

# Regional crown rot management – Edgeroi 2016

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## Key findings

- Yield loss from crown rot ranged from not significant in four of the bread wheat varieties up to 14.9% in the barley variety Compass<sup>®</sup>.
- Bread wheat variety choice affected yield in the presence of high levels of crown rot infection with eight entries being between 0.29 t/ha and 0.76 t/ha higher yielding than EGA Gregory<sup>®</sup>.
- Grain protein levels varied from 11.9% in Beacom<sup>®</sup> up to 14.7% in the recently released durum variety DBA Lillaro<sup>®</sup>. Crown rot did not affect protein levels in any other entry.
- Screening levels varied from 4.4% in the barley variety Compass<sup>®</sup> and bread wheat variety Coolah<sup>®</sup> up to 9.3% in the barley variety Spartacus<sup>®</sup>. Crown rot did not affect screenings in any other entry.

## Introduction

Crown rot (CR) caused predominantly by the fungus *Fusarium pseudograminearum* (Fp), remains a major constraint to winter cereal production in the northern grains region. Cereal varieties differ in their resistance to crown rot, which can have a significant affect on their relative yield in the presence of this disease.

This experiment was one of 11 conducted by NSW DPI in 2016 across central/northern NSW extending into southern Qld; to examine the effects from crown rot on the yield and quality of four barley, three durum and 13 bread wheat varieties.

## Site details

Location	‘Coolatoota’, Edgeroi
Co-operator	Andrew Campbell
Sowing date	19 May 2016
Fertiliser	136 kg/ha urea and 60 kg/ha Granulock 12Z (treated with 400 mL/ha of flutriafol) at sowing
Starting nitrogen	165 kg N/ha to 120 cm
Starting soil water	99 mm plant available soil water (0–120 cm)
Rainfall	The growing season rainfall was 323 mm
PreDicta B	Nil <i>Pratylenchus thornei</i> , nil <i>P. neglectus</i> and 0.7 log <i>Fusarium</i> DNA/g soil (low crown rot risk) at sowing (0–15 cm)
Harvest date	4 December 2016

## Treatments

### Varieties (20)

- Four barley varieties: Commander<sup>®</sup>, Compass<sup>®</sup>, La Trobe<sup>®</sup> and Spartacus<sup>®</sup>.
- Three durum varieties: Jandaro<sup>®</sup> and DBA Lillaro<sup>®</sup> plus the numbered line 190873.
- Thirteen bread wheat varieties: EGA Gregory<sup>®</sup>, LRPB Flanker<sup>®</sup>, Beacom<sup>®</sup>, Coolah<sup>®</sup>, Sunmate<sup>®</sup>, LRPB Lancer<sup>®</sup>, LRPB Reliant<sup>®</sup>, LRPB Gauntlet<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) plus one numbered line LPB12-0494.

### Pathogen treatment

Added or no added crown rot at sowing using sterilised durum grain colonised by at least five different isolates of Fp at a rate of 2.0 g/m of row at sowing.

## Results

### Yield

In the no added CR treatment, yield ranged from 3.85 t/ha in the barley variety Commander<sup>Ⓢ</sup> up to 5.92 t/ha in the bread wheat variety Beckom<sup>Ⓢ</sup> (Table 1).

The bread wheat varieties Beckom<sup>Ⓢ</sup>, Suntop<sup>Ⓢ</sup>, LRPB Gauntlet<sup>Ⓢ</sup> and LRPB Reliant<sup>Ⓢ</sup> did not suffer significant yield loss under high levels of crown rot infection (added CR). The remaining entries suffered significant yield loss under high levels of crown rot infection (added CR), ranging from 4.2% in the bread wheat variety Sunmate<sup>Ⓢ</sup> (0.25 t/ha) up to 14.9% in the barley variety Compass<sup>Ⓢ</sup> (0.68 t/ha).

All four barley varieties and all three durum entries were lower yielding than EGA Gregory<sup>Ⓢ</sup> under high crown rot infection (added CR). The bread wheat varieties LRPB Spitfire<sup>Ⓢ</sup>, Sunguard<sup>Ⓢ</sup>, LRPB Flanker<sup>Ⓢ</sup> and LRPB Reliant<sup>Ⓢ</sup> all produced yields equivalent to EGA Gregory<sup>Ⓢ</sup> in the added CR treatment (Table 1).

