

# NSW research results

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# Regional crown rot management – Bithramere 2014

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## 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. Cereal varieties differ in their resistance to crown rot which can have a significant impact on their relative yield in the presence of this disease. Two trials were conducted at this site in 2014. The first trial was one of 12 conducted by NSW DPI in 2014 across central/northern NSW extending into southern Queensland to examine the impact of crown rot on the yield of one barley, one durum and ten bread wheat varieties. The second trial was aimed at taking a step back in the approach of using foliar fungicides to determine if targeting application at the base of tillers might improve the level of control and provide more consistent effects. This same trial was conducted across nine sites in 2013 so when combined with this additional data from 2014 will firmly establish the potential of in-crop fungicide management of crown rot.

## Site details

Location:	<b>'Wheatacres' Bithramere</b>
Co-operator:	<b>Richard and Michael Bowler</b>
Sowing date:	<b>5 June 2014</b>
Fertiliser:	<b>150 kg/ha Urea and 60 kg/ha Granulock Supreme Z at sowing</b>
Starting N:	<b>80 kg/ha nitrate N to 120 cm</b>
Starting water:	<b>~190 mm PAW (0–120 cm)</b>
In-crop rainfall:	<b>190 mm</b>
PreDicta B®:	<b>Nil RLN, 1.2 log <i>Fusarium</i> DNA/g (low risk) at sowing (0–30 cm)</b>
Fungicide date:	<b>15 August at GS30</b>
Harvest date:	<b>28 November 2014</b>

## Treatments

### Trial 1. Variety evaluation

- One barley variety (Commander<sup>®</sup>).
- One durum variety (Caparoi<sup>®</sup>).
- Ten commercial bread wheat varieties (LRPB Lincoln<sup>®</sup>, EGA Gregory<sup>®</sup>, LRPB Dart<sup>®</sup>, Sunmate<sup>®</sup>, LRPB Gauntlet<sup>®</sup>, LRPB Lancer<sup>®</sup>, LRPB Spitfire<sup>®</sup>, Mitch<sup>®</sup>, Suntop<sup>®</sup> and Sunguard<sup>®</sup>; listed in order of increasing resistance to crown rot).
- Added or no added crown rot at sowing using sterilised durum grain colonised by at least five different isolates of *Fp*.

### Trial 2. Fungicide application evaluation

- EGA Gregory<sup>®</sup> with added or no added crown rot at sowing using infected durum grain.
- One fungicide (Prosaro<sup>®</sup> at 300 mL/ha + 0.25% Chemwet 1000)

## Key findings

Heavy crown rot infection in inoculated plots led to yield loss ranging from 14% (Sunguard<sup>®</sup>) up to 47% (EGA Gregory<sup>®</sup>) even in this relatively high yielding site (average yield of 4.67 t/ha) in 2014.

Variety choice had a large impact on yield in the presence of high levels of crown rot infection with all but two entries being between 0.65 t/ha (Sunmate<sup>®</sup>) to 1.71 t/ha (LRPB Spitfire<sup>®</sup>) higher yielding than EGA Gregory<sup>®</sup>.

Sunguard<sup>®</sup> was also the only entry to have screening levels <5% in the presence of high crown rot infection at this site in 2014 with LRPB Spitfire<sup>®</sup> just exceeding the threshold.

In-crop fungicide application at GS30, provide a *modest* yield benefit of between 0.23 to 0.34 t/ha when targeted at the base EGA Gregory<sup>®</sup> plants infected with crown rot.

- Three in-crop application strategies at GS31 using Turbo Teejet (110015) nozzles at ~300 L/ha
- Above crop – foliar spray 50 cm above crop height (i.e. normal rust spray with most of product deposited on upper leaf surfaces).
- On crop – boom dropped to crop height and nozzles moved between wheat rows (i.e. product hitting base of plant and soil).
- Droppers – solid rod from boom down to below canopy height then two nozzles angled at ~45 degrees towards base of tillers on opposite crop rows (i.e. all of product targeted at base of plants).

