

STOP THE ROOT ROT: SEED TREATMENTS FOR RHIZOCTONIA CONTROL IN CEREALS

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TAKE HOME MESSAGES

- Under very low Rhizoctonia pressure, none of the seed treatments trialed here had an impact (negative or positive) on barley yield.
- EverGol® Prime is a new product that is now registered for the suppression of Rhizoctonia in wheat and barley at a rate range of 40 - 80mL/100kg of seed.

BACKGROUND

Rhizoctonia root rot is caused by the soil-borne fungus *Rhizoctonia solani*, and has been estimated to cost \$77 million in lost production each year in southern Australia (Roget 2006). EverGol® Prime is a Succinate Dehydrogenase Inhibitor (SDHI) fungicidal seed treatment which has just gained registration for control of smut and bunt diseases and suppression of Rhizoctonia in wheat and barley.

Bayer has been working with EverGol in Australia for four years and has shown that its application as a seed treatment reduces spear-tipping of roots and improves root mass in the presence of Rhizoctonia root rot, resulting in fitter plants with improved biomass. The product has not been found to negatively affect plant growth.

AIM

This trial was established to investigate current fungicide seed treatment options in cereals and compare these with EverGol Prime for Rhizoctonia control.

METHOD

Location:	Birchip	
Replicates:	4	
Sowing date:	12 June	
Crop type/s:	Scope barley	
Inputs/fertiliser:	IBS	TriflurX® (1.5L/ha) + Roundup PowerMax® (2L/ha) + Hammer® (50ml/ha)
	at sowing	55kg/ha Granulock Supreme Z® (11% N, 21.8% P, 4% S, 1% Zn)
	4 July	Axial® (200ml/ha) + MCPA LVE (400ml/ha) + Adigor® (0.5%)
	25 July	urea (90kg/ha)
	17 September	urea (45kg/ha)
Seeding equipment:	Gason parallelogram seeder (knife points, press wheels, 30cm row spacing)	

This replicated field trial was established at the main BCG research site just west of Birchip. Emergence counts were carried out on 26 July, and the normalised difference vegetation index (NDVI) was scored using a Greenseeker® on 21 August and 14 September. The trial site was sown to wheat in 2011 (Derrimut) and to canola the year before (44C79). A PreDicta B soil test was conducted on 30 March 2012 and showed Rhizoctonia levels to be very low. There was no visual evidence of Rhizoctonia within the trial during the season.

Table 1. List of treatments included in this trial.

Treatment	Description/product	Method/timing	Rate	Cost (\$/ha)
Untreated	Nil	–	–	–
Baytan T	150g/L triadimenol 4g/L triflurumuron	Seed applied	100ml/100kg	1.50
EverGol Prime	240g/L penflufen	Seed applied	40ml/100kg	3.15
EverGol Prime	240g/L penflufen	Seed applied	80ml/100kg	6.30
EverGol Prime Baytan T	240g/L penflufen 150g/L triadimenol 4g/L triflurumuron	Seed applied	40ml/100kg 100ml/100kg	4.65
EverGol Prime Gaucho	240g/L penflufen 350g/L imidacloprid	Seed applied	40ml/100kg 200ml/100kg	9.15
Dividend	92g/L difenoconazole 23g/L metalaxyl-m	Seed applied	130ml/100kg	2.80
Dividend	92g/L difenoconazole 23g/L metalaxyl-m	Seed applied	260ml/100kg	5.60

RESULTS AND INTERPRETATION

Growth measurements

There was an even germination of barley with no significant difference in establishment between the treatments (Table 2). Slight but noticeable biomass differences were present mid-season, with the first Greenseeker (NDVI) measure (20 August) showing a significantly greater NDVI value for EverGol Prime + Gaucho® over all other treatments (Table 2). This may be due to the Gaucho Stress Shield™ effect, which can help plants continue to grow in the presence of some abiotic stresses (moisture stress, as was the case here). There were no insect pests observed at this site. At the second Greenseeker assessment (14 September), it was difficult to see any visual differences which was supported by the NDVI data (Table 2). All treatments looked even and there was no evidence of Rhizoctonia.

