Welcome to the North Mallee Farm Improvement Group Crop Updates 2014.

This event is sponsored by:

Time	Event	Speaker	Organisation
0830-0850	**Registration**		
0850-0900	Welcome	Brendan Nicholas	DAFWA
0900–0930	Sakura: Review of two seasons in the Australian marketplace	Reece Hunt	BAYER
0930-1000	Canola variety, plant density and timing of nitrogen	Mark Seymour	DAFWA
1000-1030	**Morning tea**		
1030-1100	Probes and Prophets: making the most of soil moisture data and decision support tools	Frank D'Emden	Precision Agronomics
1100-1130	Wheat variety response to early season drought	Bob French	DAFWA
1130-1200	Extensive barley mildew sampling in SW WA, host resistance and virulence changes	Simon Ellwood	Curtin University
1200-1300	**Lunch**		
1300-1330	Rhizoctonia control improved by liquid banding of fungicides	Daniel Huberli	DAFWA
1330-1400	The Cost of Australia's bulk grain export supply chain	Dr Chris Carter	AEGIC
1400-1430	Understanding crop pests to control them – Diamond Back Moths, Aphids	Svetlana Micic	DAFWA
1430-1445	SEPWA DIY PA Courses	Nigel Metz	SEPWA
1445-1500	COGGO update	Steve Tilbrook	COGGO
1500-1530	**Afternoon tea**		
1530-1600	Management options for Crown rot control in WA	Shahajahan Miyan	DAFWA
1600-1630	Barley variety selection for the Mallee	Andrea Hills	DAFWA
1630-1645	Evaluation and Close	Andrew Longmire	NMFIG
1700	**Sundowner and barbecue**		NMFIG

Management options for crown rot control in WA

Shahajahan Miyan, Daniel Hüberli, Miriam Connor and Bill MacLeod.
Department of Agriculture and Food, Western Australia, South Perth, WA 6151.

KEY MESSAGES

- Incidence of crown rot infected tillers and expression of white heads can differ between varieties.
- In 2013 field trials, crown rot incidence was often lower in Emu Rock compared to Kalka and Mace. Emu Rock provided some advantage over these other wheat varieties in reducing, but not eliminating, occurrence of crown rot infection.
- A small advantage is gained from off row sowing compared to on row sowing to reduce crown rot infection. But there was no yield difference due to a soft finish in 2013.
- In paddocks with a history of crown rot, growers should select non-cereal crops as a rotation option to reduce the inoculum load, as part of a crown rot control program.

BACKGROUND AND AIMS

Crown rot, caused by the fungus *Fusarium pseudograminearum* and *F. culmorum*, 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 has a wide host range among the cereals and grasses and can survive in infected plant residues for many years, infection can occur when plants come in close contact with those residues. The crown and lower stem close to the ground of infected plants have a honey-brown discoloration and the insides of the leaf sheaths sometimes have a faint pink colour which is a typical sign 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 fungicides for crown rot control. Management options to control crown rot are limited. Reducing inoculum through rotation with non-host crops. Sowing between rows of standing stubble and using a less susceptible variety can reduce the crown rot incidence and increase grain production in paddocks with a previous history of crown rot.

The primary objective of the research trials described in this paper was to compare the effect of susceptibility of wheat varieties on disease incidence, grain yield and quality at two locations in 2013. These trials were set up in 2013 and will be sown over with the susceptible variety Mace to assess the impact of inoculum level and on and off row sowing on disease incidence, grain yield and quality in 2014. The main objective of the large scale demonstration trials was to compare the effect of susceptible and less susceptible wheat varieties, and inter-row sowing on disease incidence, grain yield and quality.

METHODS

Wheat variety and inter-row sowing two year trials

A two-year field trial was setup at Kondinin and Salmon Gums in 2013. Two bread wheat varieties (Mace, crown rot susceptible (S), and Emu Rock, less susceptible(MSS) to crown rot) and one durum wheat variety (Kalka: crown rot susceptible (S)) were sown with a target plant density of 150 plants/m^2 on 13 and 16 of May 2013 in Salmon Gums and Kondinin, respectively. Each plot was 40 m long and 1.44 m wide with 4 replications.

