

Barellan site attributes

2025

Focus

- **Pulse species and variety comparison** – evaluate pulse species including faba bean, field pea, lentil, lupin and vetch to determine local suitability.
- **Phosphorus response** – determine the P efficiency of lentils and peas and determine if one species is more responsive to P than the other.
- **Field pea disease management** – determine the most cost-effective fungicide strategy for controlling foliar diseases in field peas in a variable rainfall environment.

Seasonal conditions

Conditions for the first 4 months were very dry, with below average rainfall and above average temperatures. Warm and dry conditions persisted into May, with some much-needed rain towards the end of the month (Table 1). Follow up rain occurred mid-late June, before the crop accessed stored soil moisture.

Below average rainfall continued throughout June, July and August combined with warm, windy days and cold frosty nights, as drought conditions strengthened. Much needed rain occurred in early September.

The Barellan trial received 148.4 mm growing season rainfall (April–October; GSR) compared with average GSR of 263.6 mm. Thirty percent or 45 mm of the GSR was received in September & October.

Table 1: Monthly rainfall for 2024 and 2025, long-term average (LTA) and total annual and growing season (April–October; GSR) at Barellan Post Office (BOM Number 74005).

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	GSR
2024	112.6	48.7	5.4	45.4	59.2	18.9	32.2	31.0	22.4	27.2	69.4	34.6	507.0	236.3
2025	17.0	15.7	29.0	0.2	31.0	31.2	28.0	13.0	36.4	8.6	19.1	47.2	276.4	148.4
LTA	38.7	33.9	37.9	34.5	37.6	40.2	36.4	37.8	34.9	42.2	35.2	31.6	440.9	263.6

Crop sequence and key management

Table 2: Key management activities at the pulse trial site at Barellan in 2025.

Date	Activity	Trials
28 May	Sowing	Pulse species and variety comparison Phosphorus response Field pea disease management
27 June	Establishment scores	All trials
15 July	Post emergent herbicide applied	All trials
1 August	Fungicide applied	Pulse species and variety comparison Phosphorus response
24 August	Fungicide applied	Pulse species and variety comparison Phosphorus response
2 September	NDVI – late vegetative/start flowering	All trials
1 October	Insecticide applied	All trials
10 November	Desiccation	All trials
20 November	Harvest	All trials

Table 3: Paddock crop sequence history at Barellan.

Year	Crop	Cultivar
2024	wheat	Scepter [Ⓛ]
2023	canola	Hyola Blazer TT
2022	lupins	Mandelup [Ⓛ]

Soil characteristics

Table 4: Soil pH at 4 depth segments at Barellan in May 2025.

Soil depth (cm)	pH CaCl ₂	Salinity EC 1:5 (dS/m)
0–5	5.84	0.18
5–10	5.42	0.23
10–15	4.74	0.18
15–20	5.53	0.063



Table 5: Soil chemical characteristics at Barellan in February 2025.

Characteristic	Unit	Soil depth (cm)	
		0–10	10–60
Nitrate (NO ₃) N	ppm	20.0	2.6
Ammonium (NH ₄) N	ppm	1.3	<1.0
Phosphorus [Colwell]	ppm	31.0	
Potassium [Am. Acet.]	meq/100g	1.18	
Magnesium [Am. Acet.]	meq/100g	0.713	
Calcium [Am. Acet.]	meq/100g	2.99	
Sulphur [MCP]	ppm	11.0	
Manganese [DTPA]	ppm	49.0	
Boron [CaCl ₂]	ppm	0.46	
Copper [DTPA]	ppm	0.49	
Iron [DTPA]	ppm	28.0	
Zinc [DTPA]	ppm	0.37	
Organic Matter	%	1.3	
CEC	cmol/kg	5.17	
Ca:Mg Ratio		4.2	
Potassium	%	23.0	
Magnesium	%	13.8	
Calcium	%	57.9	
Sodium	%	0.7	
Aluminium	%	2.9	
Exchangeable aluminium	cmol/kg	0.15	
Chloride	mg/kg	11.0	
Sodium [Am. Acet.]	cmol/kg	0.037	
Soil N	kg N/ha	26	17
Total N (0-60)	kg /ha	43	

