

Cephalosporium leaf stripe in winter wheat

- **Watch out for this emerging disease threat to wheat**
- **Crops on short rotations and shallow cultivations most at risk**
- **Wet compacted soils will also increase disease risk**
- **Use rotation to minimise disease build up**

Cephalosporium leaf stripe is an increasing problem on farms in Scotland where wheat is grown on short rotations. Incidences of the disease have increased in recent years as a consequence of changes in cropping practice and weather patterns, in particular rainfall. This note provides information on the disease to help growers identify the problem and explain the potential economic risks if it becomes established on farm.

Disease symptoms

Symptoms usually appear late in the season when the flag leaf is emerging or after heading. Broad vertical yellow stripes appear on the leaves of affected plants starting at the base of the leaf. Surrounding leaf tissue remains healthy and green. Affected leaf tissue will eventually die back and become necrotic and affected tillers will be stunted and die



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prematurely. The nodes of affected plants will also become discoloured inside. Since affected plants die-back prematurely causing whiteheads, late symptoms of the disease can be confused with take-all.

Symptoms will be most common in wetter, compacted areas of fields of winter wheat grown continuously or in short rotations. Crops most at risk are those sown in fields where straw is incorporated into the root zone and where minimum tillage or shallow cultivations are practised.

Yield losses

In the UK, wheat yield losses from widespread infection of *Cephalosporium* leaf stripe have been estimated by growers to be in the region of 0.5 t/ha. No accurate figures exist to calculate yield loss from *Cephalosporium* leaf stripe, but in inoculated studies, (Bockus et al., 1994) estimated yield losses for *Cephalosporium* leaf stripe range between 25%-65% (average 45% loss). For take-all the yield loss ranges from 52%-91% (average 72% loss).

It is also common to find the disease in many wheat crops at very low levels in compacted gateways and headlands. In these situations yield losses will be negligible.

Host range

Wheat is the major economic host, but other cereal hosts include oats, barley, rye, triticale and grasses such as the Bromes. Spring sown cereals and the resultant trash are also potential carriers, but symptoms are rare. This wide host range causes issues with planning crop rotations for fields where disease levels have built up and there is little data to assist growers make decisions on crop rotations once the disease is established.

Causal organism and biology

Cephalosporium leaf stripe is caused by the fungus *Hymenella cerealis*. The disease is perceived to be widespread but of little economic importance, but disease outbreaks on farms in Northumberland, Lothians and Perthshire in recent years suggest the problem is more widespread than first thought and also highlights the need to understand more about the pathogen, the associated losses in winter wheat grown in short wheat rotations.

The causal fungus is a slow growing fungus in the soil but it is favoured by wet soil conditions and continuous cereal cropping. The soil borne fungus enters plants via the roots during winter and early spring. There is evidence that the fungus can be transmitted by seed (Murray 2006), but there is no information on the impact fungicide seed treatments have on the disease at these early stages. Once inside the plant, the fungus moves up the plant causing blockage at the nodes, distinctive leaf symptoms and stunting. At harvest the fungus returns to the soil in the trash. Removing straw, ploughing and, where permitted, burning are the most effective ways to prevent a build up of the problem (Christian

et al. 1983). If straw removal is not practical, then deeper ploughing to remove the straw from the root zone may help. There is little data on how long the fungus can survive in the trash and this limits the knowledge required to give advice on the length of cereal breaks required following an outbreak.

Disease management

In the USA, some wheat varieties show tolerance to the disease, but none are resistant. There is currently no data regarding tolerance in European varieties. Seed treatments and foliar fungicides also have no effect on the disease.

Removing wheat trash and maintaining a rotation with non cereal hosts is the best method to reduce the disease. Growers of continuous wheat crops are likely to be reluctant to take this action since it breaks the take-all decline, leading to increase in take-all when wheat is re-sown. There is evidence that take-all fungus and *Cephalosporium* leaf stripe can compete with each other and where *Cephalosporium* levels do build up, growers are strongly advised to sow a break crop before *Cephalosporium* leaf stripe causes an economic loss. Oats or any non cereal crop would be acceptable (e.g. oilseed rape, potatoes).

A break from cereals for a minimum of 2 years would be recommended where the disease has increased to a level to cause economic losses. Where this is not possible, a break using a spring cereal will help to reduce the disease, but it can take longer to reduce the inoculum in the soil.

Specific Issues

Little data exists on methods to manage the disease in the UK. A new HGCA research project has started which aims to provide new information on the tolerance and resistance of wheat varieties.

The importance of agronomic management including the impact of minimum tillage, depth of straw incorporation by ploughing, straw removal or straw burning (where permitted) on levels of *Cephalosporium* in the root zones will also be measured.

References and further reading

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