Data on crown rot infected tillers, white heads and grain yield were recorded and analysed using Genstat.

Large scale inter-row demonstration trials

Three demonstration trials were conducted in 2013 farmer fields in Lake Grace, Tenindewa (35 km of West Mullewa) and Salmon Gums. Paddocks from Lake Grace and Salmon Gums were selected based on the previous crown rot infected property history and PreDicta-B. But the Tenindewa site was selected based on the farmers' information. Two bread wheat varieties (Mace, (S), and Emu Rock, (MSS)) were sown with a target plant density of 150 seeds/m2 on 14, 30 and 15 May 2013 at Lake Grace, Tenindewa and Salmon Gums respectively. The unit plot size was 100 m long and 18 m wide with three replications.

Data on crown rot infected tillers, white heads and grain yield were recorded and analysed using Genstat.

RESULTS AND DISCUSSION

Wheat variety and inter-row sowing two year trials

Growing season rainfall from April to October was 302 mm and 217 mm at Kondinin and Salmon Gums, respectively. Minimum rainfall was recorded in the month of June at both sites. Significant rainfall was received in September and October at both locations.

There was a significant effect of wheat varieties on the number of crown rot infected tillers in Kondinin. Kalka had significantly higher infected tillers (9/m^2) than Emu Rock (1/m^2) and Mace (Figure 1) but there was no significant difference in infected tillers between Mace and Emu Rock. A similar trend was observed in Salmon Gums (Figure 1).

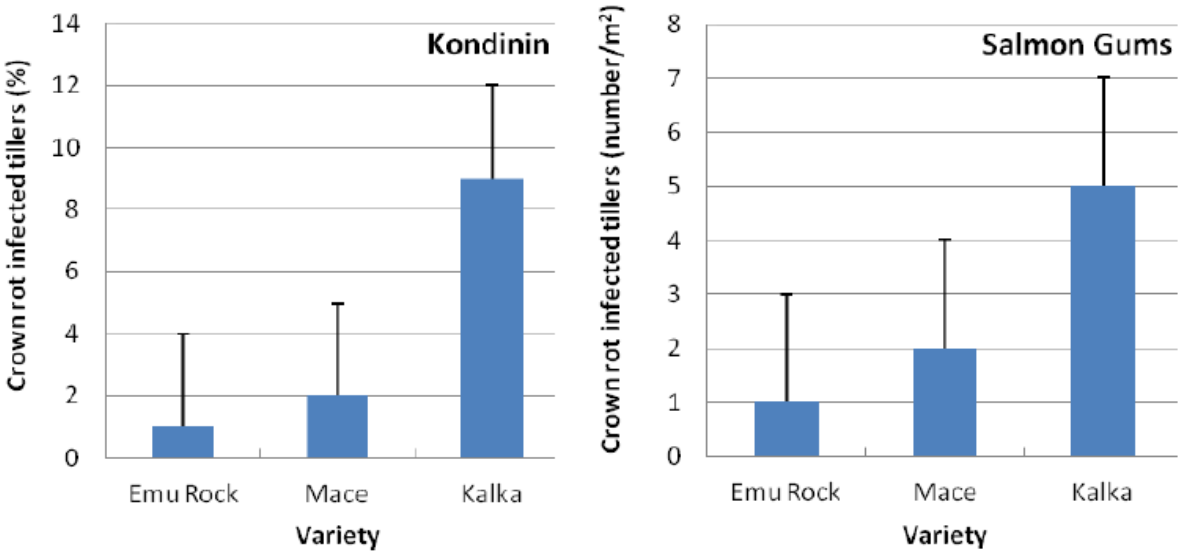

Figure 1. Average incidence of crown rot infected tillers in three wheat varieties in trials at Kondinin and Salmon Gums. Vertical bars are least significant difference (LSD).

The expression of white heads is favoured by moisture stress during grain fill and a susceptible variety and can be reflected in reduced grain yield. At an anthesis or during grain fill there were no white heads observed at Kondinin. At Salmon Gums the highest white head count was recorded in Kalka (11/m^2) and there were significantly less white heads in Emu Rock compared to Mace (Figure 2), however the overall white head number/m^2 was low due to the soft finish.