Pulse species and variety comparison

Barellan 2025

Key findings

Faba beans

- Faba bean grain yield averaged 0.63 t/ha, with PBA Nasma[Ⓛ] (0.76 t/ha) and FBA Ayla[Ⓛ] (0.74 t/ha) the highest yielding varieties.
- The largest seed was produced by PBA Amberley[Ⓛ] and PBA Samira[Ⓛ] (58 grams/100 seeds) and the smallest of the varieties evaluated was FBA Ayla[Ⓛ] (45 g/100 seeds).
- At the late vegetative stage, the average NDVI was 0.25, with only small differences in NDVI between varieties.

Field peas

- Field pea grain yield averaged 1.61 t/ha with no difference between the four varieties evaluated.
- The largest seed was produced by PBA Taylor[Ⓛ] and APB Bondi[Ⓛ] (18 g/100 seeds), followed by Sturt and PBA Butler[Ⓛ] (17 g/100 seeds).
- There were no differences in NDVI values between the 4 field pea varieties, with an average NDVI of 0.42.

Lentils

- Lentil yield averaged 0.56 t/ha, with GIA Thunder[Ⓛ] (0.75 t/ha) and ALB Terrier[Ⓛ] (0.68 t/ha) the two highest yielding varieties. PBA Hallmark XT[Ⓛ] was the lowest yielding variety (0.37 t/ha).
- The largest seed was produced by PBA Kelpie XT[Ⓛ] (4.55 g/100 seeds) and GIA 2301 (4.39 g/100 seeds). ALB Terrier[Ⓛ] and GIA Thunder[Ⓛ] (3.69 g/100 seeds) produced the smallest of the varieties evaluated.
- The average NDVI was 0.25, with PBA Hallmark XT[Ⓛ] (0.22) and PBA Kelpie XT[Ⓛ] (0.23) having the lowest readings.

Lupins

- Lupins in the trial, particularly the Albus lupin variety Luxor[Ⓛ], struggled to establish under the conditions experienced in 2025. The average lupin yield was 0.61 t/ha, with Luxor[Ⓛ] (0.55 t/ha) the lowest.
- The average seed size of the narrow leaf varieties was 12.1 g/100 seeds, compared to 26.4 g/100 seeds for the Albus lupin variety Luxor[Ⓛ].
- There were no differences in NDVI values between the lupin varieties, with an average NDVI of 0.18.

Vetch

- Vetch grain yield averaged 0.90 t/ha with Timok[Ⓛ] (1.40 t/ha) and Volga[Ⓛ] (1.20 t/ha) the highest yielding varieties.
- The largest seed was produced by Volga[Ⓛ] (7.3 g/100 seeds), while Benetas produced the smallest (3.4 g/100 seeds) of the varieties evaluated.
- There were no differences in NDVI values between the vetch varieties, with an average NDVI of 0.32.
- Hay biomass (2 October) of the vetch varieties averaged 3.5 t/ha, with Timok[Ⓛ] (4.3 t/ha), Volga[Ⓛ] (3.8 t/ha) and RM4[Ⓛ] (3.8 t/ha) having the highest.

Trial details, management and treatments

The pulse species and variety comparison trials were set up to evaluate and compare the performance of major pulse crops (faba beans, field peas, lentils, lupins, vetch) in the local variable rainfall environment.

Five separate pulse variety trials, consisting of 4 cultivars in the faba bean, field pea and lupins trials, and 7 cultivars in the lentil and vetch trials (Table 2), were grown at Barellan in 2025.

Measurements taken on each trial included NDVI, grain yield and seed size. Peak biomass (related to nitrogen fixation) and seed, taken from selected varieties in each trial, will be further analysed to determine total N fixation and N removal.

Weeds, insects and foliar fungal diseases were managed to minimise impact.

Table 1: Trial management of the pulse species and variety comparison trial at Barellan in 2025.

