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Present and future management options to control Rhizoctonia disease in wheat

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KEY MESSAGES

- When sowing to wheat or another cereal in a paddock with a previous history of Rhizoctonia bare-patch use a cultivation below the seed (~10 cm) and a registered fungicide.
- In the near future, new in-furrow fungicide options that improve the control of Rhizoctonia disease in wheat will become available to WA farmers.

AIMS

Rhizoctonia bare-patch (*R. solani* AG8) is a major problem across WA’s cereal growing regions and is estimated to reduce WA state-wide cereal yields by 1% to 5% annually. Australia has one registered fungicide for use on seed which claims to suppress rather than control the disease. Current management practices to minimise the impacts of Rhizoctonia bare-patch in WA are combinations of, cultivation with fungicide seed-dressing and adequate nutrition. Alternative fungicides and/or delivery methods (such as liquid injection) would provide greater flexibility for management of Rhizoctonia bare-patch.

Our aim was to determine the efficacy of current management options to control *R. solani* and the future options which will become available during the next few years.

METHOD

A large field trial was conducted in 2010 (Experiment 1; present options) and a second in 2011 (Experiment 2; future options) in sites with confirmed Rhizoctonia disease problems. Both sites had visible patches in the previous years and the pathogen was confirmed by PreDicta-B® soil test.

2010 Experiment - Present management options

The trial was sown with untreated wheat seed or seed that was treated with Dividend®, using knife-points tilling to a depth of the seed or 10 cm below the seed. Further details of the trial are given below.

**Trial details:**

<table>
<thead>
<tr>
<th>Property</th>
<th>Wickepin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plot size and replication</td>
<td>40 x 1.5 m, 4 reps/treatment</td>
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<tr>
<td>Soil Type</td>
<td>Brown grey loamy sand</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>18 June 2010</td>
</tr>
<tr>
<td>Wheat Crop Variety</td>
<td>Janz</td>
</tr>
<tr>
<td>Seeding rate</td>
<td>70 kg/ha (depth 3 cm)</td>
</tr>
<tr>
<td>Paddock rotation</td>
<td>Pasture 2009</td>
</tr>
<tr>
<td>Fertiliser (kg/ha)</td>
<td>DAP at 100 kg/ha</td>
</tr>
<tr>
<td>Growing Season Rainfall</td>
<td>60.75 mm</td>
</tr>
</tbody>
</table>

2011 Experiment - Future management options

The trial was sown with wheat seed treated with Product 1 or untreated wheat seed. Fungicide (Product 2) was injected as a liquid 3 cm below the untreated seed at three rates. Further details of the trial are given below.
RESULTS

2010 Experiment - Present management options

At anthesis, R. solani DNA levels in the soil (as measured by PreDicta-B®) were only slightly increased compared with the levels observed at sowing for the treatment including both Dividend® and cultivation below the seed while the inoculum levels were doubled in the Nil treatment (neither seed treatment not deep cultivation; Figure 1). Note that at sowing, DNA levels in the soil for each plot were in the medium to high risk categories for R. solani as defined by the PreDicta-B® test.

Final root weight at anthesis was higher in the treatments with Dividend® and cultivation below seed, compared to Nil. It is not known whether this result would have translated to a yield gain; no yield data was obtained due to drought in 2010.

![Figure 1. Rhizoctonia solani DNA soil levels at anthesis sampling compared with levels at sowing for plots with treatments of seed dressing with Dividend® (+/-) and cultivation 10 cm below seed (+/-). LSD = 110. No significant differences were found for the main treatments.](image)

2011 Experiment - Future management options

Small differences in disease scores on primary roots were observed at early tillering between untreated plots and plots with fungicide treatments. Product 2 at rates 2 and 3 mL/ha had the lowest disease on primary roots. At anthesis, no differences in disease scores on crown roots among the treated and untreated plots were evident. Product 2 at rate 3 had a significantly increased yield of 0.5 t/ha compared to the untreated Nil (Figure 2).
Figure 2. Mean wheat grain yield following seed and in-furrow fungicide treatments compared to the untreated Nil in a Rhizoctonia disease affected paddock. Lines above the bars are LSDs.

CONCLUSION

- These results support the current recommendation for management of Rhizoctonia bare-patch. When sowing to wheat or another cereal in a paddock with a high rhizoctonia risk, cultivate below the seed (~10 cm) at the time of sowing and use a registered fungicide (seed treatment with Dividend®). Dividend® is registered to suppress Rhizoctonia root rot, and in the absence of other practices will not provide adequate control of this disease.

- Some promising new fungicides may be registered in the near future for liquid injection in-furrow at the time of sowing. Further research on new fungicides for Rhizoctonia bare-patch control is planned for 2012 following the promising results during 2011 from this experiment and related experiments across southern Australia.

KEY WORDS

Rhizoctonia solani, root disease, soilborne pathogen, fungus.

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