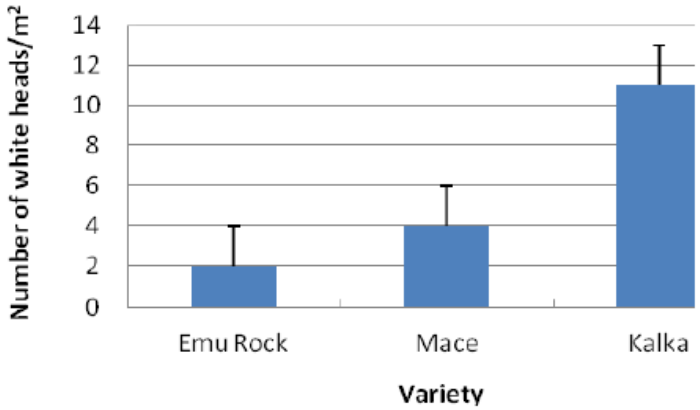

Figure 2. Average of white head numbers in three varieties in a trial at Salmon Gums. Vertical bars are least significant difference (LSD). No white heads were observed at Kondinin.

Grain yield showed significant difference between wheat varieties in Kondinin and Salmon Gums. At both sites, Mace produced the highest grain yield and the lowest was in durum wheat Kalka (Figure 3). There was no difference between Mace and Emu Rock in Kondinin. At Salmon Gums, Mace had significantly higher yield than both Emu Rock and Kalka (Figure 3). Grain quality results are not yet available at reporting.

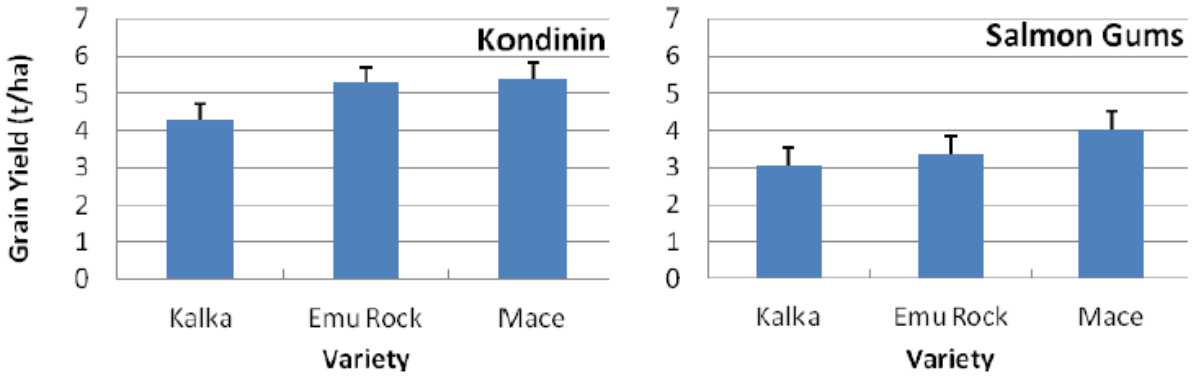

Figure 3. Mean grain yield for three wheat varieties in trials at Kondinin and Salmon Gums. Vertical bars are least significant difference (LSD).

Soil DNA (PredictaB) of *Fusarium* spp. in samples collected at anthesis were low and were not significantly different for any of the four treatments (wheat varieties and fallow) for both Kondinin and Salmon Gums.

Large scale inter-row demonstration trials

Growing season rainfall from April- October was 223 mm, 246 mm and 217 mm at Lake Grace, Tenindewa and Salmon Gums, respectively. Minimum rainfall was recorded in the month of June at all sites. But significant rainfall was received in September and October in all locations which helped the crops have a soft finish.

At Lake Grace, Mace had significantly more infected tillers (7/m^2) than Emu Rock (4/m^2) (Figure 4). Also, sowing off the row significantly reduced the infected tillers. The interaction between variety and inter-row sowing was not significant for infected tillers. Similar results were observed in the Salmon Gums trial (Figure 5), with a greater incidence of infected tillers overall at this site. There were very low numbers of infected tillers in Tenindewa and no significant differences were found between varieties or sowing systems. Despite significant levels of crown rot infected tillers at Lake Grace and Salmon Gums, white heads were not observed due to good rain during grain fill period.

