Diseases of Peas

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Technical Note

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Summary

- Test pea seed for germination, Ascochyta diseases and pea wilt.
- Reduce seed and soilborne diseases by rotations, variety and seed treatment choice.
- Protect crops from Botrytis at flowering.
- Avoid Sclerotinia through crop rotations.

Diseases of peas

Peas can suffer from a wide range of diseases, some of which are specific to the pea crop whilst others may also attack other crops in the rotation. This technical note describes the symptoms of the most common diseases and methods to prevent or control them.

Damping off diseases

Damping off diseases occur before seeds have had a chance to emerge and they are the result of fungi attacking the seeds. One common group of fungi, which cause damping off, are Pythium species. The fungus will be most problematic where seed is sown in cold wet soils, which result in slow emergence of the seedlings. The most effective methods to prevent this problem are to ensure seed is of good quality, it is sown in good conditions and a seed treatment is applied which is effective against damping off diseases.

Damping off diseases

Downy Mildew

Downy mildew can affect both seedlings and plants. Individual seedlings may be affected by soil-borne resting bodies before emergence. These plants are pale and small. The undersides of the leaves are covered with a fungal growth, which may be white or grey in colour. Secondary infections can occur when air-borne spores from the leaves attack other plants. Pods may become infected, and look pale and mottled on outside, with mass of white fungal growth inside. The fungal resting bodies reach the soil, and can survive for many years. Although the disease is not seed-borne, seed treatments can be effective at controlling the disease. Foliar treatments are rarely effective and the best method to avoid the disease is to choose more resistant varieties and maintain long rotations between pea crops. Relying on varieties with best resistance to Downy mildew may not always be successful due to the complexity of races and the difficulty in breeding broad resistance.

Downy mildew

Varietal resistance scores for Downy Mildew (2003)

Variety	Downy mildew
Arrow	8
Carlton	7
Eiffel	5
Espace	5
Lumina	8
Nitouche	7
Power	5
Venture	7
Xsara	7

Diseases of Peas

Ascochyta complex

Three fungi cause leaf and pod spots, which are collectively known as the 'Ascochyta complex'. The fungi involved are Ascochyta pisi, Mycosphaerella pinodes and Phoma medicaginis. The Ascochyta complex diseases are seed-borne and they may infect and kill the emerging seedling. Infection of established plants can occur at any time particularly in wet conditions. Ascochyta produces circular sunken tan lesions up to 7mm in diameter. The perimeter of the lesion is usually dark brown. As the disease develops, tiny dark raised spots appear in the lesions from which further spore dispersal takes place.

Mycosphaerella pinodes produces many small dark brown or purple spots on the leaves, stems and pods. The whole crop can turn black and in wet weather turn slimy. This may be confused with Bacterial Blight. When lesions occur on pods, the disease can attack the seeds, causing discolouration.

Ascochyta on leaves

Since sowing infected seed can lead seedlings to die, seed should be tested, and if levels are high, the seed should be rejected. The upper limit at which seed should be rejected is 30% Ascochyta spp. Lower levels may be controlled with a seed treatment containing thiabendazole. Bravo applied as a foliar spray to combining peas at flowering to protect the crop from Botrytis may also reduce the severity of the leaf symptoms.

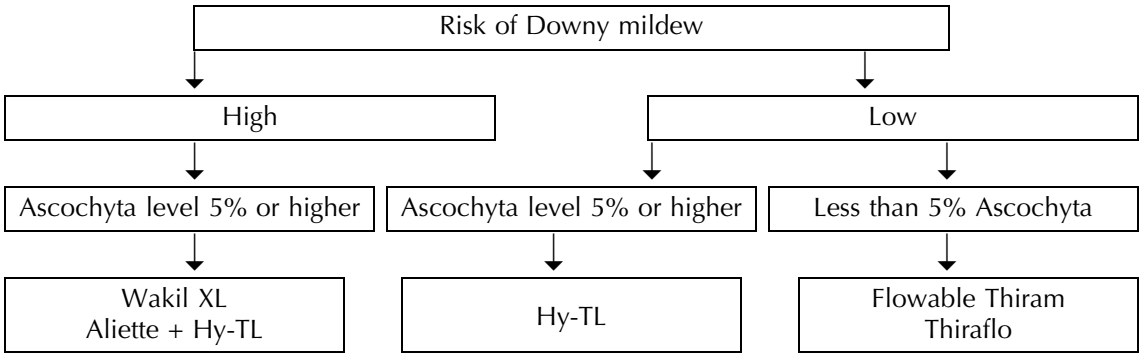
Ascochyta on pods

Mycosphaerella on pods

Diseases of Peas

Seed treatments for Damping off, Downy Mildew and Ascochyta

The three diseases described above can be controlled with seed treatments. The table below can help you decide which seed treatments are most appropriate for your crop.



Description of seed treatments currently available

Seed Treatments		Diseases controlled		
Active Ingredients	**Products**	**Damping off**	**Ascochyta**	**Downy mildew**
Thiram	Thiraflo, Agrichem Flowable Thiram	Yes	No	No
Thiram + thiabendazole	Hy TL	Yes	Yes	No
Metalaxyl M + Cymoxanil + fludioxonil	Wakil XL	Yes	Yes	Yes
Fosetyl aluminium	Aliette (off-label)	No	No	Yes

Grey Mould *(Botrytis cinerea)*

Grey mould may appear first on damaged or dead tissue, in particular withering petals. Damage caused by Botrytis is greatly encouraged by wet weather towards the end of flowering, when damp petals stick to the young pods or in the leaf axils.

