



**DOVE**  
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## Information

### Fusarium wilt

If conditions are right, *Fusarium* spp. can attack a wide range of plants including Ajuga, Centaurea, chrysanthemum, cyclamen, Dahlia, Delphinium, Dianthus, Euphorbia, Freesia, Gerbera, Gladiolus (also known as *Fusarium* yellows), Hedera, Helianthus, Hibiscus, Iris, Lathyrus, Lilium, Lisianthus, lupin, marigolds, Matthiola, Mentha, Narcissus, Nicotiana, rhododendron, rose, viola and Zinnia.

*Fusarium oxysporum* is the most common type of which there are several species that are plant-specific e.g. *F. oxysporum* sp. *dianthi* or *F. oxysporum* sp. *gladioli*.

### **How to recognise it**

On Gladiolus, it occurs at lower levels in the UK because of cooler soil temperatures. Initial symptoms are yellowing of the leaf tip which then dies back. It is different to other Gladioli diseases in that the stem is free from fungal growth but the roots go brown and start to desiccate.

On some bulbs it can lead initially to bulb rot and can then later on show as a bud blast.

On Iris, affected plants can show one-sided growth and can be stunted. Shoots can also grow away at odd angles.

On Dianthus, affected plants are slow growing, paler in colour and can collapse quite rapidly in warm, humid conditions.

Fungal mycelium is white or pale pink in colour and, when massed together, lends a distinctly pinkish tint to the surface of affected stems, usually at the base.

Most wilts result from excessive transpiration, drying out of soil, bacterial, fungal, or viral problems and involve the vascular system.

### **Symptoms**

Leaves become lighter green, turn yellow, wilt and finally fall off. Symptoms may appear on only one side of the plant. The spores are soil-borne and enter through roots, or wounds in plant tissue. They move into the vascular tissue and clog the vessels, reducing the plant's ability to replace water. A cross-section of a stem will usually reveal a black or brown discolouration in the vascular tissue. Stem decay can sometimes extend 5-6 inches above the compost.

On corms, browning or purpling of the vascular tissue can occur and although all ages of plants can be infected, the plants that are flowering can often be the ones that show the most dramatic symptoms.

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In periods of warm weather the disease can develop quickly and spores that develop can spread easily through irrigation water.

### **Biological control**

*Trichoderma* spp. can enhance plants' natural protection against a range of fungal pathogens, including *Fusarium*. Trianium P (Koppert) and T34 Biocontrol (Fargro) are both available in the UK. T34 Biocontrol (*Trichoderma asperellum* strain T34) can provide preventative and curative control of *Fusarium* infections on Dianthus and carnations. An Extension of Authorisation is available for ornamental plant production under code 2012-1118. Research shows that this product also has activity against *Pythium*, *Rhizoctonia* and *Sclerotinia*. Another product to consider is Prestop (*Gliocladium catenulatum* strain J1446).

Products based on *Bacillus subtilis*, a beneficial soil bacteria include Serenade ASO (strain QST 713, from Fargro) and Revive (Agralan).

For field-grown crops, there is a range of specially developed mustards called the Caliente series from Plant Solutions Ltd. They can be seeded in between production cycles to give a major boost to soil fertility. The large amount of organic matter produced during growth is chopped and incorporated into moist soils which release isothiocyanates. These compounds may give some control over a range of soil-borne diseases. The organic matter is broken down by beneficial soil micro-organisms that migrate into the field and may increase the competition for food and space in the soil environment.

### **Cultural control**

- Remove and destroy or securely quarantine any plants showing wilt symptoms, or propagation material which may have originated from them.
- Quarantine or monitor any bought-in stock. Always obtain bought-in material from a reputable source.
- Use a good horticultural disinfectant between crops and disinfect capillary mat at least once a year. Disinfect tools or equipment between plants or batches.
- In pot plants, *Fusarium* may spread faster on ebb and flood benches than on capillary matting.
- Growing media containing bark, wood fibre or crushed shells may help to suppress wilt.
- Do not pot too deeply and avoid root damage during potting or transplanting.
- Ensure correct irrigation and nutrition for strong growth.
- Control root pests, which may provide entry wounds for wilt fungi, and weeds, which may harbour the pathogens
- Use resistant varieties.
- Keep compost pH above 6.0 to reduce disease severity.
- Pick up fallen plant matter to break up the disease lifecycle.
- Maintain good bed hygiene in between crops.
- Make sure plants have time to dry back in between irrigation applications.
- Avoid lifting bulbs until soil temperatures are consistently below 15°C.
- Make sure bulbs are not subject to physical damage.
- If a few plants are showing symptoms, take them out of the crop and destroy them to prevent further disease spread.

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## **Fungicide control**

Consider applying any spray drenches as part of the crops' irrigation regime and not in addition to it to keep compost moisture at reasonable levels.

Products available include :

- Amistar\*
- Signum\*
- Bravo 500\* (protectant only)
- Dithane 945\* (protectant only)
- Prestop\*
- T34 Biocontrol\*
- Octave
- Switch
- Karamate Dry Flo Neotec (protectant only)
- Cercobin WG\*

\* = Extension of Authorisation for Minor Use (EAMU) required for use in protected/outdoor ornamental plant production and/or forest nurseries. Download your hard copy from <https://secure.pesticides.gov.uk/offlabels/search.asp> or contact the office.

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