2025	Management
Sowing date	28 May
Starter fertiliser	Superfect @ 120 kg/ha
Sowing rate	Calculated from seed size for target population (see below)
Desiccation	10 November
Harvest Date	20 November

Table 2: Varieties and target plant population in the five pulse species comparison trials at Barellan in 2025.

	Species trial				
	Faba bean	Field pea	Lentil	Lupin	Vetch
Target plant population (plants/m ²)	20	40	100	30–40	40
Varieties	FBA Ayla [Ⓛ]	APB Bondi [Ⓛ]	ALB Dane	Luxor [Ⓛ]	Benetas
	PBA Amberley [Ⓛ]	PBA Butler [Ⓛ]	ALB Terrier [Ⓛ]	Mandelup [Ⓛ]	Morava
	PBA Nasma [Ⓛ]	PBA Taylor [Ⓛ]	GIA Colombo [Ⓛ]	PBA Bateman [Ⓛ]	Rasina
	PBA Samira [Ⓛ]	Sturt	GIA Lightning [Ⓛ]	PBA Jurien [Ⓛ]	RM4 [Ⓛ]
			GIA Thunder [Ⓛ]		Studentica [Ⓛ]
			PBA Hallmark XT [Ⓛ]		Timok [Ⓛ]
			PBA Kelpie XT [Ⓛ]		Volga [Ⓛ]

Results

Crop growth – NDVI

NDVI was used to assess crop health and vigour of the different varieties in each trial, obtained using a handheld GreenSeeker® crop sensor. The NDVI reading was taken at the late vegetative stage, September 2025 (Table 3).

Table 3: NDVI for each variety of each pulse species at Barellan in September 2025.

Variety	NDVI	Variety	NDVI	Variety	NDVI
Field peas		Lupins		Faba beans	
APB Bondi	0.41	Luxor	0.17	FBA Ayla	0.25
PBA Butler	0.42	Mandelup	0.21	PBA Amberley	0.21
PBA Taylor	0.44	PBA Bateman	0.18	PBA Nasma	0.25
Sturt	0.41	PBA Jurien	0.17	PBA Samira	0.27
Mean	0.42	Mean	0.18	Mean	0.25
I.s.d. ($P = 0.05$)	ns	I.s.d. ($P = 0.05$)	ns	I.s.d. ($P = 0.05$)	0.04
Lentils		Vetch			
ALB Terrier	0.28	Benatas	0.34		
ALB Dane	0.26	Morava	0.35		
GIA Colombo	0.27	Rasina	0.29		
GIA Lightning	0.24	RM4	0.31		
GIA Thunder	0.26	Studenica	0.31		
PBA Hallmark XT	0.22	Timok	0.29		
PBA Kelpie XT	0.23	Volga	0.31		
Mean	0.25	Mean	0.32		
I.s.d. ($P = 0.05$)	0.02	I.s.d. ($P = 0.05$)	ns		

ns = no significant difference



Harvesting pulse species and variety comparison trial, 20 November 2025 at Barellan

