Lentil and field pea agronomy 2012

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Key findings

- Delaying sowing from 22nd May until 16th June led to an average 0.39t/ha yield reduction in 2012
- Field peas had higher grain yields than lentils at both sowing times and both sites
- At the lower yielding western site earlier maturing lentil varieties outperformed later maturing varieties Nipper and Nugget
- All field peas and field pea blends produced similar grain yields at each site and time of sowing

Why do the trials?

Interest in growing lentils has increased in recent years due to high grain prices and the availability of improved varieties leading to an increase in area sown in the more marginal pulse growing areas. Field peas have traditionally been considered to be the most reliable break crop in these areas despite lower grain prices. Recently released lentil varieties with improved disease characteristics, higher grain yield and earlier maturity timings may now provide a viable alternative to field peas in these areas. Trials to compare new lentil varieties with older standards and current field pea options were set up on two contrasting soil types at Hart from 2010 - 2012. The two trial sites comprised one on a less suitable soil type for pulse production (West Site) with higher soil EC and the other was placed on a deeper soil more suited to pulse production (East Site), allowing a comparison of varieties under less favourable conditions.

Two “Kaspa type” seed mixtures (blends), broadening the flowering and maturity range when compared with the standard varieties were also included in the 2012 experiments.

How was it done?

Plot size	1.5m x 10m	**Fertiliser rate**	MAP 2% Zn @ 90kg/ha
Sowing date	TOS 1: 22nd May 2012	**Inoculant**	-
	TOS 2: 19th June 2012	**Row Spacing**	22.5 cm (9”)
Varieties	Lentils; @ 120 plants per square metre;		
(plant density)	PBA Blitz, PBA Flash , PBA Jumbo, Nipper, Nugget and CIPAL0902		
	Field Peas @ 55 plants per square metre;		
	Varieties: PBA Gunyah, PBA Twilight, PBA Oura and Kaspa		
	Blends: Kaspa mix (50% Kaspa, 25% PBA Gunyah and 25% PBA Twilight) and mixture (33% Kaspa, 33% PBA Gunyah and 33% PBA Twilight)		
Sites	West (at top of Hart site hill), shallow hard setting, higher salinity		
	East (at bottom of Hart site hill), deeper well-structured and more friable		

Trial design Due to the difficulties associated with growing peas and lentils in the same trial they have been separated into blocks within each site.

Each site and crop type were analysed separately as a split plot design with 3 reps, blocked by sowing date.

Comparisons between sites and crop types are not statistically analysed.

Fungicides All field pea plots were treated with 2.2kg/ha mancozeb at 9 node.

All lentil plots were treated with carbendazim at 500mL/ha at canopy closure.

Results

The average grain yield for the eastern site was 1.27t/h compared with 1.1t/ha at the western site. Lentils produced an average grain yield of 0.94t/ha across both sites and field peas produced 1.43t/ha.

There was no time of sowing by variety interaction at either site or for either crop. All varieties and both sites responded the same way to time of sowing, where by, as sowing was delayed grain yields declined (Table 1). At the eastern site a yield decrease of 0.54t/ha for both crops occurred and at the western site a smaller decrease of 0.32t/ha occurred for the lentils and 0.22t/ha for the field peas.

Table 1. Average lentil and field pea grain yield (t/ha) for time of sowing and site at Hart in 2012.

TOS	Lentils		Field peas	
	East site	West site	East site	West site
TOS 1 May-22	1.26	1.04	1.82	1.43
TOS 2 Jun-19	0.73	0.72	1.28	1.21
Site LSD 0.05	0.08	0.13	0.12	0.17

Across both times of sowing all lentils performed similarly at the eastern site, producing an average 0.99t/ha (Table 2). At the western site, with less suitable soil, there were significant differences where Nipper produced the lowest grain yield (0.6 t/ha) and the earlier maturing variety, PBA Blitz produced 1.07t/ha. The three recently released lentils, PBA Jumbo, PBA Flash and PBA Blitz and the breeding line CIPAL 902 all produced similar grain yield at this site, where as the older lentils, Nipper and Nugget were lower yielding.

Table 2. Lentil and field pea variety grain yields averaged for time of sowing at the east and west site.

Lentils			Field peas		
Variety	Grain yield (t/ha)		Variety	Grain yield (t/ha)	
	East	West		East	West
Nipper	0.89	0.63	**Kaspa**	1.50	1.24
Nugget	0.99	0.72	**Kaspa Mix**	1.52	1.37
PBA Jumbo	1.00	0.91	**Mixture**	1.48	1.30
CIPAL902	1.07	0.97	**PBA Gunyah**	1.59	1.31
PBA Flash	1.02	0.98	**PBA Oura**	1.61	1.26
PBA Blitz	0.99	1.07	**PBA Twilight**	1.60	1.43
LSD 0.05	ns	0.22	**LSD 0.05**	ns	ns

All field pea varieties produced similar grain yields ranging from 1.48t/ha (Mixture) to 1.61t/ha (PBA Oura) at the eastern site and 1.24t/ha (Kaspa) to 1.43t/ha (PBA Twilight) at the less suited western site (Table 2). The Kaspa mixtures all produced similar yields showing that were no advantages to mixing these similar seed types in 2012.

