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Yield response of wheat, barley and durum varieties to crown rot – Rowena 2013

Steven Simpfendorfer and Rick Graham
NSW DPI, Tamworth

Key findings

Sunguard$^{\Phi}$, EGA Wylie$^{\Phi}$, Mitch$^{\Phi}$, LRPB Lancer$^{\Phi}$ and Commander$^{\Phi}$ were between 0.59 t/ha to 0.37 t/ha higher yielding than EGA Gregory$^{\Phi}$ under high crown rot pressure.

Variety selection is not the sole solution to crown rot with the best entries still suffering around 40% yield loss at this site where a full soil moisture profile at planting, late sowing and limited in-crop rainfall were very conducive to disease expression.

Crown rot also negatively impacted on grain quality with a 0.6 to 1.4% decrease in protein levels and a 3 to 16% increase in the level of screenings in the majority of entries.

Introduction

Crown rot (CR) caused predominantly by the fungus *Fusarium pseudograminearum* (*Fp*), remains a major constraint to the production of winter cereals in the northern grains region. Varieties have been shown to differ in their yield loss from crown rot largely in line with their resistance ratings to this disease. However, the actual yield and maintenance of grain quality in the presence of crown rot infection is also an important consideration for growers as this impacts on their economic return. This trial examined the impact of crown rot on commonly grown and recently released durum, bread wheat and barley varieties at Rowena in north-west NSW in 2013.

Site details

Location:	**'Woolondoon' Rowena**
Co-operator:	**David and Tim Cameron**
Sowing date:	**30 May 2013**
PAW sowing:	**275 mm (0–120 cm)**
Fertiliser:	**180 kg/ha granular urea and 70 kg/ha Granulock 12Z at sowing**
In-crop rainfall:	**48 mm**
PreDicta B:	**Nil *Pn*, 0.6 *Pt*/g soil (low risk), nil *Fusarium* and 1.2 log *Bipolaris* DNA/g at 0–30 cm**

Treatments

Four barley varieties (Commander$^{\Phi}$, GrangeR$^{\Phi}$, Grout$^{\Phi}$ and Oxford$^{\Phi}$).

Four durum wheat varieties (Caparoi$^{\Phi}$, EGA Bellaroi$^{\Phi}$, Jandaroi$^{\Phi}$ and Hyperno$^{\Phi}$).

Ten bread wheat varieties (EGA Gregory$^{\Phi}$, EGA Wylie$^{\Phi}$, LRPB Dart$^{\Phi}$, LRPB Impala$^{\Phi}$, LRPB Lancer$^{\Phi}$, LRPB Spitfire$^{\Phi}$, Mitch$^{\Phi}$, Strzelecki$^{\Phi}$, Sunguard$^{\Phi}$ and Suntop$^{\Phi}$).

Added (plus) or no added (minus) crown rot at sowing using sterilised durum grain colonised by at least five different isolates of *Fp*.

Results

Yield

- In the absence of crown rot infection (no added CR) yield in the durum varieties ranged from 2.78 t/ha (Hyperno$^{\Phi}$) to 3.21 t/ha (Jandaroi$^{\Phi}$), in the bread wheat from 3.08 t/ha (LRPB Spitfire$^{\Phi}$) to 3.57 t/ha (LRPB Lancer$^{\Phi}$) and in the barley from 2.80 t/ha (Oxford$^{\Phi}$) to 3.65 t/ha (Commander$^{\Phi}$) (Figure 1).
- Crown rot infection had a large impact on yield in all varieties with yield loss in the durum varieties ranging from 57% (Hyperno$^{\Phi}$) to 81% (EGA Bellaroi$^{\Phi}$), in the bread wheat from 39% (EGA Wylie$^{\Phi}$) to 58% (Strzelecki$^{\Phi}$) and in the barley from 48% (Oxford$^{\Phi}$) to 64% (GrangeR$^{\Phi}$). This equated to a loss in yield of between 1.28 t/ha with EGA Wylie$^{\Phi}$ up to 2.29 t/ha with EGA Bellaroi$^{\Phi}$ (Figure 1).

- Actual yield in the presence of crown rot infection (added CR) ranged in the durum varieties from 0.54 t/ha (EGA Bellaroi$^{\phi}$) to 1.21 t/ha (Jandaroi$^{\phi}$ and Hyperno$^{\phi}$), in the bread wheat from 1.41 t/ha (Strzelecki$^{\phi}$) to 2.03 t/ha (Sunguard$^{\phi}$) and in the barley from 1.14 t/ha (GrangeR$^{\phi}$) to 1.81 t/ha (Commander$^{\phi}$)(Figure 1).
- The four bread wheat varieties Sunguard$^{\phi}$ (0.59 t/ha), EGA Wylie$^{\phi}$ (0.58 t/ha), Mitch$^{\phi}$ (0.55 t/ha) and LRPB Lancer$^{\phi}$ (0.46 t/ha$^{\phi}$) were significantly higher yielding than EGA Gregory$^{\phi}$ in the presence of added crown rot.
- Commander$^{\phi}$ (0.37 t/ha) was the only barley variety that was significantly higher yielding than EGA Gregory$^{\phi}$ in the presence of added crown rot.
- The two durum varieties Caparoi$^{\phi}$ and EGA Bellaroi$^{\phi}$ were the only entries which were significantly lower yielding than EGA Gregory$^{\phi}$ in the presence of added crown rot.