Grain yield

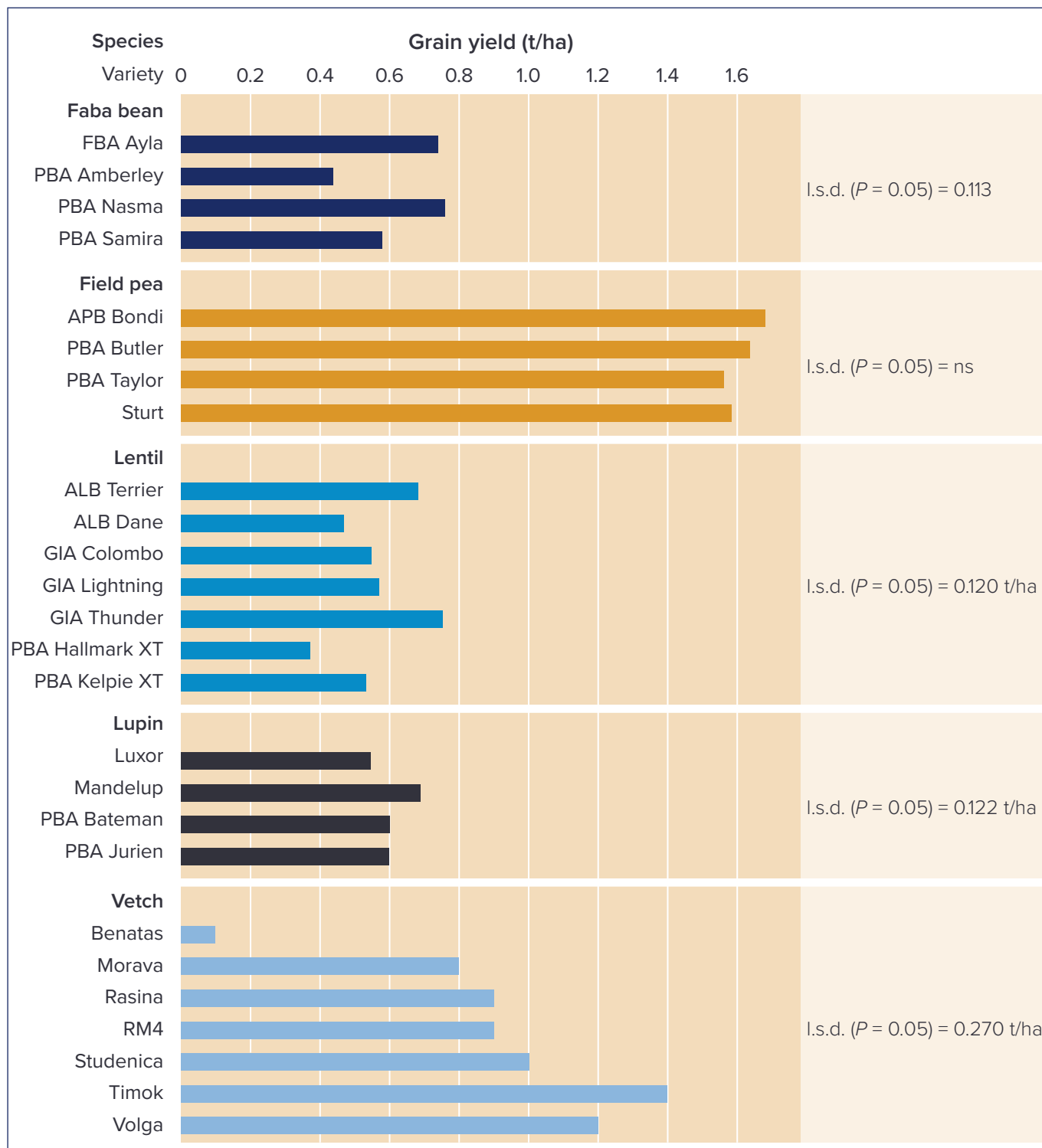


Figure 1: Grain yield of each variety of each pulse species at Barellan in 2025.

Seed size

Table 4: Seed size of each variety of each pulse species at Barellan in September 2025.

Variety	Hundred seed weight (g)	Variety	Hundred seed weight (g)	Variety	Hundred seed weight (g)
Field peas		Lupins		Faba beans	
APB Bondi	18.0	Luxor	26.4	FBA Ayla	44.5
PBA Butler	17.3	Mandelup	12.3	PBA Amberley	57.3
PBA Taylor	18.2	PBA Bateman	11.6	PBA Nasma	51.0
Sturt	17.4	PBA Jurien	12.4	PBA Samira	57.7
Mean	17.7	Mean	15.7	Mean	52.6
I.s.d. ($P = 0.05$)	0.46	I.s.d. ($P = 0.05$)	0.74	I.s.d. ($P = 0.05$)	2.00
Lentils		Vetch			
ALB Terrier	3.6	Benatas	3.4		
ALB Dane	4.2	Morava	6.5		
GIA Colombo	4.4	Rasina	5.7		
GIA Lightning	3.4	RM4	3.9		
GIA Thunder	3.7	Studenica	6.4		
PBA Hallmark XT	3.9	Timok	6.2		
PBA Kelpie XT	4.6	Volga	7.3		
Mean	4.0	Mean	5.6		
I.s.d. ($P = 0.05$)	0.17	I.s.d. ($P = 0.05$)	0.43		

Vetch hay

Table 5: Hay biomass and feed value of four vetch varieties cut 2 October at Barellan in 2025.

