The 2013 North Mallee Farm Improvement Group Crop Updates are supported by DAFWA and GRDC

Welcome to the 2013 North Mallee Farm Improvement Group Crop Updates.

Please join us for a Barbecue at the end of the day.

This event is sponsored by:

4Farmers … For Farmers

Time	Event	Speaker	Organisation
0830-0900	**Registration**		
0900-0910	Welcome	Brendan Nicholas	DAFWA
0910–0915	Grains Biosecurity	Jeff Russell	DAFWA
0915-0955	Canola field trial updates	Mark Seymour	DAFWA
0955-1035	Boron testing of barley varieties	Andrea Hills	DAFWA
1035-1105	**Morning tea**		
1105-1145	Impact of climate change on crop yields	Imma Farre	DAFWA
1145-1230	Disease suppressive soils and Crown rot field results	Shahajahan Miyan	DAFWA
1230-1330	**Lunch**		
1330-1410	Changing from phosphorus build-up to maintenance practice to increase prof-its	Mike Wong	CSIRO
1410-1450	Integrated disease management op-tions to control Rhizoctonia bare-patch in cereals	Daniel Huberli	DAFWA
1450-1520	**Afternoon tea**		
1520-1600	Wheat variety update	Kevin Young	DAFWA
1600-1605	Digital television switchover	Linda Belton	RDA
1605-1615	GRDC Update	Bill Ryan	GRDC
1615-1630	Proposed fallow project	Nigel Metz	SEPWA
1630-1645	Evaluation and Close	Andrew Longmire	NMFIG
1700	**Sundowner and barbecue**		NMFIG

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Agriculture** and **Food**

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Compiled and edited by Lee Chester

Management options for Crown rot control in Western Australia

Shahajahan Miyan, Daniel Hüberli, Miriam Connor and Bill MacLeod. DAFWA.

BACKGROUND

Crown rot, caused by the fungus *Fusarium pseudograminearum*, is a major constraint to winter cereal production in wheat, durum, barley and triticale in Australia. It is present at low levels in most years, but has its worst impact in dry years causing whiteheads that contain either no grain or pinched grain. It appears to be worst in heavy soils in the eastern wheat belt. Crown rot is estimated to cost the Australian grains industry up to $80 million per annum (Murray & Brennan, 2009). This fungus can survive in infected plant residues for many years and a wide host range among the cereals and grasses and infection can occur when plants come in close contact with those residues. The crowns at ground level and the stems close to the ground have a honey-brown discoloration and the insides of the leaf sheaths sometimes have a faint pink colour typical of the casual fungus. At heading, scattered white heads appear in the crop, especially in dry seasons. The disease can be confused with Take-All where the white heads appear more in patches than as isolated heads.

Currently, there are no registered chemicals for crown rot control. Management options to control crown rot are limited. Sowing between rows of standing stubble and using a less susceptible variety could reduce the crown rot incidence and increase grain production with a previous history of crown rot.

AIM

The main objectives were to compare the effect of susceptible and less susceptible wheat varieties, and On and Off row sowing on disease incidence, grain yield and quality.

METHODS

A field trial was conducted on a farm at Salmon Gums in 2012. Two bread wheat varieties (Mace: crown rot susceptible and Emu Rock: less susceptible to crown rot) and one durum wheat variety (Kalka: crown rot susceptible) were sown on 11 June 2012 with a target plant density of 150 plants/m^2In 2011. Each plot was 40 m long and 1.44 m wide. Soil samples were collected prior to seeding to 10 cm depth to determine the inoculum levels of crown rot using PreDicta-B (SARDI, Adelaide). Plant establishment counts were recorded by counting plant numbers in two rows each of 1 m length in each plot at three locations. A total of 40 plants were collected from each plot to determine the percent infected tillers per plant at anthesis period. The number of white heads was estimated only in Mace and Kalka by counting white head numbers in two rows each of 1 m length in each plot at ten locations. The trial was harvested with a small plot header and a sub-sample was taken for grain quality analysis.

