Comparison of lentil and field pea varieties

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Key findings

- Lentil yields ranged from 1.47 – 2.01 t/ha with a trial average of 1.81 t/ha at Hart in 2023.
- The highest yielding lentil varieties were GIA Thunder and pre-commercial variety CIPAL2122, achieving 1.99 and 2.01 t/ha, respectively.
- CIPAL2122, GIA Thunder, GIA Lightning and PBA Jumbo2 have consistently performed well across multiple seasons at Hart.
- Average grain yield for all field pea varieties was 2.23 t/ha with yields ranging from 1.90 – 2.44 t/ha.
- The highest yielding field pea varieties were PBA Wharton and PBA Taylor, achieving 2.42 and 2.44 t/ha, respectively.
- PBA Taylor, PBA Pearl, Kaspa and PBA Butler have yielded well across multiple seasons at Hart.

Aim

To compare the performance of pre-commercial or newly released lentil and field pea lines to current variety options in the medium rainfall zone of the Mid-North at Hart, SA.

Methodology

Two trials were implemented at Hart, SA to evaluate the performance of lentil and field pea varieties (Table 1). Both trials were a randomised block design with three replicates. Twelve field pea varieties were trialed, including one new coded testing line, GIA2003P. Thirteen lentil varieties were trialed. No new lentil varieties were available for inclusion, however GIA Lightning, GIA Thunder, GIA Metro and GIA Sire were commercially released for the 2023 growing season.

Both trials were managed with the application of pesticides to ensure a weed, insect and disease-free canopy and all plots were assessed for grain yield (t/ha). Data was analysed using a REML spatial model (Regular Grid) in Genstat 23rd edition.

Table 1. Trial details for lentil and field pea variety trial at Hart in 2023.

Plot size (field pea)	2.0 m x 10.0 m	**Fertiliser**	MAP (10:20) + 1% Zn @ 80kg/ha
Plot size (lentil)	1.75 m x 10.0 m		
Seeding date	June 1, 2023		
Field pea harvest date	October 26, 2023		
Lentil Harvest date	November 2, 2023		
Location	Hart, SA		

Results and discussion

Lentil

Average grain yield for lentils was 1.81 t/ha, with variety yields ranging from 1.47 – 2.01 t/ha (Table 2) at Hart in 2023. Varieties CIPAL2122 and GIA Thunder performed best, yielding 1.99 and 2.01 t/ha, respectively. Newly released IMI tolerant varieties, GIA Metro and GIA Sire, as well as PBA Hurricane XT and PBA Hallmark XT recorded the lowest yields at Hart in 2023, ranging from 1.47 – 1.76 t/ha (Table 2). GIA Sire is a slow growing variety, best suited to early sowing and therefore is likely to have been impacted by a late sowing time on June 1, as well as limited spring rainfall (GRDC Sowing Guide, 2023).

GIA Metro is the first variety with imidazolinone and metribuzin herbicide tolerances, however, has a known yield penalty when compared to other varieties (GRDC Sowing Guide, 2023). Lentils performed similarly to the 2020 and 2021 seasons at Hart, however below average growing season rainfall (GSR) resulted in lower yields, when compared to 2022 (Table 3).

Field pea

The highest yielding field pea varieties were PBA Wharton and PBA Taylor, yielding 2.42 and 2.44 t/ha, respectively (Table 4). These varieties are both early to early-mid maturity and suited to a shorter season, allowing for improved performance in a season where sowing is delayed and spring rainfall is limited (GRDC sowing guide, 2023). GIA Ourstar yielded 1.90 t/ha and was the lowest yielding variety at Hart in 2023. Across a number of trials, GIA Ourstar has yielded 1-20% lower than varieties such as PBA Wharton and PBA Oura (Grains Innovation Australia, 2020). Yield penalties of 21.5 and 14.0% were noticed when comparing GIA Ourstar to PBA Wharton and PBA Oura at Hart in 2023.