Result Summary 2010 – 2012

Over the last three years there have been different crop type and variety responses to the different seasonal conditions that have occurred. Table 3 shows a summary of the significant seasonal conditions that occurred and the variety responses associated with that season. Generally in higher yielding years lentils produced high grain yields, greater or equal to field peas. In the tighter finishing seasons field peas produced higher yield than the lentils. The newer lentil varieties performed as well or better than the older varieties in most cases.

Table 3. Significant seasonal events, field pea versus lentil comparisons and old lentils versus newer lentil variety comparisons for the three years of testing at Hart in 2010, 2011 and 2012.

Year	Significant seasonal events	Field peas vs. Lentils	Older Lentils vs. New Lentils
2010	High rainfall, with cool grain filling period, high yielding season	Lentils produced grain yields 17% higher than field peas	New lentil varieties produced slightly higher grain yields at the better site than the older varieties
2011	Late season rainfall favoured late maturing varieties and led to a complex variety by time of sowing interaction	Field peas produced higher yields than the lentils at the better site and similar yields at the poorer site	Early maturing PBA Blitz finished before late rain when sown early leading to lower yields. Nipper produced low yields at the poorer site when sown late. Other new lentils produced similar yields to the older varieties.
2012	Low rainfall but mild finishing temperatures with no clear finishing event (heat event) to the season	Peas produced higher yields than lentils	New lentils produced greater grain yields than the older varieties at the less favourable site.

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Discussion

Overall lentil and pea grain yields averaged 1.18t/ha across all sites and treatments in 2012. There was no significant foliar disease and the major yield limiting factor was the lack of late season rainfall, only 25mm in September and October. Although only small the slightly higher grain yield at the eastern site (1.27t/ha) compared to the western site (1.10t/ha) highlights the importance of paddock and crop selection to maximise pulse yields in these more marginal areas. A similar result was found in 2011 where there was a 0.4t/ha yield decrease from the eastern to the western site, 2.23t/ha to 1.76t/ha respectively.

Time of sowing was the largest influencing factor determining grain yield at Hart in 2012 as there was a clear advantage observed from sowing early. All varieties from both crops were significantly penalised as sowing was delayed until the 19th of June. The yield reduction from TOS 1 to TOS 2 was an average of 0.41t/ha across both crops and sites, with the greatest reduction occurring at the high yielding eastern site (0.54t/ha). This average yield reduction equates to 14.5kg/ha/day of delayed sowing from 22nd May. A similar result was also observed at Hart in 2011 in the lentil agronomy trials.

In TOS 2 in 2011 at both sites, variety maturity timing had a strong influence on grain yield where later maturing varieties were lower yielding (PBA Blitz also produced low yields due to maturing before the onset of late season rains). In 2012 at the lower yielding western site, the newer and earlier maturing lines produced higher grain yields than the later maturing variety, Nipper. This repeatable response in lower yielding situations shows that the newer lentil varieties have the ability to maintain grain yield in both higher and lower yielding conditions.

It was the high lentil prices that occurred around 2009 that sparked the interest in growing lentils in these areas. If grain price is considered then lentils may have the advantage, providing grain quality can be achieved. The newer lentil varieties that are available are more determinate in flowering and generally earlier in their maturity and therefore finish more quickly. This can lead to improved quality due to more consistent seed size and even seed maturity improving harvest timing and efficiency. Harvestability is also improved with more erect plant types such as PBA Flash and PBA Blitz, however this can increase the risk of pod drop, as was seen in some crops in 2012.

The pea blend trials have been implemented to assess the possibilities of mixing the “Kaspa type” pea varieties (Kaspa, PBA Gunyah and PBA Twilight). The pea varieties and blends at both sites all produced similar yields despite maturity timing and duration differences. This result was also observed in other field pea blend trials around the mid north including Snowtown, Balaklava and Willamulka on the Yorke Peninsula. At the high yielding pea blend trial at Turretfield, Kaspa was found to produce higher yields than other blends and varieties; this result is consistent with long term evaluation of these varieties and shows that in higher yielding situations Kaspa is still the preferred variety.

Over the last three years trials have shown that lentils can be successfully grown in these environments, however caution should be taken on paddocks with variable soil types as poorer areas will struggle to reliably produce grain yields particularly if sowing is delayed or the season is unfavourable. The new lentil varieties have performed equal or better than the older varieties over the last three years of testing and provide more reliable options for lentil growers in these areas. Generally field peas maintained their superiority in these environments but were lower yielding in the best season of 2010. Further genetic improvements are still required in lentil to match field pea yield performance in less favourable years, however large grain price differentials between the two will continue to make them a viable alternative providing quality parameters are achieved. In 2012 field pea varieties all performed equally and the field pea blends showed that there was no advantage or disadvantage from mixing varieties in medium to low rainfall areas.