



Department  
for Environment  
Food & Rural Affairs

# Plant Pest Factsheet

## Pest and Disease Threats to Herbaceous and Ornamental Crops



**Figure 1.** Herbaceous / ornamental plants grown under protection at a commercial nursery in England © John Adlam (Dove Associates)

### Background

Given the variety of species produced by nurseries specialising in herbaceous and ornamental plants, it is unsurprising that the plants can be affected by an equally wide range of pests and diseases, many of them individually able to attack a number of different crops. In addition to common and well-known problems there are significant risks from a number of pest and disease organisms that are not present or established in the UK. In many cases these organisms are a direct threat to the herbaceous or ornamental crops themselves. In a few cases it is a different crop (perhaps an edible such as tomatoes), or even the wider environment, that is most at risk, but imported herbaceous or ornamental

plant material is one route by which the organism could enter the UK. This factsheet provides summary information for herbaceous and ornamental growers on some of the most important threats; for several of these there are more detailed factsheets available on the plant health portal – link available at the end of the document.

## Pests

### Whiteflies

The **tobacco whitefly (*Bemisia tabaci*)** (Figs. 2-3) has a huge host range, affecting over 800 plant species in more than 90 families. It is found in many European countries, but is absent from the UK, which has Protected Zone status. It can cause direct feeding damage, with additional problems due to honeydew and associated sooty mould growth. It can also transmit a wide range of viruses, many of which are not present in the UK. The threat from these viruses is probably greatest to tomato and cucumber production, but some can affect ornamental crops.



**Figure 2.** Tobacco whitefly pupae on *Crossandra* ©  
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**Figure 3.** Tobacco whitefly adult on poinsettia ©  
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The **banded-winged whitefly (*Trialeurodes abutiloneus*)** (Figs. 4-5) is native to the Americas and can affect about 140 species in more than 30 families. Important hosts include *Aster*, *Euphorbia*, *Fuchsia*, *Solidago* and *Veronica*. It causes similar problems (feeding damage, honeydew contamination, virus transmission) to tobacco whitefly. Neither of these whiteflies can survive outdoors during most UK winters, but they pose a significant threat to protected crops.

The non-indigenous whiteflies can be distinguished from the ubiquitous glasshouse whitefly (*Trialeurodes vaporariorum*) at various stages in their life-cycle. Adult banded-winged whiteflies have zigzag markings on the wings (Fig. 5) which are absent in glasshouse and tobacco whitefly (Fig. 3). The pupae of tobacco whitefly are usually yellow (Fig. 2), whereas those of glasshouse and banded-wing whiteflies are cream, and the latter species may have dark markings (Fig. 4). See the factsheets on individual species for more details. Laboratory analysis is required to identify the species.



**Figure 4.** Banded-winged whitefly pupa on *Hibiscus* © Crown copyright



**Figure 5.** Banded-winged whitefly pupae on *Hibiscus* © Crown copyright

## Leaf-mining flies

The fly genus *Liriomyza* consists of hundreds of species, most of which are leaf-miners. Many have restricted host ranges, and there are 41 species found in the UK. However, a number of species have much larger host ranges, are not present in the UK, and are listed as quarantine organisms. These are *L. huidobrensis* (serpentine leaf miner), *L. sativae* (vegetable leaf miner) and *L. trifolii* (American serpentine leaf miner). A fourth species, *L. bryoniae* (tomato leaf miner) is an established pest of tomatoes in England, but is not present in Northern Ireland or the Republic of Ireland.

Ornamental plant hosts of one or more of these leaf miners include *Alstroemeria*, *Aster*, *Calendula*, *Centaurea*, *Chrysanthemum*, *Dahlia*, *Gazania*, *Gypsophila*, *Lathyrus*, *Malva*, *Oxalis*, *Petunia*, *Phlox*, *Verbena* and *Zinnia*. Some damage is caused by the feeding and egg-laying puncture marks made by the adult flies, but the mines produced by the larvae (maggots) are extremely disfiguring and in severe outbreaks can lead to total crop loss. Crops grown under protection are most at risk, although outdoor crops could also be attacked during the summer months.



**Figure 6.** *Liriomyza huidobrensis* larval mines on chrysanthemum © Crown copyright



**Figure 7.** Adult *Liriomyza huidobrensis* caught on a yellow sticky trap; the red arrow indicates the yellow spot characteristic of *Liriomyza* species © Crown copyright

Quarantine *Lyriomyza* species are frequently intercepted on material entering the UK. Adult flies are 2-3mm long, with a characteristic yellow spot on their back (Fig. 7), but they are not easy to distinguish from several native species. The leaf mines (Fig. 6) tend to have a 'dirty' appearance, with trails of insect frass within the mine. Laboratory analysis is required to identify the species of leaf miner present.

