratory.

Revisions of the Enforcement Ordinance of the Plant Protection Law G/SPS/N (2011) Annexed Table 1: Injurious animals. Available online at: https://www.ippc.int/file_uploaded/1309849796_qp_list.pdf

Streito, J.C. (2004) Discovery in France of *Crenidorsum aroidephagus* Martin & Aguiar (Hemiptera, Aleyrodidae). *Nouvelle Revue d'Entomologie*, 21(4), 375-382.

Walker, K. (2008) New World whitefly (*Crenidorsum aroidephagus*) Updated on 4/8/2008 11:50:18 AM Available online: PaDIL - <http://www.padil.gov.au>.