

Tan spot in winter wheat

SUMMARY

- **Watch out for this emerging disease threat to wheat in Scotland**
- **High yield losses have been reported in Denmark where the disease is common**
- **High risk crops include wheat grown in short rotations using minimum tillage cultivations**
- **Differences in varietal resistance and fungicide activity have been observed**
- **Avoid growing susceptible varieties in high risk situations**
- **Symptoms can occur at any time, but greatest yield losses occur from late infections on the upper leaves**

An outbreak of tan spot, caused by the fungus *Pyrenophora tritici-repentis* occurred in wheat crops in East Lothian, Scotland in 2010 and 2011. While this disease is a common problem in Denmark and France it has not been recognised as a major threat to Scottish wheat crops until now. This Technical note will help you identify the disease in your crops and provide advice on how to manage it.

What are the visible symptoms of tan spot?

Early symptoms are likely to comprise small dark brown flecks on a leaf which are similar to symptoms for physiological leaf spots associated with crop stress (nutritional or water stresses).

The characteristic symptoms of this disease are oval shaped tan lesions with a yellow margin and a dark brown spot in the centre. These typical symptoms are however similar to those caused by another fungus (*Septoria nodorum*) and distinguishing between the two diseases can be difficult. For a definitive identification, examination for the spores using a microscope or a molecular diagnostic test is required. These tests can be done through the SAC Crop Clinic

At later stages, several lesions may coalesce causing extensive damage to the leaf.

What damage can tan spot cause?

Tan spot lesions can occur throughout the season, but most damage occurs later in the season. The disease can affect root development, tiller production and grain size, leading to an overall reduction in yield.



Tan spot symptoms showing eye shaped tan lesion with yellow halo. The dark centre to the lesion is not always present.



*Typical lesions of tan spot showing dark centre to the lesion. The symptoms are also similar to those caused by *Septoria nodorum*.*

Detailed figures of yield losses in the UK are not available. In the USA, where the disease is common, yield losses up to 48% have been reported. In Denmark, yield losses associated with tan spot range from 0.8- 4.4 t/ha.



A mixture of tan spot lesions (on the left) and septoria tritici (on the right) on same leaf.

Why did the disease appear in Scotland?

In 2010, Scotland experienced a cold winter with crops under snow for a prolonged period, followed by a warmer than average summer with many rain showers. Infection occurs when leaves are wet for 6-48 hours. Despite the low rainfall in the summer, condensation was common on leaves during the night in June for prolonged periods of time. Higher temperatures also encourage infection (20-28C), so conditions in June 2010 were ideal for this disease to infect crops. These weather conditions mirror those typical in Denmark where the disease has become a common problem.

Disease pressure from other leaf diseases (e.g. Septoria tritici) was low in 2010. As a consequence, it is likely that fungicide inputs targeting this disease were reduced, providing tan spot an opportunity to colonise wheat leaves free from competition from the main disease threat and also from fungicides.

Is the disease affected by different cultivations?

In Denmark it is linked to minimum tillage cultivation systems with continuous wheat or short rotations. Cases of the disease in Scotland were associated with short rotation wheat crops and continuous wheat crops where straw was incorporated into the soil by ploughing. If these types of rotations increase, expect this to increase also.

How can the disease be controlled?

Avoiding short term wheat rotations is one way to limit the fungus build up in the trash in the soil. Varietal resistance can also be used effectively to manage the disease in high risk situations. Differences were seen between varieties in 2010 and on the basis of limited information from Scotland; crops most at risk from tan spot include Einstein, Duxford Panorama and Humber. Varieties with intermediate resistance include Alchemy, Gallant, Grafton, Solstice and Stigg, whilst varieties which exhibit low levels include Consort, Scout, Robigus and Viscount. Try to avoid growing susceptible varieties in high risk situations if at all possible.

UK information on fungicide activity is limited. In trials, treatments including Bravo (chlorothalonil), Cherokee (propiconazole + chlorothalonil+ cyproconazole), Aviator Xpro (prothioconazole + bixafen) and Proline 275 (prothioconazole) reduced the severity of symptoms. Treatments comprising Caramba (metconazole) or Opus (epoxiconazole) were less effective. Resistance to strobilurin fungicides has been recorded in Europe, so reliance on these fungicides for controlling tan spot is not advisable.

Tan spot symptoms appeared post flowering in Scotland, but symptoms can occur throughout the year. Later infections tend to cause the greatest loss in yield, since it will reduce the green leaf area of the upper leaves, which are important for yield. In common with other fungal diseases, it also produces plant toxins which will impact on yield. Fungicide treatments applied at stem extension limited the severity of the disease, but most effective control was achieved with fungicides applied at flag leaf emerged (GS39) and head emergence (GS59).

The disease can also be seedborne, but there are currently no seed treatments available to control it. Seed is likely to be an important method of transmitting the disease into new areas, but once established on a farm, the major source of the fungus will be from straw from the previous crop.



Tan spot lesions on the flag leaf will cause the greatest loss in yield

Further reading

Jørgensen L.N., Olsen, L.V. (2007) Control of tan spot (*Drechlera tritici-repentis*) using cultivar resistance, tillage methods and fungicides. Crop Protection 26 p 1606-1616.

Bockus W.W. (editor) 2010. Compendium of wheat diseases and pests. The American Phytopathological Press 171pp

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