

Rapid Assessment of the need for a detailed Pest Risk Analysis for *Diaphania perspectalis* (Walker) box tree caterpillar

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?

Diaphania perspectalis (Walker) (Lepidoptera: Crambidae) box tree caterpillar

The synonyms *Glyphodes perspectalis* (Walker) and *Neoglyphodes perspectalis* (Walker) are still used in Europe (Korycinska, pers .comm., 23/06/2010).

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

- *Diaphania perspectalis* is not listed in the EC Plant Health Directive.
- *D. perspectalis* was added to the EPPO Alert List in 2007 (EPPO Reporting Service 2007 / 215).

3. What is the reason for the rapid assessment?

The Fera Plant Health Risk Management Work-stream requested a rapid assessment on June 22nd 2010 to help decide on a response to this pest, including whether a UK or EU wide PRA is required.

STAGE 2: RISK ASSESSMENT

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

Diaphania perspectalis originates in East Asia and is reported in China, South Korea and Japan. The pest was discovered in southeast Germany in 2007 but is thought to have been there for at least two years before that. Larval infestations have also been reported from the Netherlands, Switzerland, France and Austria. In September 2008 adult moths were found at two locations in the south of England. Damage to box was noted in Surrey in 2009.

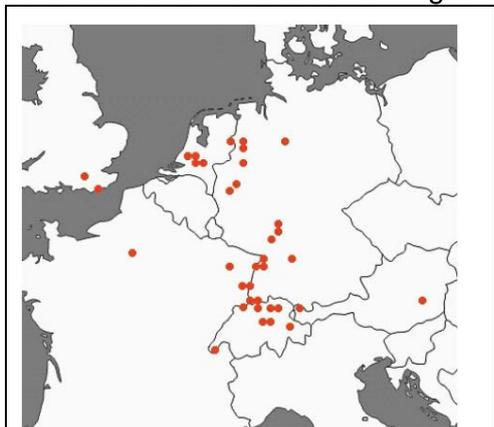


Fig 1: European locations where *Diaphania perspectalis* has been recorded (up to 2009, from van der Straten & Muus, 2010).

5. Is the pest established or transient, or suspected to be established/transient in the UK? (Include information on interceptions and outbreaks here).

In August / September 2009, *Buxus* spp. plants were inspected by PHSI in nurseries in England and Wales during inspections of plant passporting premises. *Diaphania perspectalis* was found at one nursery in Surrey. In the UK, *D. perspectalis* is suspected to be established. There is one known breeding site in Surrey with larvae and pupae, currently under official control. Fera has records of a total of five adults caught in amateur light traps over two years: in 2008, Surrey and Sussex (2 moths on consecutive nights); in 2009: East Kent and Essex.

Adult *Diaphania perspectalis* are quite large, very pretty, and with a relatively high profile amongst amateur lepidopterists. Fera assumes we are aware of all published UK findings. It is not known where the adult findings came from, most likely from import, migration, or breeding.

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

In Europe, only box plants (*Buxus* spp.) such as *B. microphylla*, *B. microphylla* var. *insularis*, *B. sempervirens* and *B. sinica* are reported as hosts. However, other hosts such as *Ilex pupurea* (purple-leaved holly), *Euonymus japonicas* and *E. alata* are also recorded as hosts in Asia. All species reported as hosts in Europe and Asia are assumed to be of some importance in the UK as ornamental plants. Box has been widely cultivated since Roman times as hedging in gardens and around woodlands. *B. sempervirens* is recorded as widely distributed in the UK, particularly England and Wales (BSBI, 2010) although only rarely as a native tree on chalk sites e.g. at Box Hill Surrey, where it grows within a Site of Special Scientific Interest.

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

No vector is required.

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

Pathway 1: Host plants of *D. perspectalis* imported from areas where the pest is present.

Very unlikely Unlikely Moderately likely Likely Very likely

Pathway 2: As a hitchhiker on other commodities (non- plants). There is some suggestion that *D. perspectalis* may have been introduced into Germany as a hitchhiker.

Very unlikely Unlikely Moderately likely Likely Very likely

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

In China there are two or three generations per year. Two or three generations are thought to occur in the Netherlands. Three are possible in southern Germany. It is assumed at least one or two generations per year would be possible outdoors in UK where hosts are generally grown outdoors.

Outdoors: Very unlikely Unlikely Moderately likely Likely Very likely

Under protection: N/A - Hosts grow outdoors

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

Adults can fly. Data from Germany suggests natural spread occurs at 5 to 10km per year. Trade of infested *Buxus* plants or parts of plants would disseminate the pest quickly over long distances. Also, *Buxus* is fairly widely planted (gardens) so natural spread is likely to be inexorable. These are also medium sized moths - wingspan 4 cm - so distances and flight capabilities may be quite high, though this is not known.

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"/>
Man assisted	Very slowly <input type="checkbox"/>	Slowly <input type="checkbox"/>	Moderate pace <input type="checkbox"/>	Quickly <input type="checkbox"/>	Very Quickly <input checked="" type="checkbox"/>

11. What is the area endangered by the pest?

In the UK south-east England is perhaps the most endangered area due to the higher summer temperatures and greater density of box plants.