Pods can be severely attacked by disease, or the disease may affect pod fill causing smaller discoloured peas. Infection of the leaf axil can cause the stem to rot.

Semi leafless and leafless varieties, and short varieties are less susceptible because these crops will dry out more rapidly than leaf varieties which produce a lot of haulm. Application of a fungicide at flowering will help protect the crop from severe Botrytis. Yield responses are best seen in wet seasons. In severe conditions, a second treatment may be required 2 – 3 weeks later.

When choosing a fungicide, be aware that products Approved for use on combining peas are not necessarily Approved for use on vining peas. Chlorothalonil (e.g. Bravo) is an example of a fungicide, which has Approval for use on combining peas only.

Botrytis on pods

Diseases of Peas

Products Approved for use on combining peas and vining peas include: Amistar, Ronilan, Rovral Flo (off-label).

Sclerotinia

Sclerotinia can infect a wide range of other crops including beans, oilseed rape, lettuce, carrots and potatoes. Symptoms are usually seen late in the season. Individual plants may have watersoaked spots on the leaves and stems, which then turn into a slimy rot. Infected tissue can dry out and a mass of white fungal growth will be associated with it. Inside

Sclerotinia

the stems, black resting bodies of the fungus can be found. These will drop into the soil and lead to future attacks on susceptible crops sown in the field. There is little you can do except avoid susceptible fields. If the disease is present either in a pea crop or other susceptible crops, keep the rotation as long as possible. The resting bodies can live for 10 years. Some fungicides applied at flowering for Botrytis protection (e.g. Ronilan) may have some effect, but this is not guaranteed.

Pea Wilt

Pea wilt is a persistent soil-borne disease caused by the fungus *Fusarium oxysporum f sp. pisi*. There are various races of the fungus, but race 1 is the most important in the UK. Current pea varieties should have resistance to this race, so it is unlikely you will come across this disease.

Symptoms of the disease generally appear late May or June. Initially individual plants may be affected, and can go unnoticed. After several crops have been grown in the field, larger patches show. The foliage turns a grey colour, and in hot dry weather the leaves turn yellow and roll downwards along the main vein. These effects appear on the lower leaves first, and progressively make their way on to the upper leaves.

Pea Wilt

Early infection leads to plant death, and later infections may allow the crop to survive but they mature early. Wilt is a disease of the vascular system and an orange brown discolouration will be seen inside the stems extending from the tap root up into the stem.

The similar disease Fusarium solani tends to cause a reddening inside the stem, but one disease may be followed by the other.

Wilt can cause severe losses, but is well controlled by sowing varieties resistant to race 1. The disease is specific to peas, and is persistent in the soil. There is a possibility of affected crops having the disease on the seed, so seed from affected crops should not be used for this purpose.

Powdery Mildew

Powdery mildew can be seen late in season in warm seasons. Infected plants are covered with a fine white powdery fungus. If it occurs early in season, it can cause damage as pods may fail to fill and maturation of the crop is delayed. It is generally of little importance in Scotland, but it is more of a problem for protein peas where the crop is in the ground for a longer period before harvest.

Powdery mildew

Diseases of Peas

Bacterial Blight

The disease develops most readily in cool wet conditions when the lesions have an olive green watersoaked appearance; later they become chocolate brown with a watersoaked margin. In drier, less favourable conditions, development is slow and lesions become brown and necrotic. Bacterial blight is more likely to be seen in winter sown crops.

Look for angular or irregular, olive green to chocolate brown watersoaked spots on the leaves, especially along the veins. The veins may also become infected causing the surrounding leaf tissues to wilt and turn yellow before becoming brown and dead. On the stem, the disease will produce oval green-brown watersoaked lesions. These may later gird the stems causing shoot death. Pods will show watersoaked lesions that become brown and sunken. Splitting the infected pods will usually reveal slimy masses of white bacterial ooze.

Early symptoms of bacterial blight

Bacterial blight is mainly seed-borne and is caused by *Pseudomonas syringae pv pisi*. Once established in a crop, it can be spread by wind and rain, on the surface of machinery, people and animals or in association with plant debris. After harvest, seed lots may be contaminated when they come in contact with equipment and machinery coated with dust and debris from an infected crop.

If you suspect a disease infection in your crop, send samples for laboratory examination. If the results are positive, do not use the seed for sowing and be very careful with the contaminated crop.

If pea haulm is saved for feeding to livestock, avoid scattering it on, or in the vicinity of fields where peas will be grown during the next two seasons.

Clean and disinfect machinery and seed storage bins thoroughly at the end of the season. A voluntary Code of Practice titles 'Mind Your Peas – measures to avoid pea Bacterial Blight' is available from the Official Seed Testing Station, Scottish Agricultural Science Agency, East Craigs, Edinburgh EH12 8NJ.

References: The PGRO Pea Growing Handbook 1984 A J Gane, A J Biddle, M Knott, D J Eagle.

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