

Faba Bean, Disease Management, HRZ South West (Tarrington), Victoria
Faba Bean, Disease Management, HRZ South West (Lake Bolac), Victoria

Authors

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Aim

To evaluate the genetic resistance to common fungal diseases of faba bean varieties and its interaction with fungicide strategies for disease control and grain yield.

Treatments

Varieties: See Table 1.

Fungicides: See Tables 2 and 3.

Table 1. Disease resistance characteristics of faba bean varieties used in disease management trials at Tarrington and Lake Bolac.

Variety	Aschochyta blight		Chocolate spot (Botrytis)
	<i>Pathotype 1</i>	<i>Pathotype 2</i>	
PBA Amberley	RMR	RMR	MR
PBA Zahra	R	MRMS	MS
PBA Samira	RMR	RMR	MS
PBA Rana	R	MRMS	MS
PBA Marne	RMR	MRMS	S
PBA Bendoc	RMR	RMR	S

Table 2. Fungicides used in a disease management trial at Tarrington.

Treatment	Fungicide	Rate (gai/ha)	Timing
1. Control (Early flower only)	Bixafen + Prothioconazole	90 mL + 45 mL	Early flowering
2. Old chemistry only	Mancozeb	1.65 kg	5 nodes
	Mancozeb	1.65 kg	Early flowering
	Mancozeb	1.65 kg	Mid podding
3. District practice	Tebuconazole	86 g	5 nodes
	Mancozeb + Carbendazim	1.65 kg + 250 g	Early flowering
	Mancozeb + Chlorothalonil	750g + 1 kg	Mid flowering
	Mancozeb + Chlorothalonil	750g + 1 kg	Late podding
4. New chemistry only	Tebuconazole + Azoxystrobin	200 g + 120 g	5 nodes
	Bixafen + Prothioconazole	90 mL + 45 mL	Early flowering
	Tebuconazole + Azoxystrobin	200 g + 120 g	Mid flowering
	Bixafen + Prothioconazole	90 mL + 45 mL	Late podding
5. Complete control (no early flower spray)	Tebuconazole + Azoxystrobin	200 g + 120 g	5 nodes
	Carbendazim	250 g	Mid flowering
	Carbendazim	250 g	Mid podding
	Carbendazim	250 g	Late podding

Table 3. Fungicides used in a disease management trial at Lake Bolac.

Treatment	Fungicide	Rate (gai/ha)	Timing
1. Control	None applied	NA	NA
2. Old chemistry	Mancozeb	1.65 kg	5 nodes
	Mancozeb	1.65 kg	Early flowering
3. District practice	Tebuconazole	86 g	5 nodes
	Mancozeb + Carbendazim	1.65 kg + 250 g	Early flowering
	Mancozeb + Chlorothalonil	750g + 1 kg	Late flowering
4. New chemistry	Tebuconazole + Azoxystrobin	200 g + 120 g	5 nodes
	Bixafen + Prothioconazole	90 mL + 45 mL	Early flowering
	Tebuconazole + Azoxystrobin	200 g + 120 g	Late flowering
5. Complete control	Tebuconazole + Azoxystrobin	200 g + 120 g	5 nodes
	Bixafen + Prothioconazole	90 mL + 45 mL	Early flowering
	Carbendazim	250 g	Mid flowering
	Carbendazim	250 g	Late flowering
	Carbendazim	250 g	Mid podding

Table 4. Other site details.

	Tarrington	Lake Bolac
Sowing date	26 April	8 May
Stubble	Burnt	Burnt
Plant density (plants/m ²)	25	25
Row spacing (cm)	20	20
Fertiliser (kg/ha) ¹	60	60

¹ MAP (9.2, 20.2, 0, 2.7)