Variety	Biomass (t/ha)	ME (MJ/kg)	CP (%)	DMD (%)	ADF (%)	NDF (%)	WSC (%)
Benatas	2.8	9.13	19.89	62.48	35.53	53.97	5.04
Morava	3.2	9.50	20.72	64.65	30.70	47.36	6.49
Timok	4.3	9.73	18.26	65.97	31.72	49.43	10.00
Volga	3.8	10.25	17.92	68.96	30.14	48.12	11.79
Mean	3.5	9.65	19.20	65.52	32.02	49.72	8.33
I.s.d. ($P = 0.05$)	0.61	0.294	1.146	1.71	1.56	2.20	1.36

Note: samples cut at ground level and may not be completely reflective of a commercial hay cut yield.

ME = ruminant metabolisable energy; CP = crude protein; DMD = dry matter digestibility; ADF = acid detergent fibre; NDF = neutral detergent fibre; WSC = Water soluble carbohydrates



Vetch variety trial, 17 September 2025 at Barellan

Acknowledgements

We gratefully acknowledge the investment support of the GRDC for BRA2105-001RTX, '*Development and extension to close the economic yield gap and maximise farming systems benefits from grain legume production in New South Wales*'.

Also thank you to farmer co-operator Jeff Savage "Mayfield" Barellan, for hosting and assisting with management of the trial.

Contributors

Barry Haskins and Rachael Whitworth – Ag Grow Agronomy and Research rachael@aggrowagronomy.com.au

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Phosphorus response in field peas & lentils

Barellan 2025

Key findings

- Phosphorus (P) rate and P placement had no effect on lentil establishment (76 plants/m²), NDVI late vegetative stage (0.21), and grain yield (0.83 t/ha).
- In contrast, field peas responded positively to in-furrow P application at the application rate of 10 kg P/ha (1.61 t/ha) compared with incorporated by sowing (1.24 t/ha). At other P rates there was no effect of placement.

Background

Two trials were conducted in 2025 to determine the effect of varying phosphorus (P) rate and placement on biomass and grain yield in field peas and lentils. The aim was to determine the P efficiency of lentils and peas and determine if one species is more responsive to P than the other.

Both the lentil and field pea trials were conducted on a brown sandy loam soil with a pH (CaCl₂) of 5.63, Colwell P of 31 ppm, and total nitrogen (0–60 cm) of 43 kg N/ha. The field peas and lentils followed a wheat crop grown in 2024, with lupins being the most recent pulse crop grown in 2022.

Trial details, management and treatments

Table 1: Trial management of the pulse phosphorus response trial at Barellan in 2025.

2025	Management
Pre-sow herbicides	Terbyne® Xtreme @ 0.86 L/ha + Reflex® @ 0.75 L/ha + Paraquat 250 g/L @ 2 L/ha
Sowing date	28 May
Starter fertiliser	As per treatment (Table 3)
Sowing rate	Calculated from seed size for target population (Table 3)
Post-emergent herbicides	15 July: Brodal® Options @ 0.2 L/ha 1 August: Status® @ 0.5L/ha + Factor® @ 80 g/ha + AMS @ 0.5kg/100L + sodium molybdate @ 25 g/ha + Hasten™ @ 1%
Fungicide	24 August: Miravis® Star @ 0.25 L/ha
Insecticide	1 October: Alpha-Scud® 300SC @ 0.1 L/ha + BS 1000 @ 0.2% (except lentils)
Desiccation	10 November
Harvest Date	20 November

Table 2: Variety, phosphorus rates and placements evaluated at Barellan in 2025.