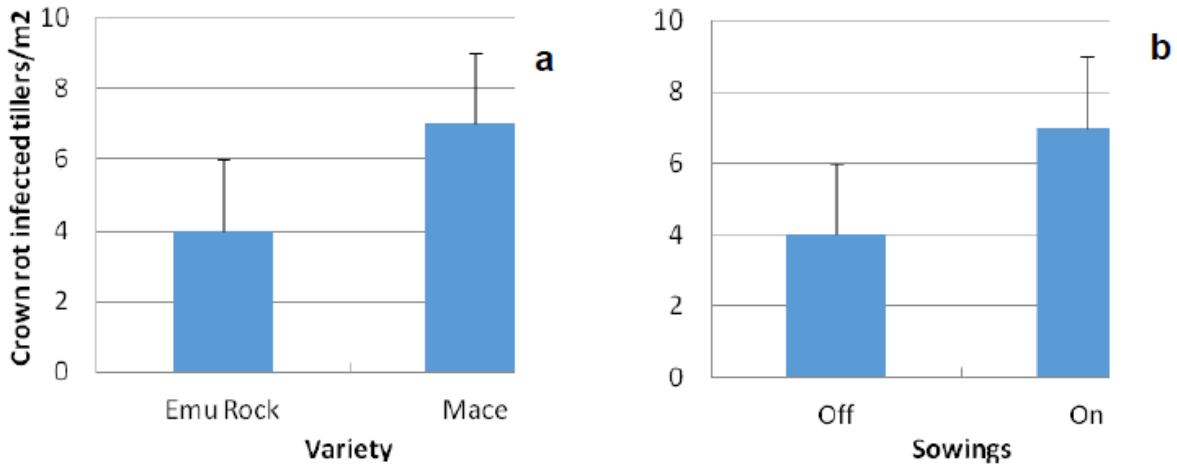

Figure 4. Average incidence of crown rot infected wheat tillers in two wheat varieties (a) and varieties sown on and off the previous crop row (b) in Lake Grace. Vertical bars are least significant difference (LSD).

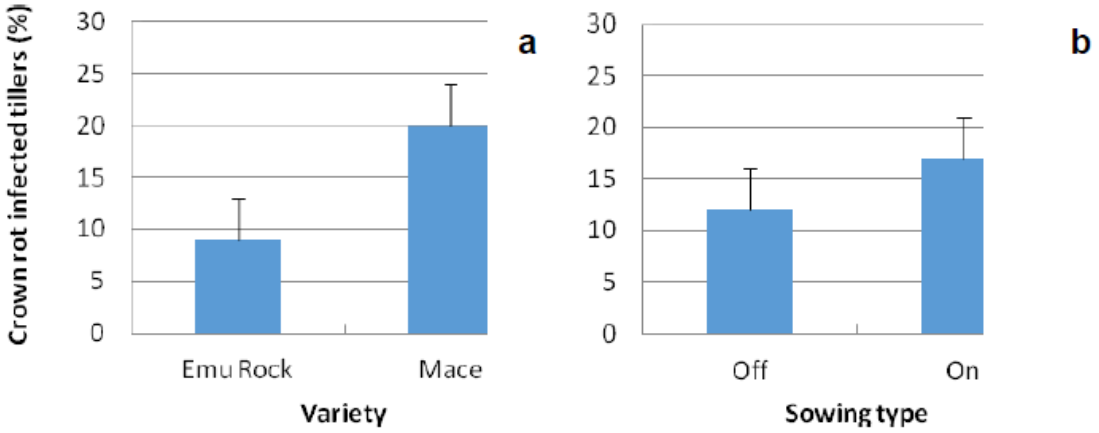

Figure 5. Average incidence of crown rot infected wheat tillers in two wheat varieties (a) and varieties sown on and off the previous crop row (b) in Salmon Gums. Vertical bars are least significant difference (LSD).

At both Lake Grace and Salmon Gums grain yield in Emu Rock was greater than Mace (Figure 6). There was no significant effect of wheat variety in grain yield at Tenindewa. Inter-row sowing did not significantly affect grain yield at any of the three locations.

