Arysta LifeScience

AgGrow
AGRONOMY + RESEARCH

CROWN ROT SEED DRESSING TRIAL

Barellan, 2015

INDEPENDENT AGRONOMY ADVICE + CUTTING EDGE RESEARCH

Crown Rot Management Trial

KEY POINTS

- Artificially infecting durum and bread wheat with crown rot enabled seed dressing options for control to be assessed.
- Durum wheat is more susceptible to crown rot than bread wheat. The durum wheat variety Aurora was used in this trial and was out-performed by the bread wheat Lancer, with yields significantly lower.
- The seed treatment Baytan significantly affected both varieties having the greatest reductions in crop vigour, the lowest NDVI and the lowest yields.
- Whilst not significant, Rancona showed that it can reduce the affects of crown rot having the least amount of early vigour reduction and maintaining yield.

BACKGROUND

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.

Crown rot has increased in southern NSW in both wheat and barley. This has been due to the increased intensity of crop rotations and the increased adoption of no-till farming practices over the past 10-15 years. Varietal resistance and tolerance to crown rot is limited.

Rancona® Dimension is a new systemic fungicide that also provides the suppression of crown rot in wheat and barley. It may have a place in situations where the risk of crown rot is high.

TRIAL DETAILS

A trial was established in southern New South Wales at Jeff Savage's, "Wanda Downs" Barellan on 30th April 2015, 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 versus industry standard seed treatments.

The trial consisted of:

<u>2 crop types:</u>

1. Aurora durum wheat (very susceptible to crown rot)
2. Lancer bread wheat (moderately susceptible to susceptible to crown rot)

<u>5 seed treatments:</u>

1. Untreated
2. Rancona Dimension
3. Rancona Dimension + zinc
4. Baytan (standard used in local area)
5. Vibrance (standard used in local area)

<u>2 crown rot treatments:</u>

1. Infected
2. Non infected

To allow for even infection of the disease throughout a plot, the method of infection used was infected sterilised seed.

The trial was replicated 3 times, with plot sizes 12m by 1.75m.

The trial was sown at 30 kg/ha with 60 kg/ha MAP. It received two fungicide applications. The first at the end of July and the second in September.

The growing season rainfall was 272mm. It was harvested on 19th November, 2015.

RESULTS AND DISCUSSION

Establishment, crop vigour reduction, NDVI at flowering, crown rot infection at late grain fill, grain yield and quality were all assessed and statistically analysed in this trial and are summarised in this section.

Figures 8 to 17 show each of the five seed treatments by variety with and without crown rot infection taken 10th June and 19th August.

Establishment:

Crop establishment scores were taken on 10th June when the crop was at the 4-5 leaf 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 6 to 9, with Aurora treated with Baytan having the lowest score.

Vigour Reduction (%) 28 DAS:

An estimate of crop vigour reduction was also taken on 10th June, figure 3.

Overall the durum variety Aurora had a significantly greater reduction in vigour than the variety Lancer. Treatments infected with crown rot also had a significantly greater reduction in vigour than the non-infected treatments.

Plots which were treated with Baytan had significantly greater reductions in vigour than all other treatments. Whilst Rancona seed treatment had the least amount of crop vigour reduction, it was not significantly different to the other seed treatments including the untreated plots and Vibrance.

NDVI:

NDVI readings were taken early tillering and again at flowering, figure 4.

Overall Lancer had significantly higher NDVI values than Aurora. Baytan had significantly lower NDVI values than all other seed treatments. Rancona had the highest NDVI values early, significantly different to all other treatments except Vibrance.

Aurora: Values at early tillering ranged from 0.22 to 0.37. At early tillering the treatments which had the lowest NDVI were the Baytan treated plots. Generally the infected plots had a lower NDVI than the non-infected plots.

At flowering values ranged from 0.6 to 0.67. The infected plots also had a slightly lower NDVI than the non-infected plots, with the exception of the Rancona treated plots which had a higher NDVI in the infected plots.

Lancer: Values at early tillering ranged from 0.34 to 0.42. There was not a lot of difference between the infected and non-infected plots, with the exception of Rancona which had a higher NDVI in the infected plot.

At flowering values ranged from 0.64 to 0.73. The NDVI values were generally higher in the infected plots.

Visual crown rot infection late grain fill:

A visual disease assessement, looking for the signs of crown rot, including whiteheads, crown discolouration, grain size, lack of grain in heads, was carried out on the 4th November. The symptoms are shown in figure 1.

