CROWN ROT SEED DRESSING TRIAL

Managing Crown Rot in Wheat & Barley – Merriwagga, 2016

KEY MESSAGES

- Growing conditions in 2016 were very wet and mild, with rainfall from May to September one of the wettest on record. Growing season rainfall was well above average with 491mm recorded at the site.
- The conditions in 2016 did not favour the expression of crown rot, with only minimal disease observed. As a result there were no significant interactions between any of the seed treatments in this trial.
- Durum wheat is more susceptible to crown rot than barley. The durum wheat variety Aurora was used in this trial and was out-performed by the barley variety LaTrobe, yielding significantly lower.
- At tillering, the NDVI of treatments not infected by crown rot were significantly higher than those infected by crown rot. At flowering there was no significant difference in NDVI between any treatment.

Background

In conjunction with Arysta LifeScience, this is the second season we have trialled seed treatments and their impact on the incidence and severity of crown rot in wheat and barley.

Crown rot (Fusarium pseudograminearum and F. culmorum) is a fungal disease which can survive in infected stubble for a number of years. All winter cereals, as well as and many grass weeds, act as a host for crown rot.

Farming practices in southern NSW have changed over the past 10-15 years, with an increase in intensity of cropping and an increase in no-till farming practices. This has favoured crown rot, with crown rot being more prevalent in southern NSW in both wheat and barley as a result.

As varietal resistance and tolerance to crown rot is limited, seed treatments such as Rancona® Dimension which provide suppression of crown rot in wheat and barley, may have the potential to be used as part of an overall management strategy for crown rot in high risk situations.

Trial details

A trial was established in southern New South Wales at Jeff Muirhead's, Merriwagga on 3rd May, 2016 in conjunction with Arysta.

The aim of the trial was to evaluate the influence of the seed treatment Rancona® Dimension on the incidence and severity of crown rot in wheat, alongside other new and industry standard seed treatments.

FIGURE 1 Visual disease symptoms observed in the trial during grain fill – Aurora|Untreated|Infected, 2nd November.

The trial was sown at 30 kg/ha with 60 kg/ha MAP. It was replicated 3 times, with plot sizes 11m by 1.75m.

The growing season rainfall was 491mm. It was harvested on 28th November, 2016.

The trial consisted of 28 treatments which includes·

2 crop types:
1. Aurora durum wheat - very susceptible to crown rot
2. LaTrobe barley - moderately susceptible to susceptible to crown rot

7 seed treatments:
1. Untreated
2. Rancona® Dimension (ipconazole 25 g/L + metalaxyl 20 g/L) at 320 mL/100 kg seed
3. Rancona® Dimension + zinc (ipconazole 25 g/L + metalaxyl 20 g/L) at 320 mL/100 kg seed and Zincflo plus at 3 L/t seed
4. Systiva® (333 g/L fluxapyroxad) at 150 ml/100kg seed
5. Bayer Product – experimental at 260 ml/100kg seed
6. Baytan (standard in local area) – (triadmenol 150 g/L + triflumuron 4 g/L) at 150 ml/100kg seed
7. Vibrance (standard in local area) - (difenoconazole 66.2 g/L + metalaxyl-m 16.5 g/L + sedaxane 13.8 g/L) at 360 ml/100kg seed

Note: Systiva, Vibrance and Baytan are NOT registered for the suppression of crown rot. Systiva was included in the trial as it is a relatively new seed treatment and has shown good control of foliar diseases of barley and suppression of rhizoctonia. Vibrance and Baytan were included in the trial as they are commonly used seed treatments used mainly for controlling bunt and smut.

2 crown rot treatments:
1. Infected (inoculated) – To allow for an even infection of disease throughout the plot, the method of infection used was infected sterilised seed.
2. Non infected (uninoculated)

Conditions in 2016:
2016 was a wet and mild season. Conditions from May to September were one of the wettest on record in the area, with 134mm rain falling in September and 587mm rain for the year. Daytime temperatures in September were below average, whilst night time temperatures were above average. These conditions did not favour the development of crown rot in this trial, as moisture was not limiting during grain fill, as such disease observed was very minimal with often no or very few whiteheads observed (figure 1).

Results and discussion

Establishment, NDVI at late tillering and flowering, crown rot infection at late grain fill and grain yield were all assessed, with NDVI and grain yield statistically analysed. Grain quality was not analysed in this trial. Results are all summarised in this section.

As there were no significant differences between the treatments, given the season, figures 6 and 7 show the untreated treatments for both Aurora and LaTrobe with and without crown rot infection, taken October, 2016.

Establishment·

Crop establishment scores were taken on 14th June when the crop was at the 3-4 tiller stage, figure 2. Establishment was scored from 0 to 9, with 0 being very poorly established and uneven and 9 being very evenly established.

The trial established well, with scores ranging from 7 to 9, figure 3. Aurora treated with Baytan had the lowest establishment score, although an error at sowing meant that only one repitition of this treatment was sown.

NDVI

NDVI readings were taken late tillering, 29th June and again at flowering, 8th September.

Tillering:
At tillering LaTrobe had significantly higher NDVI values than Aurora, figure 4. Treatments which were not infected by crown rot also had significantly higher NDVI values compared to where treatments were infected.

NDVI values at tillering ranged from 0.295 for Aurora untreated and infected with crown rot to 0.457 for LaTrobe treated with Rancona Dimension + zinc and not infected with crown rot.

Treatments which were treated with Baytan had lower

FIGURE 2 Establishment of the trial, June 2016.

FIGURE 3 Crop establishment scores, taken 14th June, 2016 @ 3-4 tiller stage.