**Result**

**Trial 1. Variety evaluation**

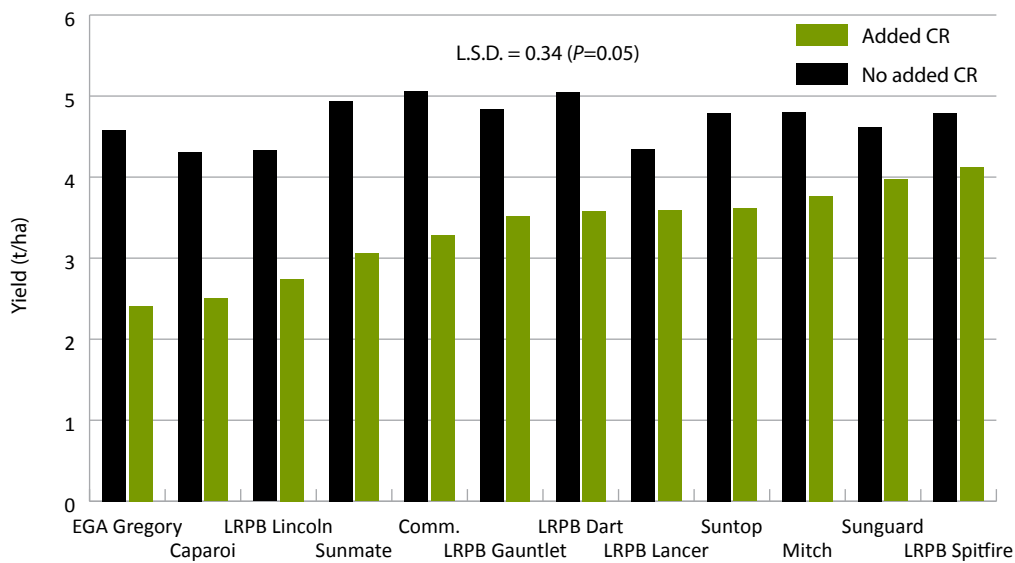
**Yield**

This was a relatively high yielding site in 2014 with yield in the no added CR treatment (black bars) ranging from 4.31 t/ha in the durum variety Caparoi<sup>Ⓢ</sup> up to 5.06 t/ha in the barley variety Commander<sup>Ⓢ</sup> (Figure 1).

All entries had significant yield loss under high crown rot infection (added CR) which ranged from 14% (0.65 t/ha) in Sunguard<sup>Ⓢ</sup> up to 47% (2.16 t/ha) in EGA Gregory<sup>Ⓢ</sup>.

None of the varieties were lower yielding than EGA Gregory<sup>Ⓢ</sup> under high levels of crown rot infection in the added CR treatment with the durum variety Caparoi<sup>Ⓢ</sup> and bread wheat variety LRPB Lincoln<sup>Ⓢ</sup> having equivalent yield.

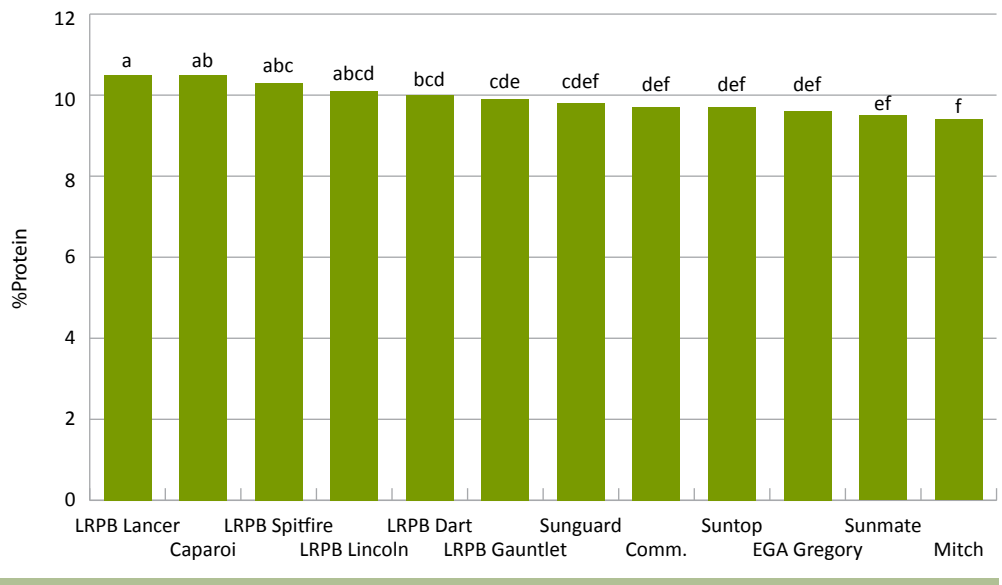
All other entries were higher yielding than EGA Gregory<sup>Ⓢ</sup> under high levels of crown rot infection (green bars) with the yield benefit ranging from 0.65 t/ha with Sunmate<sup>Ⓢ</sup> up to 1.71 t/ha with LRPB Spitfire<sup>Ⓢ</sup> (Figure 1).