Table 2. Yield results and growth assessments for each treatment.

	Emergence (plants/m ²)	NDVI		Yield (t/ha)	Protein (%)
	16 June 34 DAS*	1 21 Aug 69 DAS*	2 14 Sept 90 DAS*		
Untreated	81	0.29 ^b	0.37	2.01	10.9
Baytan T	82	0.29 ^b	0.37	2.02	10.9
EverGol Prime (40ml)	83	0.29 ^b	0.36	1.99	11.0
EverGol Prime (80ml)	83	0.29 ^b	0.36	2.03	10.9
EverGol Prime + Baytan T	80	0.29 ^b	0.38	2.02	11.1
EverGol Prime + Gaucho	88	0.33 ^a	0.38	2.09	11.1
Dividend (130ml)	80	0.27 ^{bc}	0.36	1.99	10.8
Dividend (260ml)	83	0.25 ^c	0.38	1.97	11.2
Mean of the treatments	83	0.29	0.37	2.02	11.0
Sig. diff.	NS (P=0.76)	P<0.01	NS (P=0.88)	NS (P=0.69)	NS (P=0.48)
LSD (P=0.05)	–	0.03	–	–	–
CV%	–	6.6	–	–	–

Test weight mean = 68.4kg/hL, no significant treatment effect (P=0.23, CV0.8%). Screenings mean = 1.7%, no significant treatment effect (P=0.54, CV12.4%). Retention mean = 84.8%, no significant treatment effect (P=0.76, CV3.4%). *DAS = Days after sowing.

Harvest

There was no significant difference in yield in this trial, and only 6% difference in average yield across the trial. This is low and demonstrates that it was a very even site. The Scope barley in this trial achieved a Malt 1 grade with reasonable protein. The sowing date was quite late (12 June) which does tend to favor Rhizoctonia. According to PreDicta B (a good indicator of Rhizoctonia level in the soil), Rhizoctonia levels were low and this was supported by the lack of Rhizoctonia root rot during the year. Importantly, in this trial, with the lack of disease, there was no negative effect on yield due to any of the seed treatments applied.

COMMERCIAL PRACTICE

A low PreDicta B risk rating can result in a 0-5% yield loss, a medium level can result in a 5-20% yield loss and high level can result in a 10-40% yield loss, depending on environmental conditions, management and crop type. Rhizoctonia has greatest effect on barley, followed by wheat, triticale, and then oats. In situations where Rhizoctonia risk is high (e.g. where cereal is sown following a grassy pasture) or in which a PreDicta B test shows a high result, a seed treatment should be considered. However, in some soil types with high Rhizoctonia pressure, no single product will provide sufficient suppression to prevent yield loss.

EverGol Prime works by remaining in the soil and root system. This provides Rhizoctonia suppression, but does not control foliar diseases in wheat or barley so another seed treatment or a foliar fungicide may be required. EverGol Prime does not include an insecticide so treated grain will need to have a registered insecticide for grain storage pests added if the grain is to be stored for any length time.

Economic consequences

EverGol costs \$3.15/ha for 40mL/100kg, with a seeding rate of 55kg/ha. This equates to 0.8% of the income off a 2t/ha barley or wheat crop (\$200/t) providing smut and bunt control with Rhizoctonia suppression. For medium to high pressure situations, the higher rate of 80mL/100kg seed (\$6.30/ha) is likely to be more profitable. Dividend® is recommended for Rhizoctonia suppression at a rate of 260ml/100kg seed, which would cost \$5.60/ha. Baytan is not registered for Rhizoctonia, but can be mixed with EverGol for an additional \$1.50/ha to provide greater protection against smuts and bunts.

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