Comparison of lentil and field pea varieties

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Key findings

- Most lentil varieties performed similarly, with yields ranging from 0.07 t/ha to 0.20 t/ha at Hart in 2024 under dry conditions.
- No yield differences were observed for field pea varieties with a trial average of 0.77 t/ha.
- Pulse disease risk was very low in 2024 due to delayed sowing and extended dry conditions, resulting in majority of pulse crops not reaching full canopy closure.

Aim

To compare the performance of pre-commercial and newly released lentil and field pea lines to current commercial variety options in the medium rainfall zone of South Australia (SA).

Methodology

Two variety trials were established at Hart, SA, to investigate the performance of (1) lentil and (2) field pea varieties (Table 1). These trials have been run at Hart since 2020 to evaluate varieties across multiple seasons. Trials were designed as a randomised complete block design with three replicates.

A total of 14 lentil varieties were evaluated, including three pre-commercial Grains Innovation Australia (GIA) breeding lines; GIA2302L, GIA2301L and GIA2303L. In the field pea variety evaluation, a total of 12 varieties were trialed including one new and three pre-commercial lines: APB Bondi (OZP1903), APB2402, APB2401 and GIA2203P. All varieties received the same agronomic management to ensure a weed, insect and disease-free canopy. Only two replicates could be analysed for lentil grain yield results due to non-random factors affecting one replicate in third bay of trial. Analysis was conducted using ANOVA (Tukey test) in GenStat 24th Edition. Caution should be taken when interpreting results due to the lack of replication. The field pea trial data was analysed using REML spatial model (Regular Grid) with Bonferroni test to separate variety means in GenStat 24th Edition.

Table 1. Site details for the 2024 lentil and field pea variety trials located at Hart field site, SA

Lentil	**Plot size:**	1.75 m x 10 m	**Fertiliser:**	MAP (10:20) + 1% Zn @ 80 kg/ha
	Seeding date:	June 5, 2024		
	Harvest date:	October 30, 2024		
	Previous crop:	Oaten hay		
Field pea	**Plot size:**	2.0 m x 10 m	**Fertiliser:**	MAP (10:20) + 1% Zn @ 80 kg/ha
	Seeding date:	June 5, 2024		
	Harvest date:	October 29, 2024		
	Previous crop:	Oaten hay		

Across all lentil and field pea varieties, yields achieved were well below average, resulting from drought conditions experienced at Hart in 2024. Growing season rainfall (April–October) was 176 mm, compared to the long-term average of 300 mm.

Lentil

Small differences were observed in grain yield between varieties; however, grain yields were low, ranging from 0.07 t/ha to 0.20 t/ha (70–200 kg/ha) at Hart in 2024 (Table 2). PBA Highland XT and PBA Hallmark XT (0.20 t/ha) were higher yielding than ALB Terrier and GIA Leader (0.07 t/ha).

Table 2. Grain yield (t/ha) and maturity characteristics (P = provisional) of lentil varieties at Hart in 2024. Data presented with the same letters are not significantly different (P≤0.05). Lentil maturity characteristics sourced from 2025 South Australian Crop Sowing Guide.

Lentil variety	Maturity	Grain yield (t/ha)
ALB Terrier (CIPAL2122)	Mid	0.07[a]
GIA Leader	Mid-late	0.07[a]
GIA Sire	Mid	0.09[ab]
GIA Metro	Mid-late	0.10[ab]
GIA2303L	Mid (p)	0.12[ab]
GIA2301L	Mid (p)	0.12[ab]
GIA2302L	Early–mid (p)	0.15[ab]
GIA Lightning	Mid	0.15[ab]
PBA Jumbo2	Mid	0.15[ab]
PBA Kelpie XT	Early-mid	0.16[ab]
GIA Thunder	Mid	0.16[ab]
PBA Hurricane XT	Mid	0.16[ab]
PBA Hallmark XT	Mid	0.20[b]
PBA Highland XT	Early-mid	0.20[b]
Average grain yield (t/ha)		**0.14**
P-value		**0.007**

In a small secondary lentil trial sown at Hart on June 5, GIA Thunder and PBA Highland XT were equally higher yielding than ALB Terrier (Table 3). However, there is only 140 kg/ha difference between the lowest and highest yielding variety due to the dry conditions and coinciding low yield in 2024. Similar trends were observed in the main variety trial shown above (Table 2).

Long-term yield data shows that PBA Jumbo2 and GIA Thunder have consistently performed well across the past four seasons at Hart (Table 4).

Table 3. Lentil variety grain yield and grain weight for secondary trial at Hart in 2024. Data in each column with the same letters are not significantly different (p≤0.05).

Variety	Grain Yield (t/ha)	Grain weight (g/100 seeds)
GIA Thunder(b)	0.85[a]	3.46[c]
ALB Terrier(b)	0.73[b]	3.61[b]
PBA Highland XT(b)	0.87[a]	3.70[a]
P-value	**<0.001**	**<0.001**

Variety notes

PBA Highland XT is an IMI-tolerant lentil with early flowering and early to mid-maturity with high early vigour and an upright plant type.

