

White Grain Disorder of Wheat in Western Australia

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Key messages

- White grain disorder, a fungal disease affecting the quality of wheat grain, was observed for the first time in Western Australia (WA) in wheat from the Lower Great Southern region during 2013.
- The primary impact of this disease is on grain quality, with affected grain being pinched and light grey to white in colour, affected grains can be misidentified as frost damage or Fusarium head blight
- The disease is stubble borne and is most likely to be associated with wet conditions during flowering to maturity.
- The first WA report of affected grain was in 2013, however given that it has been detected from several southern locations it is possible that the pathogen has been present for several seasons without causing any problems.

Background

White grain disorder, a fungal disease affecting the quality of wheat grain, was reported for the first time in wheat samples from the Lower Great Southern region of WA during the 2013 season. White grain disorder was first identified in Queensland in 1999 and has periodically affected wheat in Queensland and New South Wales since then. Since 2010, it has been problematic for wheat producers in South Australia, most commonly on the Eyre Peninsula.

Initially the fungi involved were identified as *Botryosphaeria* spp. but have more recently been classified as *Tiarospora* spp. More than one *Tiarospora* species can be associated with the disorder.

The disorder is caused by fungal infection of the wheat heads during flowering and grain fill. The fungus survives in cereal residues and is viable for at least 2 years. Severe problems are most likely to occur in crops grown on infected stubble in seasons when wet springs promote infection, such as occurred in southern regions of WA during the spring of 2013.

There is no evidence that white grain is associated with toxins and therefore affected wheat grain or stubble can be safely grazed by stock (Kopinski & Blaney 2010). In contrast, fusarium head blight (FHB) infection which can also produce white grains, is associated with toxins, fortunately FHB infection is rare in WA.

Grain Trade Australia commodity trading standards carry a limit for White Grain disorder in wheat deliveries, this limit reflects the market acceptance levels for affected grains.

White grain in Western Australia

In 2013, wheat grain from a small number of paddocks in the lower Great Southern region had low levels of White Grain contamination. Grain samples were collected from these paddocks and fungi isolated from affected grains. DNA sequencing places these WA isolates within the *Tiarospora* genus. When compared with sequences from isolates from across Australia, these isolates group with white grain isolates from eastern Australia indicating that the WA pathogen is the same or very closely related to the eastern Australian disease.

Soil and stubble test results from 2014, indicate that inoculum is present in paddocks in the lower Great Southern region. There are no indications that inoculum is present in the central or northern regions.

Testing of grain from the 2014 harvest is underway, however DAFWA have not received reports of affected grain from the 2014 harvest.

Symptoms

Affected grain can be white to very light grey and sometimes pinched when compared with normal grain. Infected grain is often shrivelled and lighter and may break-up during harvest. The appearance of affected grains may be confused with frost or fusarium head blight affected grain.

Wheat heads on affected plants can show bleaching or grey discolouration of infected spikelets.



White grain affected wheat can be clearly differentiated from healthy grains (Photo 1: M. Evans, SARDI).

Management

Currently there are no recommended management options for this disease. There is no evidence from other parts of Australia that fungicide applications or variety choice affect disease occurrence. If significant levels of white grain are identified in harvest samples it may be possible to adjust harvester settings to reduce the affected grain going into the bin, as white grain is lighter than healthy grain.

The fungus survives on infected crop trash and therefore crop rotation and stubble management could provide useful levels of control. In paddocks where white grain has been a problem, reducing exposure to stubble should reduce infection in following cereal crops.

The first WA report of affected grain was in 2013, however given that affected grain or soil / stubble borne inoculum has been detected from several southern locations it is possible that it has been present for several seasons without causing any problems.

Ongoing research

Department of Agriculture and Food Western Australia (DAFWA) are collaborating with South Australian researchers to compare understanding of the source and behaviour of the disease in the WA environment. In conjunction with CBH, the collection of grain samples will allow the identification of affected areas and allow for a comparison of the biology of WA isolates to those in other Australian states. Use of spore trapping in affected paddocks will help with the understanding of risk parameters and prediction of high risk seasons.

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