More generally one could consider all areas in Europe and wider EPPO region where hosts are grown as being at risk.

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

Larvae feed on leaves and shoots and severe infestations can lead to almost complete defoliation of the plants. In Germany *D. perspectalis* is apparently able to cause severe defoliation to *Buxus* plants. Van der Straten & Muus (2010) reported that larvae can completely defoliate a box tree and since the larvae are active during the entire growing season, plants get no chance to recover and will eventually die. In China, where natural enemies are assumed to be present, *D. perspectalis* is still considered to be a pest worthy of active control.

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

If no intervention is made, impacts similar to those reported from Germany can be expected in the UK.

Very small <input type="checkbox"/>	Small <input type="checkbox"/>	Medium <input checked="" type="checkbox"/>	Large <input type="checkbox"/>	Very Large <input type="checkbox"/>
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14. What is the pest’s potential as a vector of plant pathogens?

Diaphania perspectalis is not reported as a vector of pathogens.

STAGE 3: PEST RISK MANAGEMENT

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

Buxus spp. do not require a plant passport when being moved around within the EU and therefore without a Protected Zone this pest is likely to be introduced via trade. Declaring a Protected Zone would reduce the risk of future introductions, but may not be justified because it is possible that the pest can reach the UK naturally from continental Europe. Advice on control is available in the plant pest factsheet and has been copied below.

..‘on commercial nurseries, pyrethroid insecticides that have contact and some residual toxicity, such as products containing deltamethrin or cypermethrin, should be effective. An alternative is diflubenzuron, which is currently sold as Dimilin Flo. This is an insect growth regulator and is most effective if applied when caterpillars are very small, ideally just after egg hatch.

One biological control option is the entomopathogenic bacteria, *Bacillus thuringiensis* var. *kurstaki* (sold as Dipel DF). This pathogen is effective when ingested by caterpillars. For box plants in gardens, insecticides containing lambda-cyhalothrin, deltamethrin or pyrethrins should be effective against *D. perspectalis*.

Physical control, by picking off eggs or caterpillars, could also be considered depending on the situation. Pesticide approvals are constantly changing and current approvals are listed on The Chemicals Regulation Directorate (CRD) website. The conditions listed on pesticide labels should be followed.’

In addition to the advice in the plant pest factsheet, Nemolt (teflubenzuron) is another insect growth regulator which can be used against caterpillars on ornamental plants.

16. Summary and conclusion of the rapid assessment.

Recognising that caveats accompany a rapid assessment, this rapid assessment notes that *Diaphania perspectalis*, an Asian lepidopteran pest of *Buxus*, has recently been introduced into Central Europe. From being reported in one German city, in under five years it has either spread or been introduced multiple times so that it now occurs more widely across Europe, including the UK. It is firmly established in Europe and if it has not already established in the UK, it is expected to in the near future. Without interventions, impacts are likely to be seen in *Buxus* plants across Europe.

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
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Diaphania perspectalis is now distributed across central Europe and it is probably too late to apply effective phytosanitary measures. UK stakeholders should be alerted to the new pest for example using the plant pest factsheet by Korycinska & Eyre (2009) and non-statutory control advice could be given to reduce impacts.

Yes		PRA area: UK or EU		PRA scheme: UK or EPPO	
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18. Further Work

If further efforts were required to clarify areas of uncertainty it may prove fruitful to contact German, Dutch, Swiss, French and Austrian NPPOs enquiring about the current status of *D. perspectalis* in their countries, especially with respect to impacts being caused.

REFERENCES

- BSBI (2010) Botanical Society of the British Isles. Available online at: <http://www.bsbimaps.org.uk/atlas/>
- EPPO (2007) Incursion of *Diaphania perspectalis* in Germany and addition to the EPPO Alert List. *EPPO Reporting Service* 2007/215
- Korycinska, A & Eyre, D. (2009) Box tree caterpillar *Diaphania perspectalis* Plant pest factsheet. The Food and Environment Research Agency (Fera). October 2009 Available at: <http://www.fera.defra.gov.uk/plants/plantHealth/pestsDiseases/documents/boxTreeCaterpillar.pdf>
- van der Straten, M.J. & Muus, T.S.T. (2010) The box tree pyralid, *Glyphodes perspectalis* (Lepidoptera: Crambidae), an invasive alien moth ruining box trees *Proceedings of the Netherlands Entomological Society* **21**, 106-112 <http://www.nev.nl/sete/sete-2010/107-112-vdStratenMuus-2010.pdf>

IMAGES OF PEST AND SYMPTOMS



Figure 1. Late instar *Diaphania perspectalis* larva on a box plant leaf. It grows to a maximum length of 4 cm.
© Picture by W. Schön from www.schmetterling-raupe.de



Figure 2. Adult *Diaphania perspectalis* with the typical brown and semi-transparent white wing pattern. The moth has a wingspan of about 4 cm.
© Picture by W. Schön from www.schmetterling-raupe.de



Figure 3. A box plant affected by *Diaphania perspectalis* larvae, showing skeletonised leaves and dieback.
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