**Figure 1.** Yield (t/ha @ 11% moisture) of varieties with no added and added crown rot – Bithramere 2014

**Grain protein**

- The addition of crown rot inoculum at sowing did not significantly change protein levels in any variety.
- Protein levels were quite low at this site ranging between 9.4% (Mitch<sup>Ⓢ</sup>) up to only 10.5% (LRPB Lancer<sup>Ⓢ</sup>; Figure 2).



**Figure 2.** Average protein concentration achieved by varieties – Bithramere 2014

Bars with the same letter are not significantly different ( $P=0.05$ )

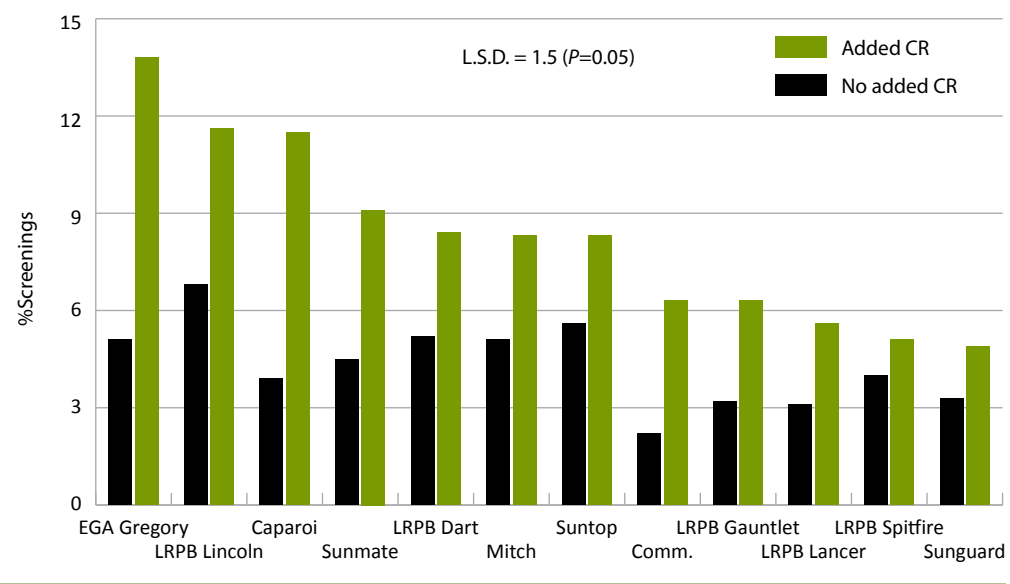
**Screenings**

In the no added CR treatment (black bars), Mitch<sup>Ⓟ</sup>, EGA Gregory<sup>Ⓟ</sup>, LRPB Dart<sup>Ⓟ</sup>, Suntop<sup>Ⓟ</sup> and LRPB Lincoln<sup>Ⓟ</sup> all had screening levels (<2.0 mm) greater than 5% (range 5.1 to 6.8%; Figure 3).

LRPB Spitfire<sup>Ⓟ</sup> was the only entry not to have a significant increase in screenings in the presence of high crown rot infection.

In all other entries the level of screenings increased by between 1.6% (Sunguard<sup>Ⓟ</sup>) to 8.7% (EGA Gregory<sup>Ⓟ</sup>) when CR was added (green bars).

Sunguard<sup>Ⓟ</sup> was the only variety to maintain <5.0% screenings in the presence of high levels of crown rot infection with LRPB Spitfire<sup>Ⓟ</sup> (5.1%) being very close to this threshold (Figure 3).



**Figure 3.** Level of screenings achieved by varieties in no added and added crown rot treatments – Bithramere 2014

**Trial 2. Fungicide application evaluation**

- The effect of treatments was not significant at the added CR versus no added CR level of interaction.
- Fungicide application at GS 30 provided a modest increase in yield of 0.23 t/ha with on crop application and 0.34 t/ha when applied with droppers over the nil treatment (3.35 t/ha).
- Above crop application did not provide a yield benefit over the nil treatment.
- None of the fungicide application treatments had a significant impact on grain protein or screenings.

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