Treatments		
Factor	Entries	Details
Species	Lentils Field peas	GIA Thunder [Ⓛ] targeting 100 plants/m ² APB Bondi [Ⓛ] targeting 40 plants/m ²
Phosphorus placement	IBS Furrow	Spread and incorporated by sowing Sown with seed
Phosphorus rate	0 kg/ha 5 kg/ha 10 kg/ha 20 kg/ha	Applied as MAP Nitrogen from MAP was balanced out for each treatment using urea

Results

Lentils

There were no differences in lentil establishment, NDVI and grain yield between P rate and placement treatments in 2025. The average establishment of the trial was 76 plants/m², average NDVI at early flowering was 0.21, and the average grain yield was 0.83 t/ha.



Lentils with 20 kg P/ha IBS (L) and 10 kg P/ha Furrow (R), 17 September 2025 at Barellan

Field peas

Field pea establishment was on target at 41 plants/m² with no effect of P rate or placement. NDVI was assessed at late vegetative growth stage (2 September) with an average 0.38, with an inconsistent response to P rate and placement (Table 4). Field peas responded positively to in-furrow P application at the application rate of 10 kg P/ha (1.61 t/ha) compared with incorporated by sowing (1.24 t/ha). At other P rates there was no effect of placement.



Field peas with 20 kg P/ha Furrow (L) and 5 kg P/ha IBS (R), 17 September 2025 at Barellan

Table 3: NDVI at late vegetative growth stage of APB Bondi[®] field peas grown with four phosphorus rates and two phosphorus placements at Barellan in 2025.

NDVI – 2 September	P Rate				Mean
P Placement	0	5	10	20	
Furrow	0.41	0.36	0.43	0.39	0.40
IBS	0.40	0.31	0.32	0.42	0.36