The durum variety Aurora showed greater symptoms than Lancer, figure 5. For Aurora the plots which were infected with crown rot all showed some signs of disease.

The treatment which showed the greatest amount of disease was the untreated plot with just under 6%. This was followed by Vibrance treated plots with 3% and Baytan treated plots with 2%. Rancona and Rancona zinc plots showed the least amounts of disease, although this was not statistically analysed.

For Lancer, whilst there was not a lot of crown rot to be seen the untreated infected plots showed the greatest amount of disease.

Grain Yield and Quality:

Grain Yield:

Overall Lancer (3.96 t/ha) had a significantly higher grain yield than Aurora (3.84 t/ha) in this trial.

There was not a lot of difference in yield between each treatment. Besides the Baytan treatment, all other treatments were not significantly different in yield from each other, figure 6.

There were no significant differences found between grain yield for treatment by variety, figure 7. Whilst not signifiant, Baytan had a negative effect on grain yield in both varieties and the untreated Nil seed dressing performed well, with grain yield similar to the other seed treatments.

Grain Protein:

Grain protein of Lancer (8.65%) was significantly higher than the durum variety Aurora (7.71%) in this trial.

Figure 1: Visual disease symptoms observed in the trial at late grain fill

Typical symptoms of crown rot observed at late grain fill. Honey discolouration on stem and pink fungal growth caused by the crown rot fungus (left) and whiteheads (right).

Figure 2: Crop establishment scores, taken 10th June,2015 @ 4-5 leaf stage.

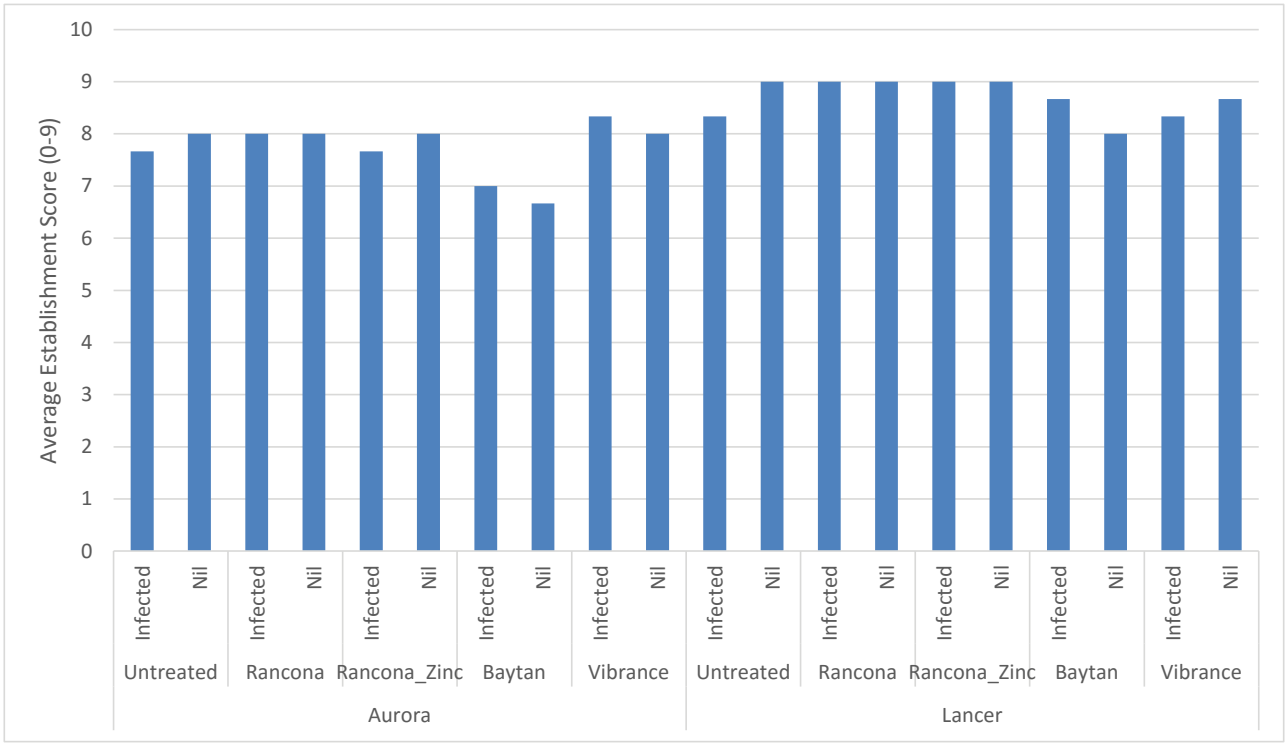

Figure 3: Crop vigour reduction percentages, taken 10th June,2015 @ 4-5 leaf stage, LSD 6.33%..