## Thrips

The **melon thrips (*Thrips palmi*)** (Fig. 8) is thought to have originated in southern Asia but is now established in many parts of the world. It is not present in the UK or the rest of Europe, although it is intercepted regularly on plant material arriving from overseas and a single outbreak in England in 2000 was eradicated. It poses a significant threat to the production of protected crops in the UK but is unlikely to survive outdoors.



**Figure 8.** Adult melon thrips *Thrips palmi* © Crown copyright



**Figure 9.** Thrips feeding damage © Crown copyright

*Thrips palmi* has been recorded on over 200 plants from more than 30 plant families. The commercial crops damaged most frequently are members of the Cucurbitaceae or Solanaceae, but the pest poses a threat to a wider range of crops, including herbaceous and ornamental species. Common ornamental hosts include *Chrysanthemum*, *Cyclamen*, *Helianthus* and *Nicotiana*. Much of the damage results from direct feeding by the thrips larvae and adults. Symptoms include stunting, distortion and silvery or bronze discolouration of leaves (Fig. 9), flowers or fruit. Both the feeding damage caused and the pest itself cannot be readily distinguished from a number of other thrips species without laboratory examination. An additional threat posed in the UK by *T. palmi* is its ability to transmit a number of non-indigenous viruses.

## Moths

The **banana moth (*Opogona sacchari*)** (Fig. 10) originates in humid regions of Africa. It cannot survive outdoors in temperate regions, but there have been occasional outbreaks in glasshouses in the UK. Statutory action is taken to contain such outbreaks, and is also taken against findings on planting material.



**Figure 10.** Banana moth caterpillar © Crown copyright



**Figure 11.** Mediterranean climbing cutworm © Crown copyright

The adult moth is nocturnal, yellowish-brown, approximately 11mm long with long antennae that point forward when the insect is at rest. The caterpillars are up to 2-3cm long, white with reddish-brown heads. They cause damage by burrowing into stems and tubers (occasionally petioles or leaves) of woody or fleshy plants. Their tunnelling activity can eventually lead to wilting foliage or complete collapse of the plant; bore-holes and frass may also be visible. Ornamental plants affected include bamboos, *Begonia*, bromeliads, cacti and succulents, *Cordyline*, a range of palm species, and *Yucca*.

A number of **moths of the genus *Spodoptera*** are quarantine pests posing a significant threat to a wide range of crops grown under protection in the UK. The species intercepted most commonly on material entering the UK is *Spodoptera littoralis* (Mediterranean climbing cutworm) (Fig. 11), but other threats include *S. eridania* (southern armyworm), *S. exempta* (black armyworm), *S. frugiperda* (fall armyworm) and *S. litura* (tobacco cutworm).

Both the adult *Spodoptera* moths and the caterpillars (cutworms) are nocturnal. During the day the caterpillars can be found at the base of plants or under pots. Young caterpillars cause 'windowing' of the leaves, whereas older caterpillars can completely defoliate plants if present in large numbers. Ornamental hosts (the complete list is enormous) of one or more *Spodoptera* species include *Anemone*, *Canna*, *Chrysanthemum*, *Dahlia*, *Dianthus*, *Euphorbia*, *Gaillardia*, *Lathyrus* and *Salvia*.

## Mites

The **Lewis spider mite (*Eotetranychus lewisii*)** (Fig. 12) has been recorded on 69 plant species from 26 families. It is not present in the UK, although there was an outbreak on poinsettias in 2014 that was eradicated. Protected crops are again at risk, including edible crops such as cucumbers, peppers and strawberries. Ornamental hosts include *Abutilon*, *Ceanothus*, *Cleome*, *Euphorbia*, *Hydrangea* and *Monarda*.

Symptoms produced are similar to those caused by other spider mites, such as stunting and reduction in vigour, speckling, yellowing, distortion and abscission of leaves and, at high mite numbers, the production of webbing (Fig. 12). Laboratory examination is

required to distinguish Lewis mites from other species such as the glasshouse red spider mite (*Tetranychus urticae*).



Figure 12. Lewis spider mite feeding damage © Crown copyright



Figure 13. Gall midge larvae in an orchid flower © Crown copyright

## Gall Midges

The tiny, white or yellowish larvae of these midges cause significant damage by feeding within developing flower buds, resulting in distortion or abortion of the flowers. Those currently of concern include:

- ***Contarinia maculipennis*** (Fig. 13), a tropical species thought to originate in Asia and posing a threat to protected crops. It can affect plants from eight families, but the main risk is to *Dendrobium* orchids and *Hibiscus* – there have been a number of interceptions on cut flowers of *Dendrobium* arriving from Thailand.
- ***Contarinia jongi*** affects the flowers of *Alstroemeria* species. First described in Australia in 2013, a case was confirmed in the Netherlands in 2016.
- ***Prodiplosis longifila*** is found in parts of North and South America. The larvae of this midge can affect leaves and developing fruit, in addition to flowers. The greatest risk is probably to crops such as tomatoes, peppers and asparagus, but growers of ornamentals should be aware as it can also affect plants such as *Cynara* and *Tagetes*.
- ***Enigmadiplosis agapanthi*** is a previously unknown midge first found in southern England in 2014. Damage is confined to flowers of *Agapanthus* but can be very extensive. Statutory action is no longer taken against this midge as it is established in southern England.

