INTEGRATED DISEASE MANAGEMENT OPTIONS TO CONTROL RHIZOCTONIA BARE-PATCH IN WHEAT

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ABSTRACT. Rhizoctonia bare-patch (*Rhizoctonia solani* AG8) is a major problem across Western Australia's cereal growing regions. Additional disease management options are needed as the current do not offer adequate control in severe paddocks. Three field trials were conducted: 1) cultivation below the seed and Dividend® seed treatment resulted in the lowest *R. solani* inoculum level at anthesis compared to either treatment alone; 2) a new fungicide injected below the seed increased yield significantly when applied at the highest rate, although there were no differences in disease on roots; and 3) a test of rotation crops showed the soil inoculum levels of *R. solani* were elevated by barley and wheat, but canola and fallow plots resulted in an overall decline. The results support the recommendation to farmers that in paddocks with a history of Rhizoctonia bare-patch, use cultivation below the seed and a registered fungicide. Also, it is suggested that a break crop of canola or fallow may be useful preceding cereals, although the disease level in the following wheat crops is yet to be assessed. Reduced disease and yield improvements were demonstrated with the new fungicide, but work on this and other new fungicides is continuing.

INTRODUCTION

Rhizoctonia bare-patch (*R. solani* AG8) is a major problem across Western Australia's (WA) cereal growing regions and is estimated to reduce 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 *R. solani* in WA are combinations of, cultivation below the seed with fungicide seed-dressing in direct-drilled crops and adequate nutrition. Alternative fungicides and/or delivery methods (such as liquid injection) would provide greater flexibility for management of *R. solani*.

In South Australia it has been shown that canola and other non-grasses can reduce the inoculum level of *R. solani* following cereals and thus, are effective break crops (1). In WA, benefits from crop rotation have yet to be demonstrated.

Here we show the efficacy of the current options available to manage *R. solani* as well as the benefits of using a new fungicide.

MATERIALS AND METHODS

Three field trials were conducted in 2010 to 2012. Trial 1 (Wickepin, 2010) determined the impact of cultivation and the current seed treatment on *R. solani* soil inoculum level (PreDicta-B). It 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. Trial 2 (Corrigin, 2011), sown to wheat, investigated the efficacy of a new fungicide liquid injected 3 cm below untreated seed. Three rates of a new fungicide were tested. Trial 3 (Katanning, 2011 and 2012) examined the influence of crop rotation on *R. solani* soil inoculum level, and was sown to barley, wheat, canola and fallow in 2011. DNA levels (PreDicta-B) were assessed at before sowing and anthesis in 2011, and every 6 wk over summer until sowing in 2012.

RESULTS AND DISCUSSION

Cultivation and Dividend seed dressing 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 treatment with neither Dividend® nor cultivation below the seed (Figure 1). The initial PreDicta-B test at sowing indicated *R. solani* levels in the soil for each plot were in the medium to high risk categories.

New fungicide Roots at early tillering and anthesis had less disease, although not significant, in plots treated at the highest rate compared to untreated plots. At the two highest rates there was a significant increase in yield of 0.16 and 0.26 t/ha compared to the untreated Nil. The new fungicide shows some promise to reduce disease and improve yield.

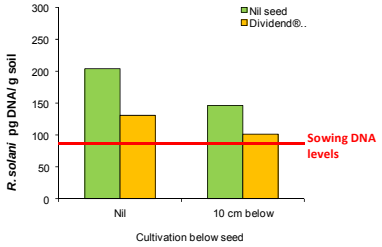

Figure 1. *R. solani* DNA soil levels at anthesis sampling compared with levels at sowing for plots with treatments of seed dressing with Dividend® (+/-) and cultivation 10 cm below seed (+/-).

Crop rotation Both cereal crops significantly increased the inoculum level of *R. solani* over the growing season in 2011 (Figure 2). The inoculum levels of these anthesis samples and into summer 2012 were always higher than those for the canola and fallow plots. Additional over-summer samples are being analysed. In 2012, plots have been sown to barley with treatments of fungicide injection, Dividend® seed dressing, and a cultivation below the seed. The disease levels in the 2012 crops are yet to be assessed

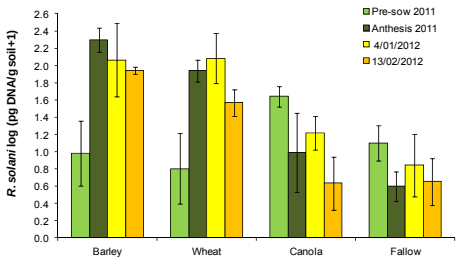

Figure 2. *R. solani* DNA levels in soil pre-sowing and anthesis of rotation options in 2011 and over summer 2012. Paddock was in pasture in 2010.

ACKNOWLEDGEMENTS

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