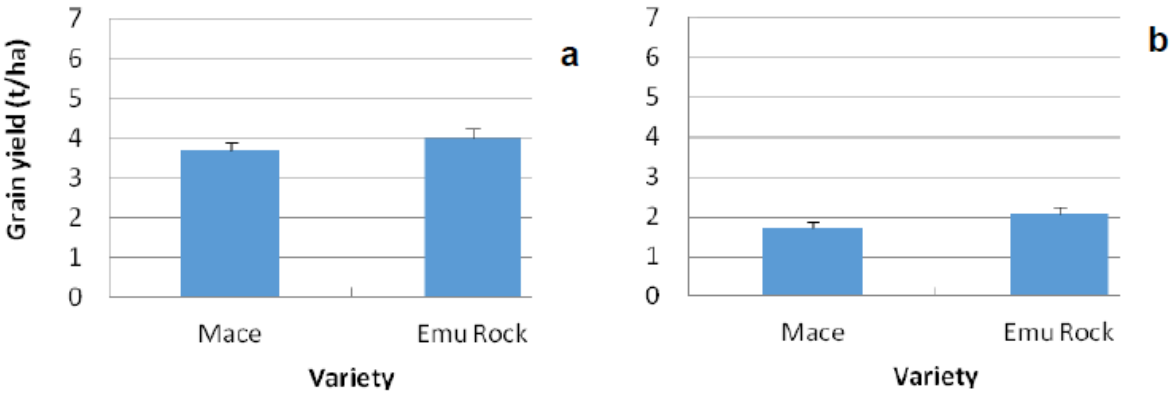

Figure 6. Average grain yield of two wheat varieties at Salmon Gums (a) and Lake Grace (b). Vertical bars are least significant difference (LSD). Inter-row sowing did not significantly increase grain yield at any of the three locations.

DNA levels of *Fusarium* spp. in soil collected at anthesis were found to be in the medium to high disease risk category at Lake Grace and Salmon Gums. This was reflected by the presence of infected tillers observed at anthesis in both locations. However white heads were not observed due to good rain during grain fill period even though inoculum levels were at high risk category. In Tenindewa, soil DNA levels were at below detection level (BDL).

REFERENCE

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

KEY WORDS

Crown rot, Wheat, Inter row

ACKNOWLEDGMENTS

GRDC for funding the research. DAFWA Geraldton, Katanning, Northam and Wongan Hills Research Support Unit for seeding and harvesting trials. All the growers that kindly allowed DAFWA to conduct the trials on their land during 2011 to 2013.

GRDC Project No.: DAN00175
Paper reviewed by: Geoff Thomas

Department of
Agriculture and **Food**

Disclaimer

1. The information, representations and statements contained in this publication are provided for general scientific information purposes only.

2. The State of Western Australia, the Minister for Agriculture and Food the Director General of the Department of Agriculture and Food, the Grains Research and Development Corporation and their respective officers, employees and agents:

a) do not make any representation or warranty as to the accuracy reliability completeness or currency of the information, representations or statements in this publication (including but not limited to information which has been provided by third parties); and

b) shall not be liable, in negligence or otherwise, to a person for any loss liability or dam age arising out of an act or failure to act by any person in using or relying on any information, representation or statements contained in this publication.

3. The State of Western Australia, the Minister for Agriculture and Food the Director General of the Department of Agriculture and Food, the Grains Research and Development Corporation and their respective officers, employees and agents:

a) make no representations or warranty that any of the products specified in this publication ('Specified Products') are registered pursuant to the Agricultural and Veterinary Chemicals Code Act 1994 (WA).

4. a) The State of Western Australia, the Minister for Agriculture and Food the Director General of the Department of Agriculture and Food, the Grains Research and Development Corporation and their respective officers employee and agents do not endorse or recommend any Specified Product or any manufacturer of a Specified Product. Brand, trade and proprietary names have been be used solely for the purpose of assisting users of this publication to identify products.

b) Products that are not Specified Products ('Alternative Products') may perform as well as or better than Specified Products.

5. Users of any chemical product should always read the label on the product before use and should follow the directions specified on the label.