Regional crown rot management – Coonamble 2015

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Key findings

High background crown rot inoculum levels existed at this site in 2015, resulting in high infection levels in all plots, so the actual extent of yield loss within each variety could not be determined.

Bread wheat variety choice had a large effect on yield where there were high levels of crown rot infection with nine entries being between 0.34 t/ha to 0.84 t/ha higher yielding than EGA Gregory(Ф).

The barley varieties Commander(Ф) and La Trobe(Ф) and were 1.03 t/ha and 1.28 t/ha higher yielding than EGA Gregory(Ф) under high levels of crown rot infection, respectively.

Rancona® Dimension did not provide a yield benefit in the presence of high levels of crown rot infection at this site in 2015.

Introduction

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

Rancona® Dimension (ipconazole + metalaxyl) was recently registered in Australia as a fungicide seed treatment with good activity against cereal bunts and smuts, pythium and for the suppression of rhizoctonia. Rancona® Dimension is also the first seed treatment to be registered (at 320 mL/100 kg seed) for the suppression of CR. Suppression, by definition, indicates that the seed treatment reduces the pathogen's growth for a set period of time early in the season.

Two trials were conducted at this site:

1. A variety trial, which was one of 12 conducted by NSW DPI in 2015 across central/northern NSW extending into southern Qld to examine the effect of CR on the yield of two barley, one durum and 13 bread wheat varieties.
2. A second trial aimed to evaluate the efficacy of Rancona® Dimension as a standalone option to control CR was also conducted across the same 12 sites in the northern region. This will hopefully ensure that growers have a realistic expectation of what this seed treatment can achieve if used in isolation from other integrated disease management strategies.

Site details

Location:	**"Naratigah", Coonamble**
Co-operator:	**Tony Single**
Sowing date:	**28 May 2015**
Fertiliser:	**60 kg/ha Granulock® 12Z at sowing**
Starting N:	**41.4 mg/kg (0–60 cm)**
In-crop rainfall:	**174 mm**
PreDicta B®:	**Nil root lesion nematodes and 2.2 log *Fusarium* DNA/g (high) at sowing (0–30 cm)**
Harvest date:	**19 November 2015**

Treatments

Trial 1. Variety evaluation

- Two barley varieties: (Commander(Ф) and La Trobe(Ф))
- One durum variety: (Jandaroi(Ф))
- Eleven commercial bread wheat varieties: (EGA Gregory(Ф), LRPB Flanker(Ф), Sunmate(Ф), LRPB Gauntlet(Ф), LRPB Lancer(Ф), LRPB Viking(Ф), LRPB Spitfire(Ф), Beckom(Ф), Mitch(Ф), Suntop(Ф) and Sunguard(Ф); listed in order of increasing resistance to CR) and two numbered lines (VO7176-69 and QT15046R).
- Added or no added CR at sowing using sterilised durum grain colonised by at least five different isolates of *Fp*.

Trial 2. Fungicide seed treatment evaluation

- EGA Gregory(Ф) with added or no added CR at sowing using infected durum grain.
- Seed treatments evaluated:
  1. Nil seed treatment
  2. Rancona® Dimension (ipconazole 25 g/L + metalaxyl 20 g/L) at 320 mL/100 kg seed

3. Dividend M® (difeniconazole 92 g/L + metalaxyl-M 23 g/L) at 260 mL/100 kg seed
4. Jockey Stayer® (fluquinconazole 167 g/L) at 450 mL/100 kg seed.

Dividend M® and Jockey Stayer® are NOT registered for the suppression of CR, but were included to represent a commonly used wheat seed treatment for bunt and smut control, or early control of stripe rust (leaf disease), respectively. Including four treatments across each site ensured statistical rigour for yield outcomes.