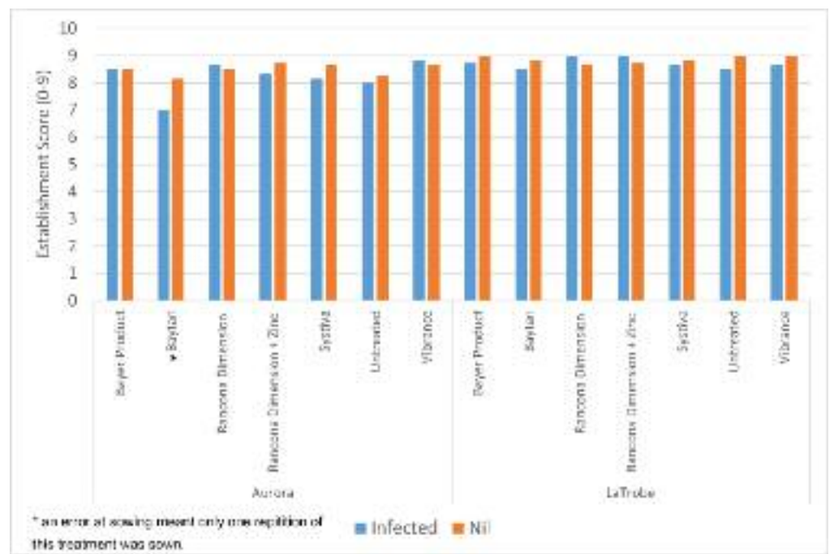

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TABLE 1 Disease incidence observed late grain fill, 2nd November 2016

TREATMENT	AURORA		LATROBE	
	Non infected	Infected	Non infected	Infected
Bayer Product	Nil	Nil	Nil	Nil
Baytan	Nil	Very low	Nil	Nil
Rancona Dimension	Nil	Nil	Nil	Nil
Rancona Dimension + Zinc	Nil	Nil	Nil	Nil
Systiva	Nil	Nil	Nil	Nil
Untreated	Nil	Very low	Nil	NIl
Vibrance	Nil	Very low	Nil	Nil

FIGURE 4 NDVI values at tillering - taken 29th June, 2016.

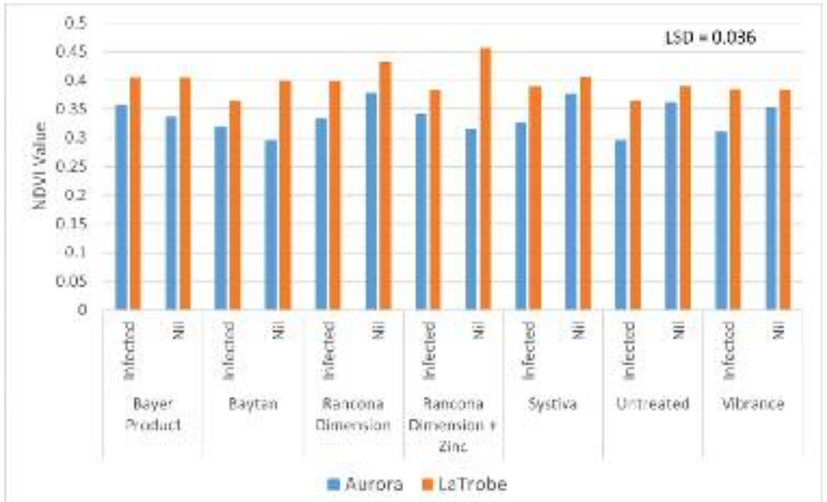

FIGURE 5 Crown Rot trial before harvest, November 2016

NDVI values (0.345) compared to all other treatments, although an error at sowing neant only one repitition was sown for the Aurora infected with Baytan treatment.

Rancona Dimension had the highest NDVI value (0.387) at tillering, compared to all other treatments.

Flowering:

LaTrobe barley was at mid flowering whilst Aurora durum wheat was just starting to flower when the measurement was taken.

At flowering the only significant difference in NDVI value was between the varieties Aurora and LaTrobe, with Aurora having a significantly higher NDVI value (0.595) compared to LaTrobe (0.555). There was not a lot of difference in NDVI value between each treatment, with no significant interactions between any of the treatments in this trial.

Visual crown rot infection late grain fill:

A visual disease assessement, looking for the signs of crown rot, including whiteheads, crown discolouration, grain size and lack of grain in heads, was carried out on the 2nd November.

The incidence of disease was rated from Nil (no disease observed) to severe, with greater than 50% of the plot affected by crown rot.

As growing conditions in 2016 were very mild, with a soft finish to the season, the expression of crown rot in the trial was very low.

Disease observed was therefore minimal, with a very low incidence of white heads and basal browning observed in a few treatments of Aurora, Table 1.

Grain Yield:

Given the season, there were no significant interactions between any of the treatments in this trial. The average grain yield of the trial was 2.96 t/ ha.

The only significant effect was between the crop types Aurora and LaTrobe, figure 5. Latrobe had a significantly higher grain yield (3.18 t/ha) compared to Aurora (2.75 t/ha).

Acknowledgements

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Further contacts

Barry Haskins
Ag Grow Agronomist
barry@aggrowagronomy.com.au

Rachael Whitworth
Ag Grow Research Manager
rachael@aggrowagronomy.com.au

Michael Skipper
Area Sales Manager, Arysta
michael.skipper@arysta.com

Clay Sutton
Technical Specialist, Arysta
clay.sutton@arysta.com

FIGURE 6 Treatments 1 and 8 - Aurora untreated and not infected (left) vs untreated and infected (right); taken 13th October, 2016

FIGURE 7 Treatments 15 and 22 - LaTrobe untreated and not infected (left) vs untreated and infected (right); taken 13th October, 2016