I.s.d. ($P = 0.05$) P Rate x P Placement = 0.067

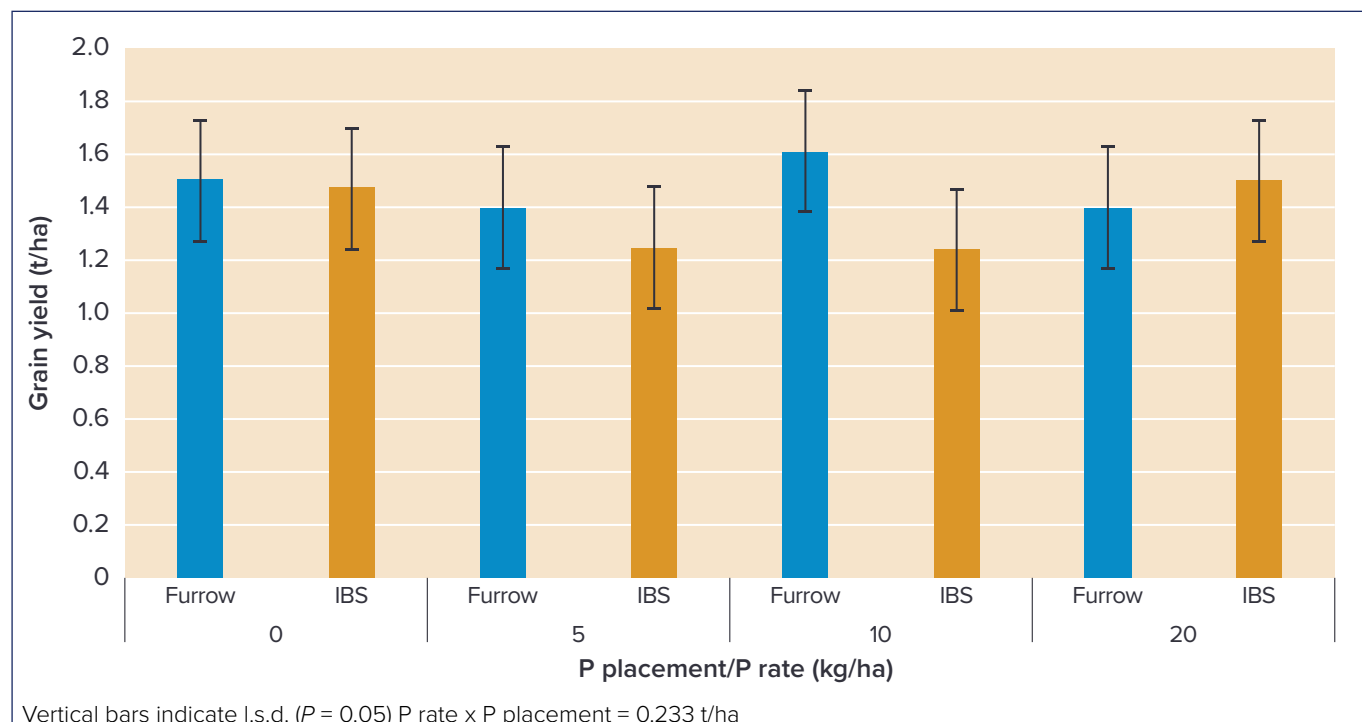


Figure 1: Grain yield of APB Bondi[®] field peas grown with four phosphorus rates and two phosphorus placements at Barellan in 2025.

Acknowledgements

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Field pea disease management

2025 – Barellan

Key findings

- There was no difference in observed disease incidence between treatments at any assessment timing through the season.
- Vegetative growth and canopy development was similar across all treatments.
- Despite the lack of differences in disease severity and NDVI, grain yield varied between treatments. Miravis® Star at 500 mL/ha (1.96 t/ha) or 750 mL/ha (1.91 t/ha) resulted in the highest yield, with other treatments including the Nil averaging 1.71 t/ha.

Background

A trial was conducted to determine if foliar fungicides can be used effectively to manage foliar fungal disease in field peas and to identify the most cost effective strategy in low rainfall environments.

Seasonal conditions were warmer and drier than average, conditions not conducive to fungal disease development. As a result there was very little disease observed in the trial.

Seasonal conditions

Conditions for the first 4 months of the year were very dry, with below average rainfall and above average temperatures. Warm and dry conditions persisted into May, with some much-needed rain towards the end of the month (Table 1). Follow up rain occurred mid-late June, before the crop accessed stored soil moisture.

With warmer, windy days and cold, frosty nights impacting topsoil moisture, below average rainfall continued throughout June, July and August as drought conditions strengthened. Much needed rain occurred in early September.

The Barellan trial received 148.4 mm growing season rainfall (GSR) from April–October (263.6mm GSR average) with 45 mm (30%) of this rainfall received during September and October.



Table 1: Monthly rainfall at Barellan Post Office (BOM Number 74005) in 2025.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2025	17.0	15.7	29.0	0.2	31.0	31.2	28.0	13.0	36.4	8.6	19.1	47.2	276.4

Trial details, management and treatments

Table 2: Trial management of the pulse phosphorus response trial at Barellan in 2025.

2025	Management
Pre-sow herbicides	Terbyne® Xtreme @ 0.86 L/ha + Reflex® @ 0.75 L/ha + Paraquat 250 g/L @ 2 L/ha
Sowing date	28 May
Starter fertiliser	120 kg/ha Superfect
Variety	APB Bondi [®]
Sowing rate	Calculated from seed size for target plant population 40 plants/m ²
Post-emergent herbicides	15 July: Brodal® Options @ 0.2 L/ha 1 August: Status® @ 0.5L/ha + Factor® @ 80 g/ha + AMS @ 0.5kg/100L + sodium molybdate @ 25 g/ha + Hasten™ @ 1%
Fungicide	17 September: as per treatment (Table 3)
Insecticide	1 October: Alpha-Scud® 300SC @ 0.1 L/ha + BS 1000 @ 0.2%
Desiccation	10 November
Harvest Date	20 November

Table 3: Fungicide treatments applied at canopy closure (17 September) of APB Bondi[®] field peas at Barellan in 2025.