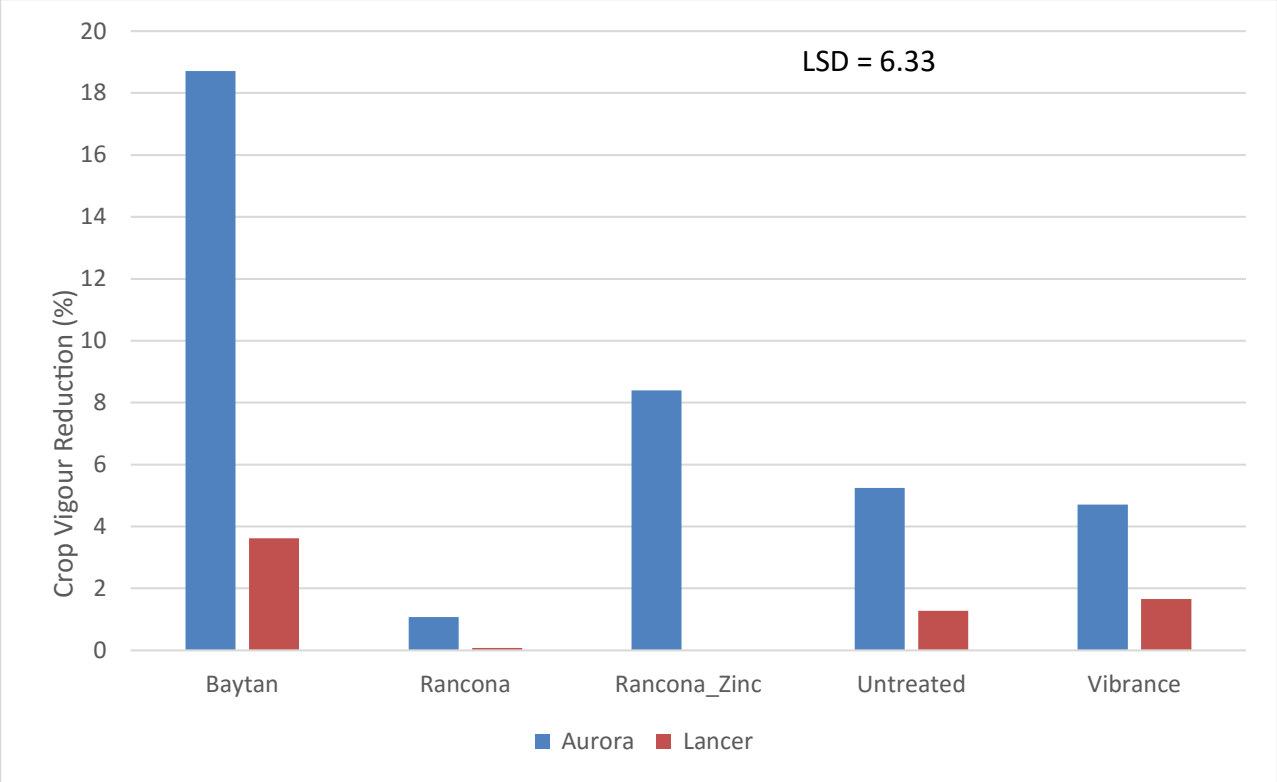

Figure 4: NDVI values - taken 29th June, 2015 at early tillering and 21st September, 2015 around flowering

