Management practices to reduce the impact of crown rot

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Take home messages

- *Crown rot has become an important disease to manage in Victorian wheat crops.*
- *A soil test can be used to identify paddocks most at risk of crown rot.*
- *In the presence of medium crown rot levels crop losses can be reduced by choosing tolerant crops.*

Background

Crown rot is a cereal disease caused by the fungus *Fusarium pseudograminearum*. Symptoms usually become evident as white heads in the crop at flowering. However, during seasons with above average rainfall white heads may not develop, but symptoms of crown rot, known as stem browning, may be present on the lower stems above the crown.

Crown rot has increased in importance during the last decade. The adoption of stubble retention, the intensification of cereal rotations, and a number of dry seasons have all contributed to an increase in the occurrence of crown rot in Victorian wheat crops. DPI Horsham, with support from GRDC in collaboration with South Australian Grains Industry Trust (SAGIT), is conducting several field experiments across south-eastern Australia to develop management practices that reduce the impact of crown rot.

Aim

To compare the tolerance of different cereal crops to crown rot, and therefore determine the most tolerant cereals for paddocks at risk of crown rot.

Methods

Seed with and without crown rot was sown to determine the tolerance of a range of crops to crown rot.

Location:	Woomelang
Replicates:	4
Plot size:	2m X 14m
Sowing date:	10 July 2009
Treatments:	+/- crown rot inoculated seed
Crop types:	Tamaroi wheat (Durum)
	Yitpi wheat (Bread)
	Hindmarsh barley

Seeding density:	Tamaroi wheat 58 plants/m^2
	Yitpi wheat 99 plants/m^2
	Barley 70 plants/m^2
Seeding equipment:	Cone seeder 7 rows x 30cm
Fertiliser:	MAP @ 55kg/ha
Herbicides:	Roundup PowerMax (1.5 L/ha) plus Triflur X (1L/ha) applied on 10 July 2009

Results

Results from the trial are presented in Table 1. Stem browning was significantly higher in all plants where seed was inoculated with crown rot. However, this treatment only resulted in a significantly higher level of white heads in the Tamaroi wheat variety. Barley was not assessed for white heads as it has been shown to be more tolerant to white head development than wheat.

While there was a trend for crops established with crown rot treated seed to have a lower grain yield compared to the untreated, the addition of the crown rot fungus only significantly reduced grain yield in Tamaroi wheat.

Table 1. The effect of crown rot on stem browning, white heads and grain yield of different cereals crops.

Crop	Stem browning (%)		White heads (%)		Yield (t/ha)		
	crown rot		crown rot		crown rot		change[B]
	-	+	-	+	-	+	(%)
Durum	13	48 ***[A]	4	18 ***	0.73	0.41	44 **
Wheat	5	43 ***	1	8	0.66	0.52	21
Barley	6	33 **	-	-	1.07	0.92	14

[A] *Significant effect of crown rot indicated by * (P<0.1), ** (P<0.05), *** (P<0.01)*

[B] *Indicates yield reduction due to crown rot*

Interpretation

This trial has shown that in the presence of crown rot barley (14% yield loss) is a better option than Yitpi wheat (21% yield loss). Yitpi is however a better option than Tamaroi wheat (44% yield loss).

The high level of stem browning shows good development of crown rot, but due to the weather conditions, stem browning did not cause white heads except in the Tamaroi variety. The number of white heads, and subsequent yield loss would be expected to be higher in a year with a drier spring.

For more information refer to the GRDC Fact Sheet – *Crown Rot in Cereals for the Southern & Western Regions.* Available on-line at the GRDC website.

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