Data on infected tillers, severity, white heads, grain yield, grain protein and screenings were recorded and analysis of variance was carried out using Genstat.

RESULTS

The growing season rainfall at Salmon Gums from April to October was 124.5 mm. Low rainfalls in September and October was associated with yield reductions.

Wheat varieties had a significant effect on the percent crown rot infection of tillers. Infection of tillers was the highest in the susceptible durum variety Kalka (51%), and the lowest in the less susceptible Emu Rock (32%) (Figure1). Off row sowing significantly reduced the infected tillers compared to On row sowing in all wheat varieties (data not shown).

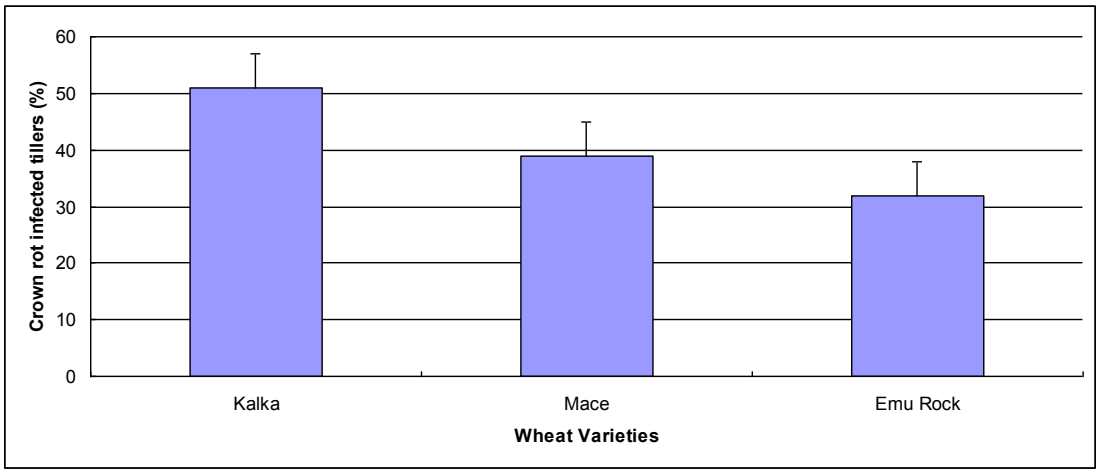

Fig. 1. Average of crown rot infection of wheat tillers in three varieties. Vertical bars are least significant difference (LSD).

The expression of white heads is favoured by moisture stress during grain fill and a susceptible variety and this ends up with reduced grain yield. There were significantly reduced white heads in Mace compared to Kalka. But there was no interaction effect between variety and On and Off row sowing.

Emu Rock had the highest grain yield (Figure 2) and better resistance to crown rot than Mace and Kalka. There was no statistical interaction effect between On and Off row sowing and wheat varieties. The highest grain yield was recorded in Emu Rock followed by Mace. However Mace produced significantly less grain yield (19%) than Emu Rock, but significantly higher than Kalka. But the lowest grain yield was re-

