Assessment of alternative fungicides for improved blackspot control in field peas

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Key Findings:

- The optimum agronomic sowing window for field pea coincided with high blackspot in many districts of South Australia in 2015.
- Under such high disease risk situations, growers in low rainfall areas may be best suited to choose alternative break crop options to field pea to avoid significant yield losses through delayed sowing or disease infection.
- Experimental fungicide treatments with greater efficacy than mancozeb showed improved blackspot control and significant yield increases over the nil and mancozeb treatments in 2015. Further assessment and application approval is still required.

Why do the trial?

Blackspot or ascochyta blight, remains one of the most economically important diseases in field peas often resulting in significant yield losses either directly through infection or indirectly through delaying sowing time to minimise infection. The use of fungicides to control blackspot disease can be an important component of disease management and also assist in maintaining yield potential through enabling agronomically acceptable sowing times. Research in the Mid North of SA has shown that a fungicide application strategy, using P-Pickel T® and two foliar mancozeb applications (9 node and early flowering) at 2 kg/ha suppresses blackspot and is generally economical in crops yielding 1.5 t/ha or greater. The aim of this project was to test the efficacy of a range of experimental (unregistered) foliar fungicides against the above strategy in controlling blackspot in field pea in three major production areas of South Australia.

How was it done?

Plot size	2.0 m x 10.0 m	**Fertiliser**	MAP (10:22) + Zn (2%) @ 90 kg/ha
Seeding date	Hart – 30th April Minnipa - 1st May Pinery – 7th May		

Field pea blackspot fungicide management trials were conducted at three sites Hart and Pinery, which represented medium rainfall zones and Minnipa which represented low rainfall zone. Trials were designed as Randomized Complete Block Design (RCBD), replicated three times with eight fungicide treatments and a nil treatment. Fungicide treatments and application timings are presented in Table 1. The dual purpose (grain/forage) field pea type PBA Coogee was sown at 55 plants/m^2 at all sites due to its increased biomass production, lodging and blackspot susceptibility over Kaspa. The plot sizes were 10 m by 2.0 m with six rows sown on 30 cm (12 inch) spacings. Trial sowing dates were as shown above. The Hart sowing date corresponded to a medium blackspot risk sowing window while Pinery and Minnipa sowing dates were within high blackspot risk sowing windows as forecasted by the Blackspot Manager, DAFWA Crop Disease Forecasts, May 2015.

Table 1. Foliar fungicide treatments and application timings

Treatment	Timing
Nil	
PPT*	
Mancozeb_PPT	8 weeks after sowing (WAS) and early flowering
Chlorothalonil_ PPT	Fortnightly in front of rain events from 8 WAS
Fluid_Flutriafol	seeding
Fluid_Uniform	seeding
Aviator Xpro _PPT	8 WAS and early flowering
Amistar Xtra_PPT	8 WAS and early flowering
Cabrio_PPT	8 WAS and early flowering

*PPT = P-Pickle T® seed treatment @ 200 ml/100 kg seed (360g/L Thiram & 200g/L Thiabendazole) #All treatments were treated with Apron® (350 g/L Matalaxyl-M) seed dressing to control downy mildew
***Some of the fungicide treatments in this research contain unregistered fungicides, application rates and timings and were undertaken for experimental purposes only.*

Blackspot disease was assessed visually at 9 to 10 node (early bud development) and the mid - late flowering stage. Assessment at 9 to 10 node was done as percentage blackspot severity per plot while the final assessment was conducted on five individual plants selected at random from the centre of each plot and scored for the number of girdled nodes. A disease index (DI) was further developed from these scores. Only data from the 9-10 node rating has been presented in this report.