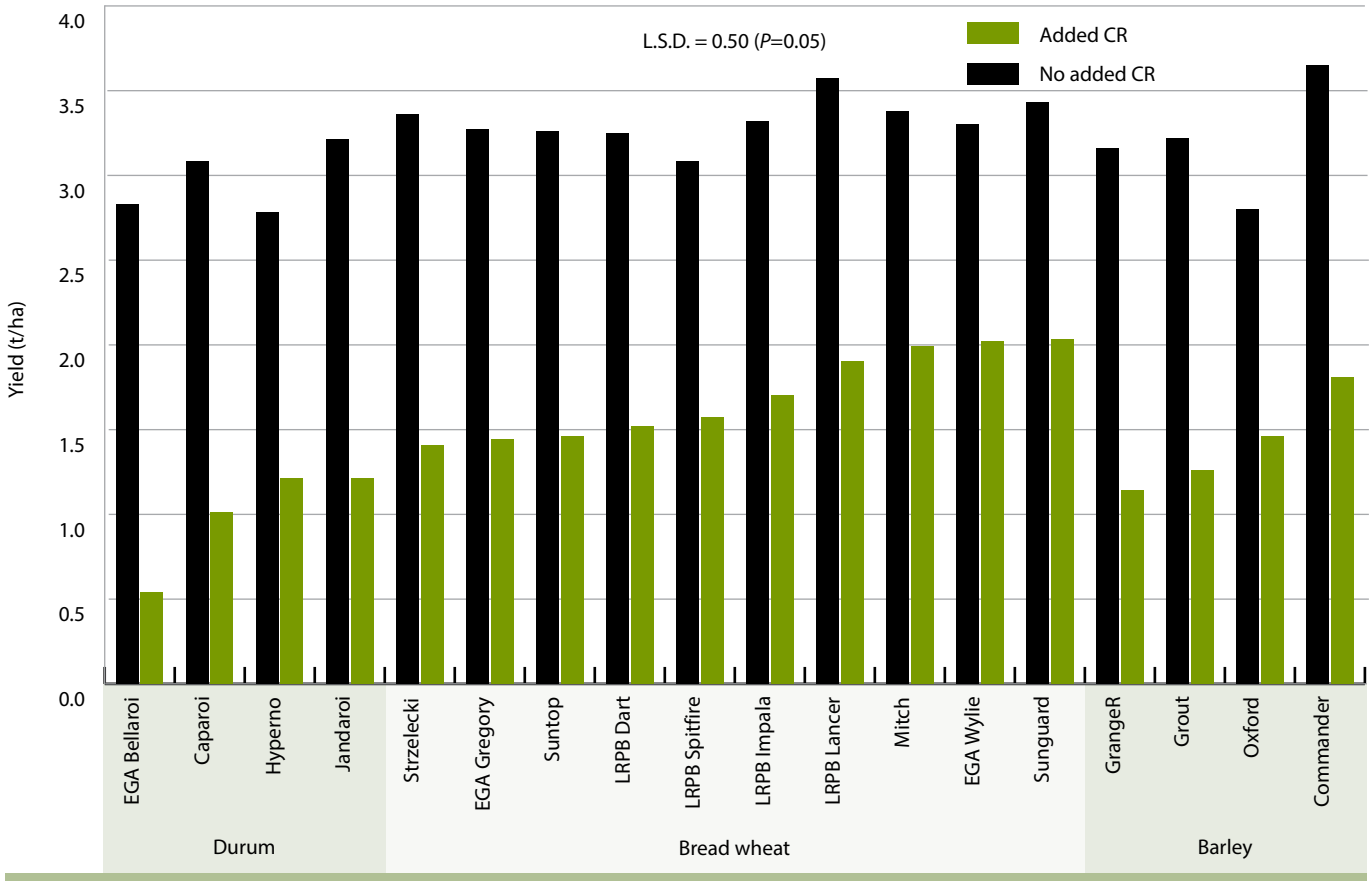

***Figure 1**. Yield (t/ha @ 11% moisture) of varieties with no added and added crown rot – Rowena 2013*

Protein

- Protein levels ranged between 12.1% (LRPB Impala$^{\phi}$) up to 15.4% (EGA Bellaroi$^{\phi}$) in the absence of crown rot infection (data not shown).
- Crown rot infection significantly reduced grain protein levels in all but six of the 18 entries (Jandaroi$^{\phi}$, Mitch$^{\phi}$, LRPB Spitfire$^{\phi}$, Sunguard$^{\phi}$, Suntop$^{\phi}$ and Grout$^{\phi}$). Crown rot infection reduced protein levels by between 0.6% in EGA Wylie$^{\phi}$ to 1.4% in EGA Bellaroi$^{\phi}$ in the remaining varieties (data not shown).