Fungicide treatments			
Number	Product	Active ingredient concentration	Application rate
1	Nil		
2	Amistar® Xtra	200 g/L azoxystrobin + 80 g/L cyproconazole	800 mL/ha
3	Miravis® Star	150 g/L fludioxonil + 100 g/L pydiflumetofen	250 mL/ha
4	Miravis® Star	150 g/L fludioxonil + 100 g/L pydiflumetofen	500 mL/ha
5	Miravis® Star	150 g/L fludioxonil + 100 g/L pydiflumetofen	750 mL/ha
6	Bravo® Weatherstik®	720 g/L chlorothalonil	1.1 L/ha

Results

Seasonal conditions in 2025 were not conducive to disease development. As such there was very minimal disease in the trial, with no difference in disease scores between any of the treatments at each timing. There were also no differences in NDVI between any of the treatments.

Despite this there were differences in grain yield (Figure 1). The application of Miravis® Star at either 500 mL/ha or 750 mL/ha resulted in the highest yield, ~1.94 t/ha. Amistar® Xtra, Bravo® Weatherstik® and the lowest rate of Miravis® Star were equal to the nil treatment, yielding 1.7 t/ha.



Applying fungicide treatments to field peas, 17 September 2025 at Barellan

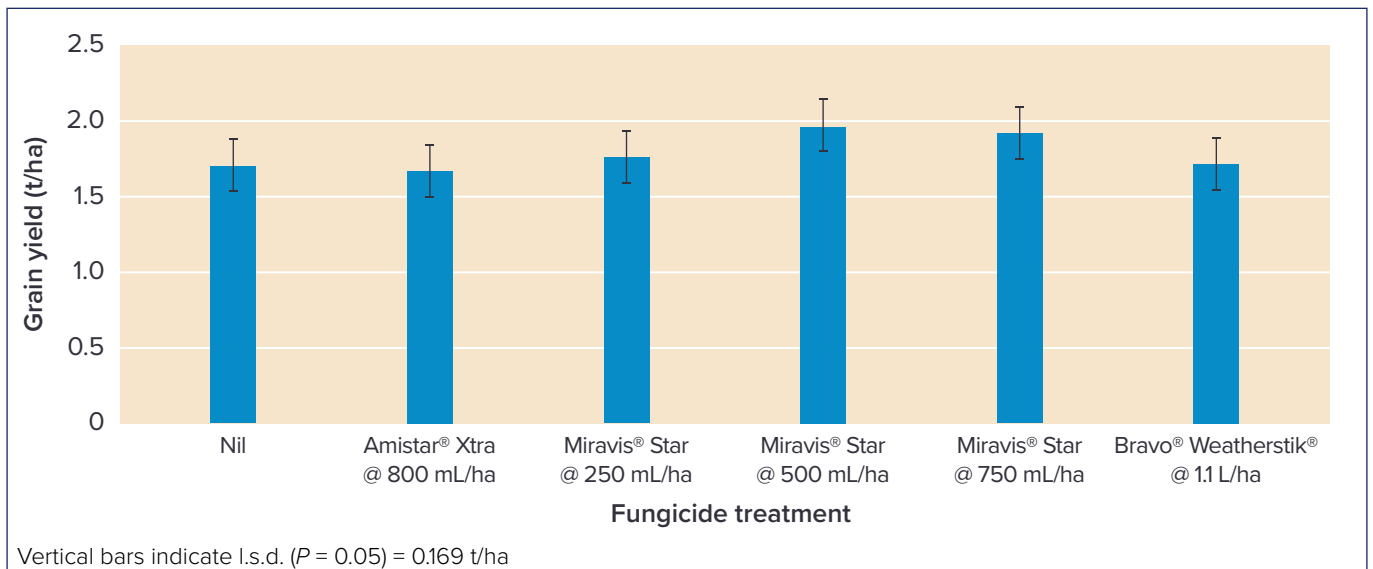


Figure 1: Grain yield of APB Bondi[®] for each fungicide treatment at Barellan in 2025.

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