Results and Interpretation

- Key Messages: PBA Samira, PBA Zahra, and PBA Amberley, varieties with improved resistance to chocolate spot had less symptoms and better grain yields than PBA Marne and PBA Bendoc. At Tarrington, where there was very high disease pressure, the new chemistry fungicide strategy increased grain yield by 33% (to 4 t/ha) compared to the control where fungicides were not applied (3 t/ha).
- The Tarrington experiment illustrates the importance of crop genetic resistance as a baseline defence mechanism against common faba bean diseases. For example, PBA Amberley maintained very low levels of disease even when the fungicide intensity was decreased from the complete treatment to the old chemistry treatment (Tables 5). Further, the disease scores in PBA Amberley was lower than other varieties within each fungicide strategy (Table 5). However, disease did increase slightly in PBA Amberley at lower levels of fungicide control, so genetic and chemical disease control were mutually reinforced in this trial.
- The disease pressure at Lake Bolac was much lower than Tarrington in 2019. As a result, the differences in disease symptoms between varieties were small. However, PBA Amberley and PBA Zahra out-yielded older varieties suggesting that the greater yield potential of these varieties cannot be attributed to improved disease resistance alone.
- It is suspected that the PBA Bendoc seed sown at Tarrington was of poor quality. It displayed reduced vigour in the early vegetative stage and some abnormal leaf growth. The seed sown at Lake Bolac was from a different source and achieved a much higher yield, so the yield data of PBA Bendoc at Tarrington should be treated with caution.

Table 5. Percentage of leaf area affected by chocolate spot in faba beans at Tarrington, Victoria, with six varieties (V) and five fungicide treatments (F).

	PBA Amberley	PBA Zahra	PBA Samira	Rana	PBA Marne	PBA Bendoc	<i>Mean (F)</i>
Complete	4	13	9	24	29	30	18
New chem	4	8	9	16	25	29	15
District	4	13	11	21	25	34	18
Early flower	6	11	13	31	35	40	23
Old chem	11	21	20	40	58	55	34
<i>Mean (V)</i>	6	13	12	27	34	38	
Factor	Variety (V)		Fungicide (F)		Variety x Fungicide (VxF)		
LSD	3		7		6		
P-value	<0.001		<0.001		<0.001		

Table 6. Percentage of leaf area affected by chocolate spot in a faba beans at Lake Bolac, Victoria, with six varieties (V) and five fungicide treatments (F).

	PBA Amberley	PBA Zahra	PBA Samira	Rana	PBA Marne	PBA Bendoc	<i>Mean (F)</i>
Complete	0	0	0	1	4	2	1
New chem	0	0	1	0	1	0	0
District	1	1	1	1	2	2	1
Old chem	1	4	3	10	13	11	7
Control	4	9	9	16	24	20	14
<i>Mean (V)</i>	1	3	3	6	9	7	
Factor	Variety (V)		Fungicide (F)		Variety x Fungicide (VxF)		
LSD	2		4		4		
P-value	<0.001		0.009		0.002		

Table 7. Grain yield of a faba beans at Tarrington, Victoria, with six varieties (V) and five fungicide treatments (F).

	PBA Amberley	PBA Zahra	PBA Samira	Rana	PBA Marne	PBA Bendoc	<i>Mean (F)</i>
Complete	4.9	4.8	3.8	3.8	2.5	2.7	3.8
New chem	5.0	5.1	4.1	3.9	2.8	2.9	4.0
District	4.6	4.5	3.4	3.6	2.7	2.5	3.6
Old chem	4.1	3.9	3.2	2.9	2.3	1.9	3.0
Control	4.2	3.7	3.0	3.1	2.2	2.1	3.0
<i>Mean (V)</i>	4.6	4.4	3.5	3.4	2.5	2.4	
Factor	Variety (V)		Fungicide (F)		Variety x Fungicide (VxF)		
LSD	0.2		0.3		n.s.		
P-value	<0.001		<0.001		0.6225		

Table 8. Grain yield of a faba beans at Lake Bolac, Victoria, with six varieties (V) and five fungicide treatments (F).

	PBA Amberley	PBA Zahra	PBA Samira	Rana	PBA Marne	PBA Bendoc	<i>Mean (F)</i>
Complete	3.8	4.6	3.6	3.5	2.6	3.9	3.7
New chem	4.4	4.5	3.5	3.4	3.0	4.2	3.8
District	4.0	4.0	3.5	3.3	3.0	4.0	3.6
Old chem	4.0	3.8	3.3	3.3	2.7	3.9	3.5
Control	3.7	4.1	3.1	3.2	2.3	3.5	3.3
<i>Mean (V)</i>	4.0	4.2	3.4	3.3	2.7	3.9	
Factor	Variety (V)		Fungicide (F)		Variety x Fungicide (VxF)		
LSD	0.2		n.s.		n.s.		
P-value	<0.001		0.326		0.118		