Screenings

In the absence of crown rot infection (no added CR) screening levels in the durum varieties ranged from 2.8% (Jandaroi$^{\phi}$) to 6.7% (Hyperno$^{\phi}$), in the bread wheat from 3.3% (LRPB Spitfire$^{\phi}$) to 10.1% (Mitch$^{\phi}$) and in the barley from 4.9% (Commander$^{\phi}$) to 14.8% (Oxford$^{\phi}$) (Figure 2).

Crown rot infection significantly increased the level of screenings in all entries except the barley variety Oxford(◊) which already had nearly 15% screenings in the absence of this disease. Screening levels were increased with crown rot infection by around 3–6% in bread wheat, 5–6% in barley and were highest in durum with around a 10–16% increase. Since receival standards for durum grades DR1 and DR2 are 5% or less, and DR3 is 10% or less this would have meant a drop in grade to delivering as Feed wheat only, which would also cause a significant reduction in returns to a grower (Figure 2).

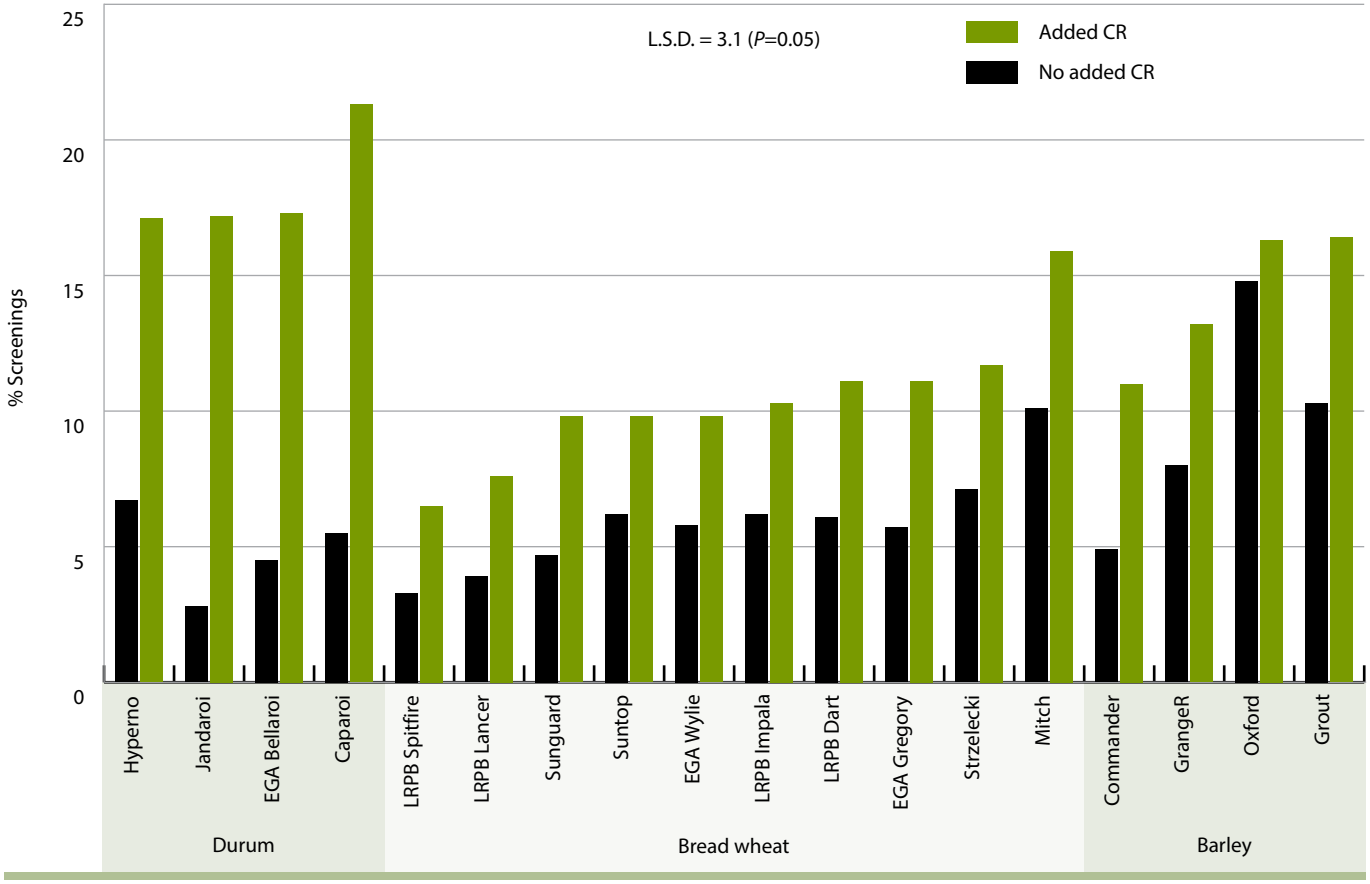

***Figure 2**. Percentage screenings of varieties with no added and added crown rot – Rowena 2013*

Acknowledgements

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