Chickpea, Disease Management, MRZ Wimmera (Horsham), Victoria

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Aim
To evaluate chickpea varieties and breeding lines against ascochyta blight and their response to foliar fungicide application.

Treatments
Varieties: Refer to Table 3.
Fungicide Treatments: Refer to Table 1 for treatments and application rates. Strategic sprays were applied before rainfall events, at key growth stages, to maximise foliage protection, which were 4th node and late vegetative/ early flowering stage. The full control treatment is a rotation of fungicides applied to ensure minimal to no disease as a control in the experiment.
The Bixafen + Prothioconazole and Nil treatments were inoculated with infected stubble on 26th June 2019.

Table 1. Fungicide treatments and the number of sprays applied for each fungicide spray to assess the control of Ascochyta Blight in chickpea at Horsham during 2019.

Seed Treatment	Rate (g/kg)	In Season Fungicide	Rate (gai/ha)	Timing	Number of applications
Nil	NA	Nil	NA	NA	0
Thiram Thiabendazole	0.72 0.4	Bixafen Prothioconazole	45 90	Strategically	2
Thiram Thiabendazole	0.72 0.4	Full control			

[A] Strategic fungicide application was done before rainfall events, at key growth stages (4th node and late vegetative / early flowering stage), to maximise foliage protection.
[B] The full control treatment is a rotation of fungicides applied to ensure minimal to no disease as a control in the experiment

Table 2. Other Site Details

	Horsham
Sowing Date	13 May
Stubble height (cm)	Standing (20)
Row Spacing (cm)	36
Fertiliser (kg/ha)[1]	100
Plant density (plants/m^2)	35

[1] MAP (9.2, 20.2, 0, 2.7) + Zn (2.5)

Results and Interpretation

- Key Messages: Ascochyta blight infection was severe within this trial and resulted in almost complete plot death in multiple susceptible varieties (Table 3). Grain yields were higher when disease was fully controlled. Interestingly, PBA Royal, a new variety with improved resistance produced the highest yields when diseases were fully controlled (2.44 t/ha) and not controlled at all (1.6 t/ha).

- Establishment and Plant Growth: Plant growth and establishment was good with due to early and consistent rainfall. Warmer than average temperatures and decreased rainfall later in the season resulted in less yield than expected.

- Plant Disease: Ascochyta blight infection progressed well throughout the season. Multiple varieties had almost 100% of their plot affected by stem breakages and almost complete plot death (Table 3). Multiple assessments were undertaken but the disease did not progress further than the results presented in Table 3. The new variety PBA Royal ranked in the untreated plots as having the lowest disease severity with only 24% of the plot affected and had only 4% plot affected with 2 applications of

Bixafen + Prothioconazole, compared to over 50% of the plot affected in some susceptible varieties (Table 3).

- Grain Yield and Profitability: There was a significant interaction in grain yield between treatment and variety. The bixafen + prothioconazole strategically, reduced grain yield losses significantly. At Horsham, in the nil treatment, PBA Royal was the highest yielding variety with 1.6t/ha. However, this had still lost 0.84 t/ha compared to the full control treatment. There were also significant differences in grain yield between varieties within the full control treatment, with some susceptible varieties in the absence of disease yielding the highest.

Table 3. Percentage (%) of plot affected by ascochyta blight in chickpea varieties treated with different fungicide treatments at Horsham, 2019.

Variety	Treatment [A]			
	Full Control	Bixafen + Prothioconazole	Nil	Mean
PBA Royal	0	4	24	9
CICA1454	0	3	26	10
Kalkee	0	4	26	10
CICA1552	0	8	40	16
CICA1352	0	3	46	16
CICA1551	0	14	55	23
Almaz	0	14	68	27
CICA1521	0	42	70	37
Sonali	0	45	73	39
Genesis090	0	16	80	32
PBA Slasher	0	35	91	42
CICA1841	1	45	93	46
PBA Striker	0	75	95	57
Howzat	0	60	98	53
PBA Monarch	0	64	98	53
Mean	0	27	66	
	P	LSD		
Variety	<0.001	5		
Treatment	<0.001	13		
Variety x Treatment	<0.001	22		

[A] The three treatments were: (1) full control, where no AB stubble was applied and fungicides were applied to ensure no disease; (2) Bixafen + Prothioconazole, applied at 4-node and flowering growth stages and inoculated with AB infested stubble at the 4-node stage; and (3) Nil where there was no disease control and the plots were inoculated with AB infested stubble.

Table 4. Grain yield of chickpea varieties inoculated with ascochyta blight and treated with different fungicide treatments in Horsham during 2019.

Variety	Treatment [A]			
	Full Control	Bixafen + Prothioconazole	Nil	Mean
PBA Monarch	1.73	0.76	0.18	0.89
PBA Striker	2.76	0.51	0.14	1.13
PBA Slasher	2.23	1.06	0.28	1.19
Sonali	2.05	1.34	0.24	1.21
Howzat	2.76	0.85	0.20	1.27
CICA1841	1.89	1.45	0.54	1.29
Almaz	2.17	1.64	0.64	1.48
Genesis090	2.22	1.65	0.73	1.53
CICA1521	2.42	1.36	0.86	1.55
CICA1352	2.06	2.18	0.65	1.63
Kalkee	2.01	1.89	1.28	1.73
CICA1551	2.45	2.03	0.83	1.77
PBA Royal	2.44	1.75	1.60	1.93
CICA1552	2.40	2.29	1.37	2.02
CICA1454	2.74	2.57	1.54	2.28
Mean	2.28	1.60	0.75	
	P	LSD		
Variety	<0.001	0.12		
Treatment	<0.001	0.29		
Variety x Treatment	<0.001	0.51		

[A] The three treatments were: (1) full control, where no AB stubble was applied and fungicides were applied to ensure no disease; (2) Bixafen + Prothioconazole, applied at 4-node and flowering growth stages and inoculated with AB infested stubble at the 4-node stage; and (3) Nil where there was no disease control and the plots were inoculated with AB infested stubble.

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