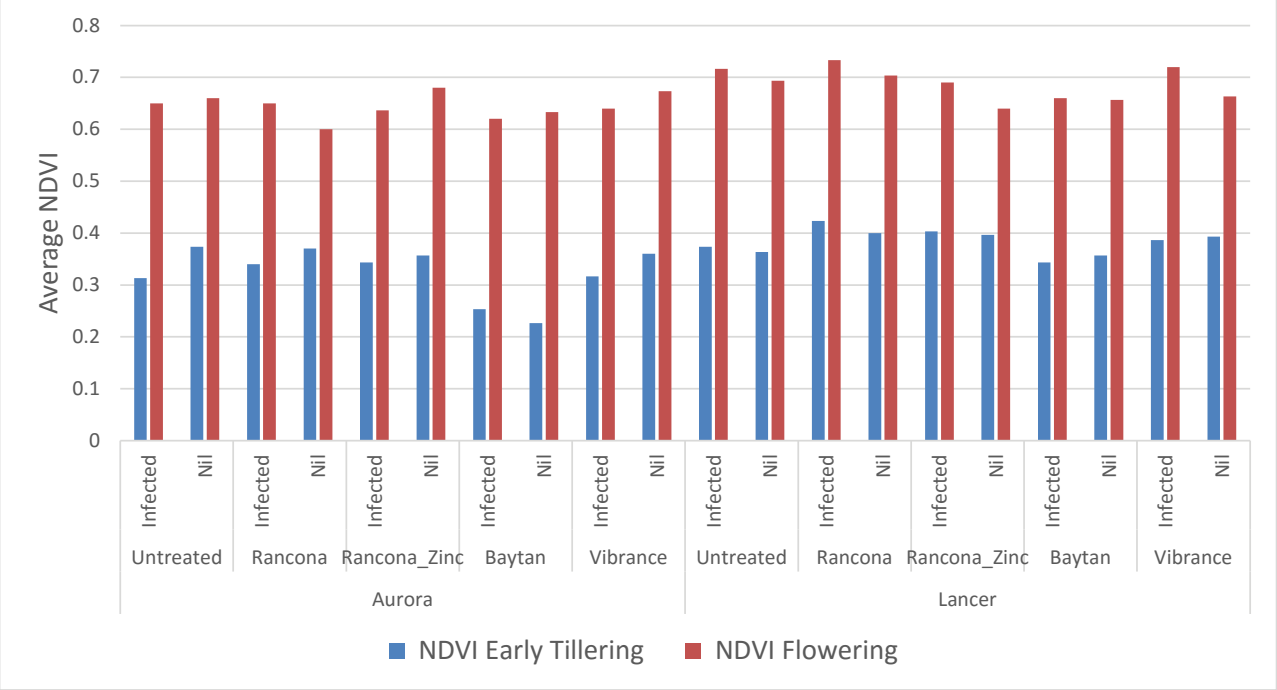

Figure 5: Visual disease assessement - signs of disease (whiteheads, crown discolouration), grain size/lack of grain in heads, taken 4th November 2015 at late grain fill.