GIA Thunder is a broadly adapted IMI-tolerant lentil with mid flowering and mid maturity and has been a high yielding variety at Hart over the past four seasons (Table 4).

PBA Jumbo2 is a high yielding conventional, non-herbicide tolerant, lentil with an excellent disease resistance profile, mid flowering and mid maturity.

ALB Terrier is a new broadly adapted IMI-tolerant lentil with mid-flowering and mid maturity characteristics, and good disease resistance profile.

GIA Leader is an IMI-tolerant variety with mid to late flowering and maturity (2025 South Australian Crop Sowing Guide).

GIA Metro is unique to other lentil varieties due to its dual herbicide tolerance (metribuzin and Imidazolinone). While the dual technology of GIA Metro is a huge benefit in situations where weeds are controlled or non-existent, the dual technology generally results in GIA Metro having lower grain yields when compared to Imidazolinone (IMI) tolerant and conventional lentil varieties (Grains Innovation Australia (GIA) and PB Seeds, 2003). Additionally, GIA Metro is a late flowering and a late maturing variety. When combined with the dry and short growing season of 2024 (Grains Innovation Australia (GIA) and PB Seeds, 2003), to which it is poorly suited, low yield results are not unexpected.

Table 4. Long-term yield data for lentil varieties at Hart 2020-2024.

	% of trial average					Grain yield (t/ha)
Variety	**2020**	**2021**	**2022**	**2023**	**2024**	**2024**
ALB Terrier(þ) (CIPAL2122)					52	0.07
GIA2301L					89	0.12
GIA2302L					111	0.15
GIA2303L					89	0.12
GIA Leader(þ)	98	103	105	99	52	0.07
GIA Lightning(þ)			105	105	111	0.15
GIA Metro(þ) (GIA2004L)			80	81	74	0.10
GIA Sire(þ) (GIA1703L)			80	92	66	0.09
GIA Thunder(þ) (GIA2002L)		113	123	110	118	0.16
PBA Blitz(þ)			90	100		
PBA Bolt(þ)			90	104		
PBA Hallmark XT(þ)	95	97	99	97	148	0.20
PBA Highland XT(þ)	100	99	104	100	148	0.20
PBA Hurricane XT(þ)	91	95	105	93	118	0.16
PBA Jumbo2(þ)	104	110	108	105	108	0.15
PBA Kelpie XT(þ)	106	82	94	103	118	0.16
Average grain yield (t/ha)	**1.62**	**1.30**	**5.42**	**1.81**	**0.14**	
Sowing date	May 18	May 18	June 9	June 1	June 5	
April-October (mm)	355	232	355	236	176	
Annual rainfall (mm)	503	401	519	355	240	

Field pea

There were no observed yield differences across field pea varieties at Hart in 2024 (Table 5). Grain yields ranged from 0.65–0.87 t/ha with a trial average of 0.77 t/ha. Long-term yield data for field pea varieties at Hart can be found in Table 6.

Table 5. Field pea grain yield (t/ha) data at Hart in 2024.

Field pea variety	**Grain yield (t/ha)**
GIA2203P	0.87
APB Bondi(þ) (OZP1903)	0.86
PBA Wharton(þ)	0.82
APB2401	0.80
PBA Oura(þ)	0.78
GIA Ourstar(þ)	0.77
Kaspa(þ)	0.75
PBA Gunyah(þ)	0.75
APB2402	0.73
GIA Kastar(þ)	0.71
PBA Butler(þ)	0.70
PBA Taylor(þ)	0.65
Average grain yield (t/ha)	**0.77**
P-Value	**NS**

Table 6. Long-term yield data for field pea varieties at Hart 2020-2024.

% of trial average						Grain yield (t/ha)
Variety	**2020**	**2021**	**2022**	**2023**	**2024**	**2024**
APB2401					104	0.80
APB2402					94	0.73
APB Bondi(b) (OZP1903)					112	0.86
Kaspa(b)	112	113	106	102	97	0.75
GIA2202P			110	95		
GIA2203P				101	113	0.87
GIA Kastar(b)	98	88	86	99	93	0.71
GIA Ourstar(b)	111	93	84	85	100	0.77
PBA Butler(b)	94	108	112	101	91	0.70
PBA Gunyah(b)			93	99	97	0.75
PBA Oura(b)	101		101	99	102	0.78
PBA Pearl(b)			106	103		
PBA Percy(b)			99	98		
PBA Taylor(b)			105	110	84	0.65
PBA Wharton(b)	83	98	99	109	106	0.82
Average grain yield (t/ha)	**1.38**	**1.61**	**3.63**	**2.23**	**0.77**	
Sowing date	May 18	May 18	June 9	June 1	June 5	
April-October (mm)	355	232	355	236	176	
Annual rainfall (mm)	503	401	519	355	240.2	

Acknowledgements

The Hart Field-Site Group would like to acknowledge the generous support of our sponsors who provide funding that allows us to conduct this trial. Proceeds from Hart's ongoing commercial crop also support Hart's research and extension program. We would like to thank Seednet, Grains Innovation Australia (GIA), Agriculture Victoria and South Australia Research and Development Institute (SARDI) for providing seed to conduct this trial. We also thank the SARDI Clare Agronomy team for managing the field trial site.

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