The bread wheat entries Beckom<sup>Ⓢ</sup> (0.76 t/ha), Sunmate<sup>Ⓢ</sup> (0.60 t/ha), Suntop<sup>Ⓢ</sup> (0.56 t/ha), Mitch<sup>Ⓢ</sup> (0.52 t/ha), Coolah<sup>Ⓢ</sup> (0.52<sup>Ⓢ</sup> t/ha), LRPB Lancer<sup>Ⓢ</sup> (0.41 t/ha), LRPB Gauntlet<sup>Ⓢ</sup> (0.34 t/ha) and LPB12-0494 (0.29 t/ha) were all higher yielding than EGA Gregory<sup>Ⓢ</sup> under high levels of crown rot infection (added CR; Table 1).

Table 1. Yield and grain quality of varieties with no added and added crown rot – Edgeroi 2016.

Crop	Variety	Yield (t/ha)		Protein	Screenings
		No added CR	Added CR	(%)	(%)
Barley	Spartacus	4.85	4.46	14.4	9.3
	La Trobe	4.84	4.16	13.7	7.9
	Compass	4.58	3.89	12.7	4.4
	Commander	3.85	3.44	13.7	8.1
Durum	DBA Lillaroï	4.92	4.57	14.7	7.3
	Jandaroï	4.77	4.38	14.0	5.6
	190873	4.68	4.11	14.5	7.2
Bread wheat	Beckom	5.92	5.79	11.9	5.1
	Sunmate	5.88	5.63	12.3	8.9
	Suntop	5.81	5.59	12.3	5.1
	Mitch	5.83	5.55	12.0	5.0
	Coolah	5.83	5.55	12.3	4.4
	LRPB Lancer	5.71	5.44	13.2	5.1
	LRPB Gauntlet	5.55	5.37	12.5	6.2
	LPB12-0494	5.72	5.32	12.4	8.5
	LRPB Spitfire	5.67	5.12	14.5	5.1
	Sunguard	5.46	5.12	12.4	7.4
	LRPB Flanker	5.64	5.08	12.7	6.1
	EGA Gregory	5.50	5.03	12.8	6.3
	LRPB Reliant	5.01	4.86	12.6	6.7
Site mean		5.30	4.92	13.1	6.5
CV (%)		2.8		2.2	25.6
I.s.d.		0.236		0.33	1.91
P value		0.021		<.001	<.001

### Grain quality

Protein levels were relatively high at this site in 2016, ranging from 11.9% (Beckom<sup>Ⓢ</sup>) up to 14.7% (DBA Lillaroï<sup>Ⓢ</sup>; Table 1). Crown rot infection (added CR) did not significantly affect grain protein levels in any of the entries at this site in 2016.

Screening levels ranged from 4.4% in the barley variety Compass<sup>db</sup> and bread wheat variety Coolah<sup>db</sup> up to 9.3% in the barley variety Spartacus<sup>db</sup> (Table 1). Crown rot infection (added CR) did not significantly affect grain protein levels in any of the entries at this site in 2016.

## Conclusions

Bread wheat variety choice provided a 6–15% yield benefit over growing the susceptible bread wheat variety EGA Gregory<sup>db</sup> under high levels of crown rot infection at Edgeroi in 2016. This could have maximised profit in this growing season, but will **not** reduce inoculum levels for subsequent crops because all winter cereal varieties are susceptible to crown rot infection. Winter cereal crop and variety choice is therefore **not** the sole solution to crown rot, but rather just one element of an integrated management strategy to limit losses from this disease.

## Acknowledgements

This research was part of the project *National crown rot epidemiology and management program* (DAN00175), with joint investment by NSW DPI and GRDC. Thanks to Andrew Campbell for providing the experiment site and Rick Graham, Jim Perfrement, Mick Dal Santo, Stephen Morphett (NSW DPI) for sowing, maintaining and harvesting the experiment. Thanks to Chrystal Fensbo (NSW DPI) for grain quality assessments and to Jason Lowien (GrainCorp) for use of an NIR machine to determine grain protein levels.