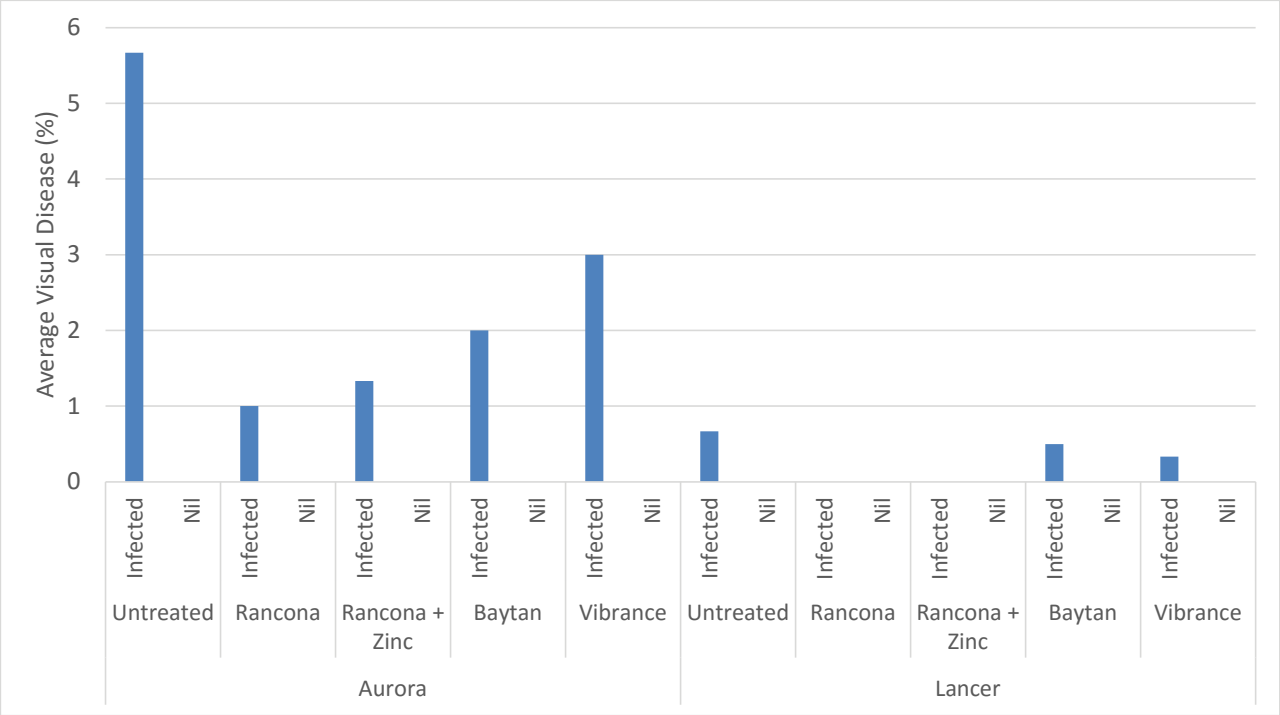

Figure 6: Grain Yield (kg/ha) for each seed treatment, LSD 181 kg/ha..

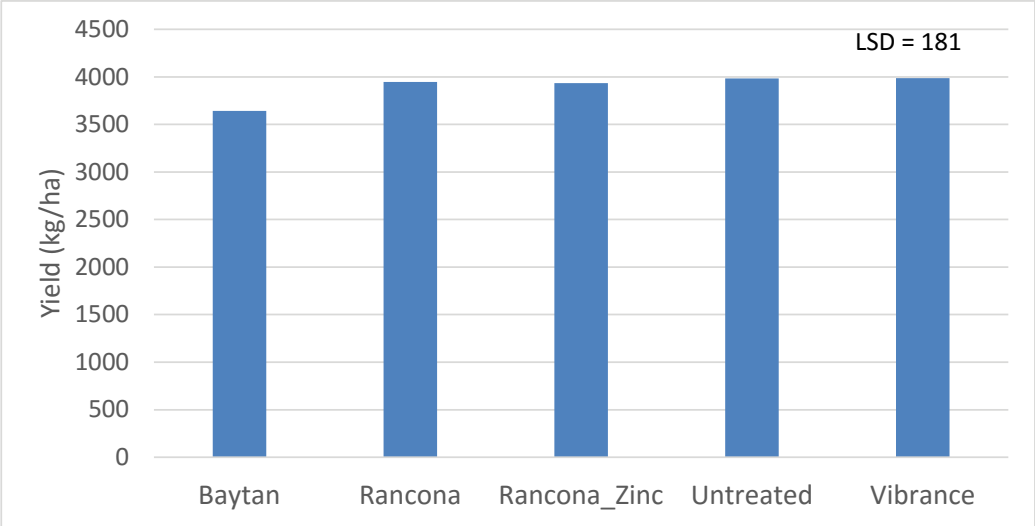

Figure 7: Grain Yield (kg/ha) for each variety and treatment (infected v non-infected)

