

Faba Bean, Fungicides strategies, chocolate spot in PBA Amberley, HRZ South East (Bool Lagoon), South Australia

Faba Bean, Fungicides strategies, chocolate spot in PBA Amberley, MRZ Lower Eyre Peninsula (Yeelanna), South Australia

Authors

Jenny Davidson, Amanda Pearce, Amy Gutsche, Mohsen Khani, Sarah Day, Penny Roberts

Aims

To evaluate the effectiveness of reduced foliar fungicide applications on the control of chocolate spot disease (*Botrytis fabae*) in moderately resistant variety, PBA Amberley.

Background

Chocolate spot disease is caused by the fungal pathogen *Botrytis fabae*. Chocolate spot is one of the severest diseases of faba bean in Victoria, SA and NSW. Disease develops in spring with the canopy closure and initiation of flowering. Further, increased humidity beneath the canopy due to frequent rainfall combined with wet soils are highly conducive for the disease occurrence and development. The symptoms of chocolate spot disease occur in leaves, which later infects flowers and pods causing loss of photosynthetic tissue, pod abortion and 30-50% yield losses in an untreated crop. Infected seeds develop reddish-brown discolouration decreasing their market value.

All faba bean varieties are susceptible to chocolate spot disease where multiple applications of foliar fungicides are required to control the disease. However, the variety PBA Amberley, which is released by the national Faba Bean Breeding program in 2019 is provisionally rated as being moderately resistant. Thus, trials were conducted to evaluate the effectiveness of different foliar fungicide application regimes on different varieties of faba bean.

Cercospora leaf spot (caused by the fungal pathogen *Cercospora zonata*) is another leaf disease of faba bean that can potentially cause yield loss. Tebuconazole is effective against cercospora leaf spot (covered by permit PER13752 and registration of Veritas®). Foliar fungicides applied in the trials prevented or minimised the influence of this disease and thus the outcomes of the trial.

Treatments

Varieties: Three varieties (PBA Amberley was tested as AF11023).

Fungicide strategies:

Treatment	Fungicide	Active ingredient concentration (g/l)	Rate of application (ml/ha)	Time of application
Nil	Fungicides are not applied	Not applicable (NA)	NA	NA
Standard	Genfarm Blast®	Tebuconazole (430)	145	Applied with grass spray
	Adama Howzat®	Carbendazim (500)	500	Applied immediately before canopy closure ¹ and early pod set ²
Minimum	Genfarm Blast®	Tebuconazole (430)	145	Applied with grass spray
Low cost	Genfarm Blast®	Tebuconazole (430)	145	Applied with grass spray and immediately before canopy closure ¹

¹ 27 August ² 20 September

Table 1. Trial site details

Trial Sites	Bool Lagoon	Yeelanna
Sowing Date	17 May	20 April
Fertiliser (kg/ha) ¹	80	75
Disease inoculum	Natural infection	Natural infection
Varieties	PBA Amberley	PBA Amberley
	PBA Bendoc	PBA Bendoc
	PBA Kareema	PBA Samira
Sowing density (plants/m ²)	24	24

¹MAP (9.2, 20.2, 0, 2.7) + Zn (2.5)

Results and Interpretation

- **Key Messages:** Although disease pressure was low, the resistant variety, PBA Amberley had significantly lower occurrence of chocolate spot disease than the other two varieties confirming improved resistance in this variety. The lower rainfall in spring was not conducive to chocolate spot and no infections were seen until late November when plants were near maturity. Further research is required to clarify the fungicide treatments required to control chocolate spot in PBA Amberley, especially in seasons more conducive to the disease.
- **Seasonal conditions and impact on disease:** Seasonal conditions in the South East of South Australia were extremely dry in summer and autumn, which received an average rainfall from May to July. Approximately 75% of the average rainfall fell in August to October. The lower rainfall in spring was not conducive to chocolate spot and no infection was seen until late November when plants reached maturity. Seasonal conditions in the lower Eyre Peninsula were also extremely dry in summer and autumn months, with higher than average rainfall in May and June, but lower than average rainfall in August and October. Combined with colder night temperatures in September the conditions were not conducive for chocolate spot and infection was absent at Yeelanna.
- **Disease assessment:** The moderately resistant variety, PBA Amberley had less chocolate spot on pods and leaves compared to PBA Bendoc and PBA Kareema (Table 2) confirming an improved level of resistance in this variety. The standard application of foliar fungicides was required to control chocolate spot across the varieties (Table 3). Late infections occurred in all fungicide treatments eight weeks after the last application of foliar fungicides. However, none of the grains were infected. Level of cercospora leaf spot symptoms were not different between varieties as all varieties were susceptible to cercospora leaf spot (Table 4). Cercospora leaf spot occurred in the Bool Lagoon trial early in the season before fungicides were applied. The disease symptoms recorded soon after the application of fungicides do not show treatment differences because the fungicides were applied after the disease infection (Table 5). Later in the season, all fungicide treated plots had significantly less disease than the untreated plots. This is because subsequent application of fungicides prevented or minimised the occurrence and further development of the Cercospora leaf spot (Tables 5 and 6).
- **Grain Yield:** The fungicide effects on grain yields were not significant as the chocolate spot infection occurred late in the season. Further, control of cercospora leaf spot by fungicide treatments minimised the effects on grain yield.

Table 2. Occurrence of chocolate spot symptoms on leaves and pods of different varieties of faba bean assessed on 21st November at Bool Lagoon, 2019

Varieties	Percentage of diseased area	Percentage of diseased area
	on pods	on leaves
PBA Amberley	1.5a	10.8A
PBA Bendoc	5.7b	22.1B
PBA Kareema	4.7b	23.8B
LSD (p<0.001)	0.9	4.7

Different letters represent significant difference between treatments

Table 3. Effects of fungicide strategies on chocolate spot symptoms on percentage of chocolate spot disease symptoms on pods of faba bean assessed on 21st November at Bool Lagoon, 2019.

Fungicide strategies	Percentage of diseased area on pods
Nil	4.7b
Minimum	3.7ab
Low cost	4.2ab
Standard	3.2a
LSD (p<0.001)	1.1

Nil = no spray; Minimum = tebuconazole at grass spray; Low cost = tebuconazole at grass spray and at canopy closure (27 August); Standard = tebuconazole at grass spray, carbendazim at canopy closure (27 August) and 20 September

Different letters represent significant difference between treatments

Table 4. Occurrence of Cercospora leaf spot disease symptoms on leaves of different varieties of faba bean at Bool Lagoon, 2019

Varieties	Percentage of diseased area on lowest four leaves (25 th July)	Percentage of the disease severity per plot (4 th September)
PBA Amberley	27.9	8.3
PBA Bendoc	24.8	8.0
PBA Kareema	29.4	9.8
LSD (p<0.001)	ns	ns

ns: not significant

Table 5. Effects of fungicide treatments on levels of Cercospora leaf spot disease symptoms on leaves of different varieties of faba bean at Bool Lagoon, 2019

Fungicide treatment	Percentage of diseased area on lowest four leaves (25 th July)	Percentage of the disease severity per plot (4 th September)
Nil	28.3	19.2
Minimum	28.6	4.9
Low cost	26.7	5.3
Standard	25.8	5.2
LSD (p<0.001)	NS	4.0

Nil = no spray; Minimum = tebuconazole at grass spray; Low cost = tebuconazole at grass spray and at canopy closure (27 August); Standard = tebuconazole at grass spray, carbendazim at canopy closure (27 August) and 20 September

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