Results

Trial 1. Variety evaluation

Yield

- Due to high background crown rot inoculum levels at this site the interaction between winter cereal entry and inoculum level was not significant (P=0.363) as high infection levels occurred in both the no added CR and added CR treatments. Hence, the average of added CR and no added CR treatments for each entry are presented (Table 1).
- However, entries still varied in their yield performance under these high levels of crown rot infection which ranged from 3.05 t/ha in the bread wheat variety EGA Gregory up to 4.33 t/ha in the barley variety La Trobe (Table 1).
- No entry was lower yielding than EGA Gregory. The durum variety Jandaroi and bread wheat varieties LRPB Flanker, Viking and Sunguard all produced yield equivalent to EGA Gregory (Table 1).
- The bread wheat entries VO7176-69 (0.34 t/ha), QT15046R (0.35 t/ha), Suntop (0.38 t/ha), LRPB Spitfire (0.44 t/ha), LRPB Lancer (0.45 t/ha), Mitch (0.50 t/ha), Sunmate (0.56 t/ha), LRPB Gauntlet (0.64 t/ha) and Beckom (0.84 t/ha) were all higher yielding than EGA Gregory under high CR infection levels at this site in 2015 (Table 1).
- The barley varieties Commander (1.03 t/ha) and La Trobe (1.28 t/ha) were both higher yielding than EGA Gregory under high CR infection levels at this site in 2015 (Table 1).

Table 1. *Yield and grain quality of varieties averaged over treatments (no added and added crown rot) – Coonamble 2015*

Crop	Variety	Yield (t/ha)	Protein (%)	Screenings (%)
Barley	La Trobe	4.33	13.1	16.4
	Commander	4.08	13.1	13.2
Durum	Jandaroi	3.23	15.1	13.4
Bread wheat	Beckom	3.89	13.1	30.5
	LRPB Gauntlet	3.69	13.8	10.8
	Sunmate	3.61	13.1	19.4
	Mitch	3.55	13.7	19.0
	LRPB Lancer	3.50	14.0	11.9
	LRPB Spitfire	3.49	14.6	15.6
	Suntop	3.43	13.8	20.1
	QT15046R	3.40	12.9	17.5
	V07176-69	3.39	13.2	17.3
	Sunguard	3.33	13.9	18.7
	Viking	3.33	13.2	18.8
	LRPB Flanker	3.18	13.6	19.8
	EGA Gregory	3.05	13.1	17.1
Site mean		3.53	13.6	17.5
CV (%)		7.0	3.6	18.5
LSD		0.286	0.56	3.74
P value		<0.001	<0.001	<0.001

Grain quality

- The addition of CR inoculum did not significantly impact on grain quality in any of the entries (data not presented). Hence, the average of added CR and no added CR treatments for each entry are presented (Table 1).
- Protein levels were relatively high at this site in 2015 which ranged between 12.9% (QT15046R) up to 15.1% (Jandaroi; Table 1).
- Screening levels were also quite high at this site in 2015 which ranged from 10.8% in the bread wheat variety LRPB Gauntlet up to 30.5% in the bread wheat variety Beckom averaged across the no added CR and added CR treatments (Table 1).

Trial 2. Fungicide seed treatment evaluation

- The addition of *Fp* inoculum at sowing reduced establishment in the added CR treatment (54 plants/m^2) compared to the no added CR treatment (62 plants/m^2), averaged across seed treatments.
- Jockey Stayer® and nil seed treatment (both 53 plants/m^2) had lower establishment than Rancona® Dimension (68 plants/m^2) averaged across the CR treatments with Dividend M® (58 plants/m^2) having intermediate establishment. The interaction between CR treatment and seed treatment was not significant (P=0.769).
- Yield loss in the added CR treatment averaged 22% (0.68 t/ha) across seed treatments compared to the no added CR treatment.
- There was no significant (P=0.704) effect of any of the seed treatments on the yield of EGA Gregory in either the no added CR or added CR treatments (data not shown).

Conclusions

Cereal crop and variety choice provided an 11–42% yield benefit over growing the susceptible bread wheat variety EGA Gregory under high levels of CR infection at Coonamble in 2015. This can maximise profit in the current season but will not reduce inoculum levels for subsequent crops, because all winter cereal varieties are susceptible to CR infection. Winter cereal crop and variety choice is therefore not the sole solution to CR but rather just one element of an integrated management strategy to limit losses from this disease.

Rancona® Dimension did not provide a yield benefit under high CR pressure at Coonamble in 2015. Although Rancona® Dimension is registered for the suppression of CR, with activity against early infection and potential establishment losses evident in this study, growers should not expect this to translate into a significant and consistent reduction in yield loss from CR infection when the product is used as a standalone management strategy.

Integrated management remains the best strategy to reduce losses to CR.

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