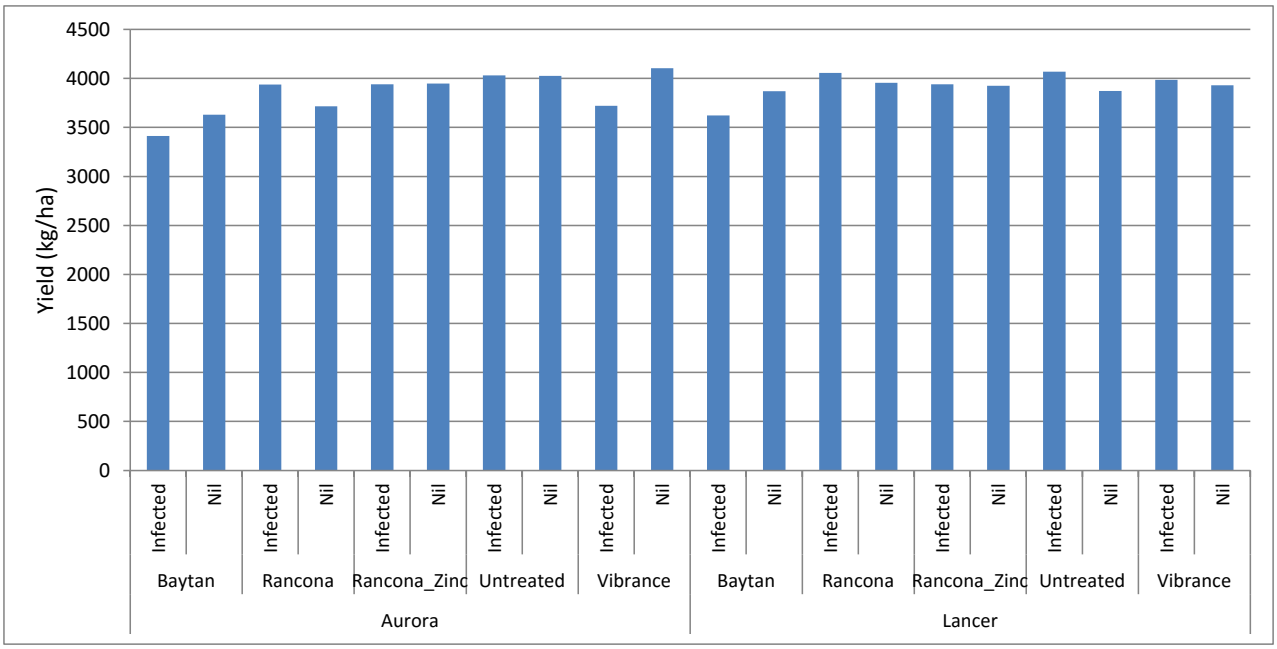

Figure 8: Treatments 1 & 6 - Aurora untreated and not infected (left) vs untreated and infected (right); taken 10th June and19th August, 2015

Figure 9: Treatments 2 & 7 - Aurora treated with Rancona Dimension and not infected (left) vs Rancona Dimension and infected (right); taken 10th June and19th August, 2015

Figure 10: Treatments 3 & 8 - Aurora treated with Rancona Dimension plus zinc and not infected (left) vs Rancona Dimension plus zinc and infected (right); taken 10th June and19th August, 2015

Figure 11: Treatments 4 & 9 - Aurora treated with Baytan and not infected (left) vs Baytan and infected (right); taken 10th June and19th August, 2015

Figure 12: Treatments 5 & 10 - Aurora treated with Vibrance and not infected (left) vs Vibrance and infected (right); taken 10th June and19th August, 2015

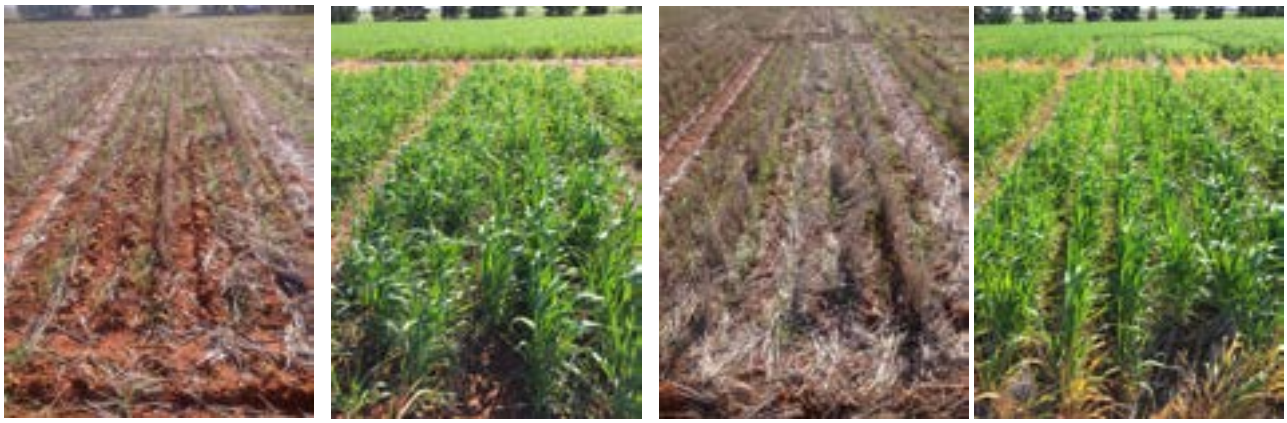

Figure 13: Treatments 11 & 16 - Lancer untreated and not infected (left) vs untreated and infected (right); taken 10th June and19th August, 2015

Figure 14: Treatments 12 & 17 - Lancer treated with Rancona Dimension and not infected (left) vs Rancona Dimension and infected (right); taken 10th June and19th August, 2015

Figure 15: Treatments 13 & 18 - Lancer treated with Rancona Dimension plus zinc and not infected (left) vs Rancona Dimension plus zinc and infected (right); taken 10th June and19th August, 2015

Figure 16: Treatments 14 & 19 - Lancer treated with Baytan and not infected (left) vs Baytan and infected (right); taken 10th June and19th August, 2015

Figure 17: Treatments 15 & 20 - Lancer treated with Vibrance and not infected (left) vs Vibrance and infected (right); taken 10th June and19th August, 2015

ACKNOWLEDGEMENTS

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