Results and discussion

Low summer rainfall followed by high rainfall during the month of April led to relatively late release of blackspot spores in 2015 and all trials were sown into medium or high risk disease situations. The wet winter climatic conditions favoured plant growth and disease progression, and black spot infection was apparent at all sites. The Minnipa trial was spread with infected pea stubble from the previous year post sowing but prior to emergence and disease onset occurred earlier at this site. The interaction between fungicide treatment and site was significant for blackspot disease infection as measured by percentage plot disease severity at the 9-10 node stage (Table 2). Minnipa had the highest level of disease infection and it was thought that the timing of the first foliar fungicide spray occurred too late for effective control at this site. Similar levels of infection were observed at Hart and Pinery. The fluid injection Uniform and PPT treatments showed similar levels of disease infection to the nil at all sites. Disease severity levels were lower in the mancozeb and fluid flutrifol when compared with the nil, however this reduction in the mancozeb treatment was only significant at Hart. Fortnightly Chlorothalonil treatments reduced disease infection over the nil at Hart and Minnipa but not at Pinery while the Amistar® Xtra treatment reduced infection levels at Hart and Pinery but not at Minnipa. The Cabrio® and Aviator® Xpro treatments showed the highest level of disease reduction over the nil. Further, Cabrio® was also improved over mancozeb at Hart and Aviator® Xpro improved over mancozeb at Hart and Pinery. At Hart, Aviator® Xpro showed an improved level of blackspot control over all other treatments.

Grain yields of field peas at all sites were reduced greatly by a very hot and windy day on October 4th which led to rapid maturity and dry down. There was no site by fungicide treatment effect for grain yield. The Hart and Minnipa sites had similar grain yields (1.6 t/ha) and Pinery was lower yielding (1.2 t/ha). Grain yields showed a very similar response to the mid-flowering disease index scores (data not shown) with similar responses obtained in the nil, mancozeb, PPT and fluid treatments. All these treatments had both a higher disease index score and a lower grain yield than the remaining four treatments (Figure 1).

Table 2. Blackspot severity assessed at 9 to 10 node as percentage plot severity PBA Coogee under different fungicide treatments at Hart, Pinery and Minnipa, 2015.

Treatment	Hart		Minnipa		Pinery	
Nil	23.7	a.....	36.6	a...	21.1	a....
Amistar Xtra_PPT	5.8	....e.	29.7	abc.	13.1	.bcd.
Aviator Xpro _PPT	3.6	.....f	19.1	..cd	7.9	....e
Cabrio_PPT	6.8	...de.	21.1	.bcd	12.2	..cde
Chlorothalonil_PPT	9.3	..cd..	17.1	...d	14.4	abcd.
Fluid_Flutriafol	15.0	.b....	22.9	.bcd	10.4	...de
Fluid_Uniform	28.0	a.....	30.0	ab..	19.6	ab...
Mancozeb_PPT	12.2	.bc...	29.7	abc.	16.5	abc..
PPT	28.2	a.....	26.2	abcd	18.2	abc..
Site mean	11.8		25.1		14.2	

*log base 10 back transformed data; letters indicate significance within a site only