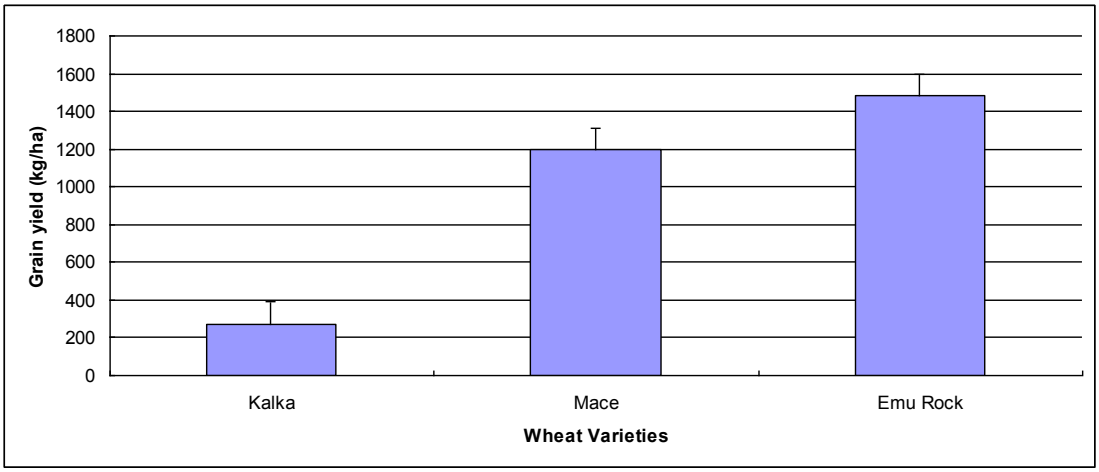

Fig. 2. Mean grain yield for three wheat varieties sown On and Off row. Vertical bars are least significant difference (LSD).

There was a significant difference on grain yield due to different inoculums level at sowing. High levels of crown rot inoculum significantly reduced the grain yield. However, there was no difference in grain production between low and medium inoculums levels (Figure 3).

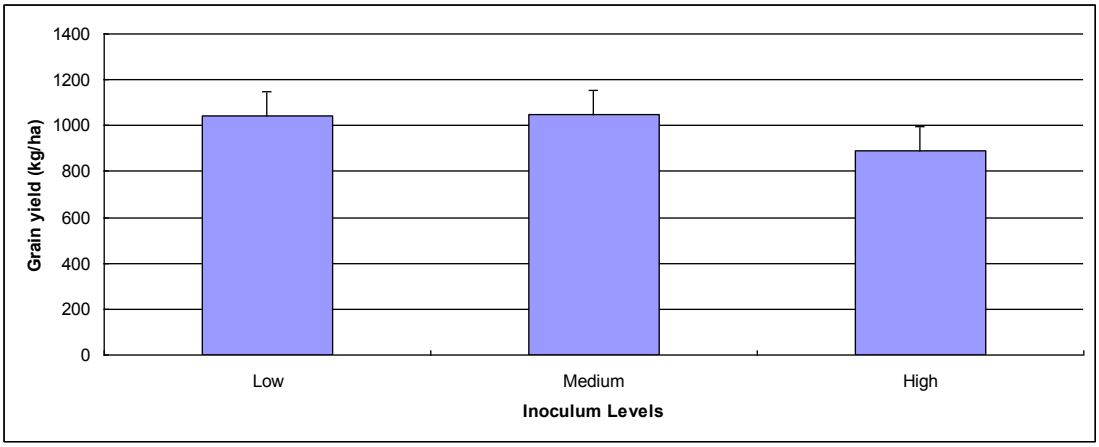

Fig. 3. Average grain yield at three inoculum levels of crown rot disease as determined by Pre-DictaB. Vertical bars are least significant difference (LSD).

Protein content were significantly different among wheat varieties. The highest protein content was observed in Kalka durum wheat. However, no varieties achieved 13% protein to attract premium price. The highest screenings was recorded in durum wheat compared to bread wheats due to the high number of white heads. There was no difference between Mace and Emu Rock in screenings. However, bread wheat screenings were below 5% which is a receival standard (data not shown).

CONCLUSIONS

- Bread wheat is a clear variety choice over durum wheat where crown rot inoculum levels at medium or at high risk category.
- A small advantage is gained from Off row sowing compared to On row sowing to reduce crown rot infection and thus improve grain yield.

Growers should grow non-cereal crops option as part of their crown rot control program.

REFERENCE

Murray GM and Brennan JP (2009). Estimating disease losses to the Australian wheat industry. *Australasian Plant Pathology* **38**, 558-570.