

Stubble Guidelines

Managing Eyespot in Stubble Retained Systems on Lower Eyre Peninsula

Local Management Guideline for the GRDC Stubble Initiative Project (LEA0002)

Eyespot is a fungal disease that infects the lower stems of wheat plants, resulting in stem breakage, lodging, yield loss and high screenings. Eyespot has the potential to cause significant yield losses on Lower Eyre Peninsula (LEP) in susceptible varieties. Infection has been on the rise in recent years due to shorter rotations, retention of stubbles and earlier sowing and increased use of nitrogen leading to denser crop canopies.

The eyespot fungus can survive in plant stubbles for two years or longer if the stubbles have not broken down. Fungal spores produced on the stubbles are dispersed by rain-splash over short distances in autumn and winter. Infection of leaf sheaths occurs when moisture levels remain high for extended periods. The early stages of infection cannot be detected visually. Only after six to eight weeks can lesions be detected on stems but by then, it will be too late to avoid yield losses.

Economic Importance - When is it a problem worth worrying about?

Yield losses can be in the order of 25%, plus further losses that escape and delay the harvest process due to lodging. The difficulty for management is knowing where to look for it and under what conditions.

The triggers for eyespot infection are:

- Properties and paddocks that have had eyespot infection are very likely to have it again.
- Growing wheat in close rotation, particularly tall varieties.
- Varieties that are taller or have weaker stems will be more prone to lodging after eyespot infection.

- Conditions that promote long periods of moisture at the stem base, particularly during tillering to GS30.
 - Eyespot is more likely with frequent rain, even small amounts, received daily over a prolonged period from around mid-tillering to growth stage 30 (GS30).
 - Conditions that maintain wet and/or high humidity at the base of the plant contribute to infection. About 3mm/day of rain for several days in July and early August combined with days where humidity is high at the base of the plant.
 - Lush crops with high nitrogen supply are more prone to infection and subsequent lodging losses.
 - Eyespot will be first observed in low lying areas of a paddock that are the first to become waterlogged.

What are the solutions?

Eyespot is difficult to manage because infection is hard to identify for early treatment. Unlike rust (a communal disease), eyespot is a property-by-property disease. Different rotations, farming practices and environmental conditions can be the difference between infection and healthy crops.

Management must focus on preventative measures, anticipating how often conditions conducive to eyespot occur. Consideration needs to be given to the frequency of wheat in rotations, rainfall, extended waterlogging/moist surface conditions and the history of eyespot infection events in a particular paddock or location.

Varietal resistance

Research on LEP has identified several varieties that have consistently shown less eyespot symptoms under high disease pressure. Trojan and Emu Rock were least affected by eyespot and Mace, Scout and Wyalkatchem were worst affected. Research results also show that Shield, Axe, Cobra and Corack should be avoided where eyespot is an issue.

Barley varieties appear to be less consistent in their response to eyespot compared with bread wheat varieties which makes it difficult to recommend specific varieties. Lodging in barley varieties was relatively higher than that in bread wheat varieties which suggests that affected barley might be more at risk of yield losses due to harvest difficulties.

Cont.

Fungicides

There are no chemical options registered for treatment of eyespot in Australia. However, the registration of products is currently underway and is expected within the next 12 months. Plant growth regulants (PGR's) can be used to shorten and strengthen plant stems and thus reduce the risk of infected plants lodging.

LEP trials evaluated a range of fungicides and PGR's to provide data that will support registration for eyespot control. All the products evaluated provided some protection against eyespot whilst most products provided a significant lowering of lodging, particularly where a PGR was added. Yield increases of 7% to 22% (0.35-1.11 t/ha) were also achieved across the products applied.

Cultural

There are a range of factors influencing the risk of eyespot infection which can be managed including:

Stubble: Wheat in standing stubbles, especially thick stubbles that stand 10 to 20cm high, will have a higher risk of infection. Burning can reduce inoculum but does not eliminate the disease.

Rotation: Reducing the frequency of growing wheat reduces eyespot infection. The amount of inoculum will be reduced with each year out of wheat.

Nitrogen timing: Keep the canopy open as long as possible to help reduce risk of eyespot infection. Later nitrogen applications will avoid promoting excessive canopy growth at GS30-32.

Seeding rate: Higher seeding rates create a denser canopy earlier in the season. While not a large risk, when added to the other infection factors, it could be a contributor.

Time of sowing: Early sowing tends to create crops with more biomass which increases the risk of eyespot. However, yield losses from delaying sowing may outweigh potential losses from eyespot. Focus on other control options first.

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Further reading

<https://grdc.com.au/Resources/Factsheets/2013/11/Eyespot-in-wheat-fact-sheet>

<http://eparf.com.au/wp-content/uploads/2015/04/4i-Eyespot-variety-tolerance-and-fungicide-efficacy.pdf>

<http://23ha8gmx47t1jcm5w1sd58s7.wpengine.netdna-cdn.com/wp-content/uploads/2016/05/4c.-2015-Eyespot-variety-tolerance-and-fungicide-efficacy-EVANS.pdf>



Photo: Pat Head, eyespot lesion on cereal stem



Photo: Pat Head, crop lodging due to eyespot infection

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