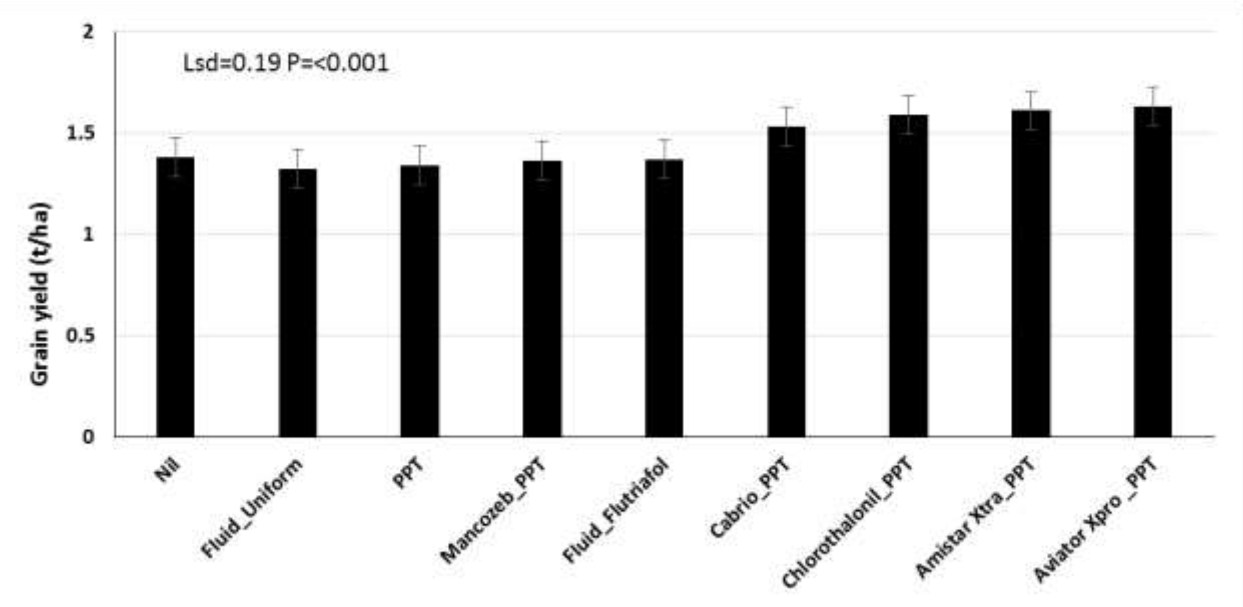

Figure 1. Mean yield (t/ha) of field pea (PBA Coogee) under different fungicide treatments averaged across three field sites, 2015.
***Some of the fungicide treatments in this research contain unregistered fungicides, application rates and timings and were undertaken for experimental purposes only. The results within this document do not constitute a recommendation for that particular use by the author or author's organisation.*

Several experimental fungicides in field pea were effective in both reducing blackspot levels below and increasing grain yields above that achieved in the nil and mancozeb treatments at multiple field sites in SA in 2015. Disease progression and grain yield were both reduced by dry and hot spring conditions in early October at all sites and further evaluation is warranted in years and environments with more favourable spring conditions. Earlier application timings than the eight week treatment used in these experiments may also be warranted along with additional 'spring' treatments in longer more favourable seasons.

Summary / implications

Weather patterns experienced early in 2015 resulted in growers in many districts being advised by DAFWA's Blackspot Manager Prediction model to delay sowing of field peas in SA. This timing was often out of alignment with optimal sowing times based on best agronomic practice for some districts. Growers in these districts had to decide whether to choose an alternative crop, sow field peas into high blackspot-risk situations, or delay sowing date past the optimal window for successful production. Under these circumstances, growers could also revise their blackspot management strategy and consider recommended fungicide applications to manage this disease. If going against the Blackspot Manager recommendations, and choosing to sow into periods where a high risk of blackspot spore showers are predicted in your region, growers should consider an alternative break crop to field pea. However, if field peas are preferred it is important to consider the following to reduce the risk of blackspot outbreaks:

- Apply P-Pickle T seed treatment (PPT) to seed prior to sowing and follow up with current recommended fungicide strategies of two applications of mancozeb, one at 8-weeks after sowing and one early flowering.
- Select paddocks with no history of field pea, or paddocks with a long break period from field pea and history of a low incidence of blackspot.
- Avoid close proximity to previous field pea stubbles, particularly downstream to prevailing wind direction.
- Delay sowing as long as possible.

A number of industry support groups have reported the economic benefit of using fungicide in controlling blackspot in field pea. Results in 2015 showed the current fungicide application strategy, using PPT and two mancozeb applications, suppressed blackspot at most sites, but previous yield benefits reported from this treatment were not realised due to the dry spring experienced in 2015. However, new fungicide actives and formulations being evaluated showed significant increases in efficacy for controlling blackspot compared to both untreated plots and those treated with mancozeb. Furthermore, a significant yield benefit (approx. 15%) were also identified in these treatments this year. Further trials are planned in 2016 to explore these results.

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