## Nematodes

The **apple root knot nematode (*Meloidogyne mali*)** originated in Japan and has been found in France, Italy and the Netherlands. It is predominantly a threat to trees and shrubs (particularly apple, elm and mulberry), reducing vigour by forming numerous bead-like galls on the root system. It has, however, been found colonising the roots of herbaceous and ornamental hosts including *Dryopteris*, *Geranium*, *Geum* and *Impatiens* (mainly wild

species growing in the vicinity of infested trees, but infested ornamental specimens of *Geum* were also found in the Netherlands). Soil-grown plants from affected areas would therefore be a potential risk by carrying the nematode in their roots (although it is unclear whether the nematode produces visible galls on the roots of the hosts).

## Diseases

### *Xylella fastidiosa*

This bacterial pathogen is a major concern, due to its extensive host range and potential threats to both the horticultural industry and the wider environment. The bacterium invades the water-conducting (xylem) vessels of affected plants. It is transmitted by a number of leafhoppers and planthoppers. Vector species are present in the UK (e.g. meadow spittlebug, *Philaenus spumarius*) and could spread *X.fastidiosa*, should it arrive.

The bacterium exists as a number of different subspecies (subsp.), some of which are a greater threat to the UK than others. *X. fastidiosa* subsp. *multiplex* is of the greatest concern, given its large host range and likely ability to thrive under UK conditions. However, the arrival of any strain in the UK could have serious consequences in terms of eradication measures.

There have been a number of cases of *Xylella* in the EU, in countries such as France, Germany, Italy and Spain. The greatest perceived threats from the pathogen are to woody plants such as grapevine, olive, citrus, *Prunus* species, oak, elm, plane, maple, and many other trees and shrubs. The symptoms caused are very variable, but leaf scorch (Fig. 14) and dieback is common. Unfortunately, many of the symptoms are very similar to those produced by other stress factors such as drought or nutrient problems, and there is the added complication of symptomless infection in some hosts.



**Figure 14.** A common symptom of *Xylella fastidiosa* looks like leaf scorch © John Hartman, University of Kentucky (Bugwood/ Forestry Images images)

Whilst woody plants are currently thought to be at greatest risk, growers of herbaceous and ornamental crops still need to be vigilant. The host range of the bacterium is huge, and some of the known hosts (there are many others) likely to be produced by growers are *Artemisia*, *Carex*, *Erodium*, *Euphorbia*, *Geranium*, *Helianthus*, *Hemerocallis*, *Lavandula*, *Lupinus*, *Polygonum*, *Rosmarinus*, *Salvia*, *Solidago*, *Veronica* and many members of the grass family. Unfortunately, there is currently little information available on the symptoms produced on most of these hosts, but growers should be alert for any unusual foliar symptoms developing, particularly on plants with an import connection.

## ***Alstroemeria necrotic streak virus (ANSV)***

This virus, absent from the UK, is a member of the thrips-transmitted *Tospovirus* genus. It was first reported from Columbia in 2010, causing necrotic streaks in the leaves of *Alstroemeria* plants. It has since been recorded on chrysanthemum, pepper and tomato (causing symptoms such as necrotic stem lesions, and necrotic lesions, rings and veins on leaves) and the potential host range could be larger. The western flower thrips (*Frankliniella occidentalis*), found commonly on protected crops in the UK, is a known vector of the virus.

## **Advisory Information**

Suspected outbreaks of any of these organisms (or any other non-native plant pest) should be reported to the relevant authority:

For **England and Wales**, contact your local **APHA Plant Health and Seeds Inspector** or the **PHSI Headquarters**, Sand Hutton, York. Tel: 01904 405138

Email: [planthealth.info@apha.gsi.gov.uk](mailto:planthealth.info@apha.gsi.gov.uk)

For **Scotland**, contact the **Scottish Government's Horticulture and Marketing Unit**:

Email: [hort.marketing@gov.scot](mailto:hort.marketing@gov.scot)

For **Northern Ireland**, contact the **DAERA Plant Health Inspection Branch**:

Tel: 0300 200 7847 Email: [planthealth@daera-ni.gov.uk](mailto:planthealth@daera-ni.gov.uk)

For additional information on UK Plant Health please see:

<https://secure.fera.defra.gov.uk/phiw/riskRegister/>

<https://planthealthportal.defra.gov.uk/>

<https://www.gov.uk/plant-health-controls>

<http://www.gov.scot/Topics/farmingrural/Agriculture/plant/PlantHealth/PlantDiseases>

<https://www.daera-ni.gov.uk>

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