Yield trends were consistent with NVT trials, with PBA Taylor performing well at other locations across the Mid-North, including Laura and Riverton sites (National Variety Trials, 2023). GIA Ourstar was among the lowest yielding varieties at both Laura and Riverton NVT sites and has been low yielding at Hart for several seasons (Table 5).

Table 2. Lentil grain yields at Hart in 2023. Shaded values indicate the highest yielding lentil varieties.

Lentil variety	Grain yield (t/ha)
GIA Metro(b)	1.47[a]
GIA Sire(b)	1.67[b]
PBA Hurricane XT(b)	1.69[b]
PBA Hallmark XT	1.76[bc]
GIA Leader(b)	1.79[cd]
PBA Highland XT	1.81[cde]
PBA Blitz(b)	1.81[cdef]
PBA Kelpie XT(b)	1.87[defg]
PBA Bolt(b)	1.88[defg]
PBA Jumbo2(b)	1.90[efg]
GIA Lightning(b)	1.90[egh]
GIA Thunder(b)	1.99[hi]
CIPAL2122	2.01[i]

Table 3. Long-term yield data for lentil varieties at Hart 2020-2023.

	% of trial average				Grain yield (t/ha)
Variety	**2020**	**2021**	**2022**	**2023**	**2023**
PBA Kelpie XT(b)	106	82	94	103	1.87
PBA Highland XT	100	99	104	100	1.81
PBA Jumbo2(b)	104	110	108	105	1.90
PBA Hallmark XT	95	97	99	97	1.76
GIA Thunder(b) (GIA2002L)		113	123	110	1.99
GIA Leader(b)	1.58	103	105	99	1.79
PBA Hurricane XT(b)	91	95	105	93	1.69
GIA Sire(b) (GIA1703L)			80	92	1.67
GIA Metro(b) (GIA2004L)			80	81	1.47
PBA Bolt(b)			90	104	1.88
PBA Blitz(b)			90	100	1.81
GIA Lightning(b) (GIA2003L)			105	105	1.90
CIPAL2122			111	111	2.01
Average grain yield (t/ha)	**1.62**	**1.30**	**5.42**	**1.81**	
Sowing date	May 18	May 18	June 9	June 1	
April - Oct (mm)	355	232	355	236	
Annual rainfall (mm)	503	401	519	355	

Table 4. Field pea yields at Hart in 2023. Shaded values indicate the highest yielding varieties.

Field pea variety	Grain yield (t/ha)
GIA Ourstar(b)	1.90[a]
GIA2202P	2.12[b]
PBA Percy	2.17[bc]
GIA Kastar(b)	2.19[bc]
PBA Gunyah(b)	2.19[bc]
PBA Oura(b)	2.21[bc]
GIA2003P	2.25[bc]
PBA Butler(b)	2.26[c]
Kaspa(b)	2.26[c]
PBA Pearl	2.30[c]
PBA Wharton(b)	2.42[d]
PBA Taylor(b)	2.44[d]

Table 5. Long-term yield data for field pea varieties at Hart 2020-2023.

	% of trial average				Grain yield (t/ha)
Variety	**2020**	**2021**	**2022**	**2023**	**2023**
GIA Kastar(b)	98	88	86	99	2.19
GIA Ourstar(b)	111	93	84	85	1.90
PBA Wharton(b)	83	98	99	109	2.42
PBA Butler(b)	94	108	112	101	2.26
PBA Oura(b)	101		101	99	2.21
Kaspa(b)	112	113	106	102	2.26
PBA Gunyah(b)			93	99	2.19
PBA Percy			99	98	2.17
PBA Taylor(b)			105	110	2.44
PBA Pearl			106	103	2.30
GIA2202P			110	95	2.12
GIA2003P				101	2.25
Average grain yield (t/ha)	**1.38**	**1.61**	**3.63**	**2.23**	
Sowing date	May 18	May 18	June 9	June 1	
April - Oct (mm)	355	232	355	236	
Annual rainfall (mm)	503	401	519	355	

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References

GRDC (2023), 2024 South Australian Crop Sowing Guide