

Lentil, amendments for deficient soils, HRZ Mid North (Riverton), South Australia
Faba bean, amendments for deficient soils, HRZ Mid North (Riverton), South Australia
Chickpea, amendments for deficient soils, HRZ Mid North (Riverton), South Australia

Authors

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Aim

To evaluate effects of soil amendments on yields of pulses grown in nutrient deficient soils

Treatments

Factor 1: Nine varieties (Table 1)

Factor 2: Four soil amendments

Soil amendment treatments	Details
Nil + top up Nitrogen	9.0 units of nitrogen added
Gypsum	10.5 units of sulphur
Sulphur	10.5 units of sulphur
Phosphorus	20.5 units of phosphorus, additional 93.5 kg/ha MAP

Table 1. Species and varieties

Species	Varieties
Lentil	PBA Hurricane XT, PBA Bolt, PBA Jumbo2
Faba bean	PBA Zahra, PBA Samira, PBA Bendoc
Chickpea	PBA Slasher, PBA Monarch, Genesis 090

Table 2. Trial site details

Riverton, 2019	
Sowing date	3 June
Sowing density (plants/m ²)	Lentil: 120 Faba bean: 24 Chickpea: 50 (PBA Slasher), 35 (PBA Monarch and Genesis 090)
Row spacing (cm)	23
Fertiliser (kg/ha) ¹	75
Inoculant	Group E and F
Date of harvest	Faba bean and lentil: 17 November Chickpea: 29 November

¹MAP (9.2, 20.2, 0, 2.7) + Zn (2.5)

Results and Interpretation

- Key Messages: Soil treatments had no effect on grain yield. Varieties differed in biomass and grain yields.
- Biomass: Soil amendments did not influence biomass. Interactions between soil amendments and varieties on biomass were insignificant. In chickpeas, average biomass yield was 2.5 t/ha at flowering and 4.3 t/ha at crop maturity (data not shown).
- At maturity certain varieties of lentils and faba beans produced more biomass than the other varieties suggesting the varietal differences in reproductive efficiency (Figure 1). For instance, PBA Jumbo2 lentil variety produced 12% (0.6 t/ha) more biomass than the PBA Hurricane XT (Figure 1). In faba beans PBA Zahra produced 17% more biomass than the average biomass of other two varieties (Figure 1).

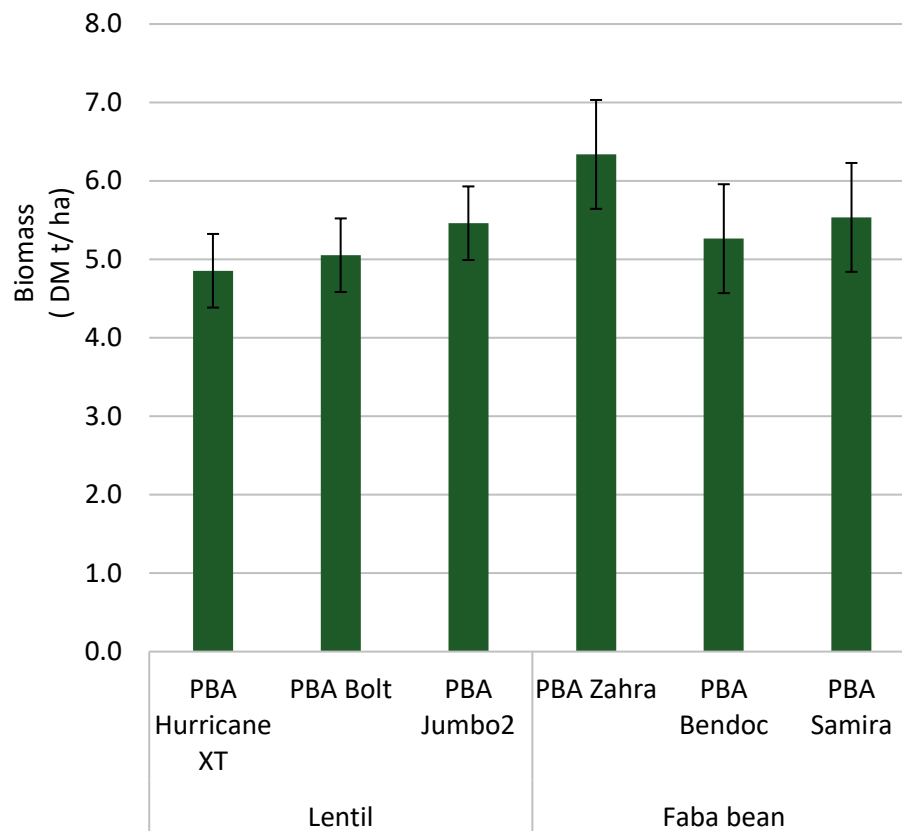


Figure 1. Dry biomass of lentil and faba bean varieties at maturity at Riverton, 2019. Error bars represent least significant difference ($P < 0.05$).

- Grain yield: Soil amendments were not significant on grain yield at Riverton in 2019. However, varieties had a significant impact on grain yields for each crop (Figure 2). For instance, PBA Jumbo2, desi chickpea PBA Slasher and PBA Samira were the highest yielding varieties for chickpeas, lentil and faba bean respectively.

Desi chickpea PBA Slasher yields 9% (0.13 t/ha) more grains than Genesis 090 (Figure 2). However, growing high yielding PBA Slasher (desi variety) does not warrant higher profits because kabuli grains such as PBA Monarch and Genesis 090 fetch far higher prices than desi grain.

PBA Jumbo2 (2.0 t/ha) was the highest yielding lentil variety at Riverton, 2019 (Figure 2). These results are consistent with yield data for PBA Jumbo2 where PBA Jumbo2 is the highest yielding red lentil in the in South Australian region. Grain yields of PBA Jumbo2 is 12% and 28% more than PBA Bolt and PBA Hurricane XT, respectively.

PBA Samira (2.1 t/ha) was the highest yielding faba bean variety (Figure 2). PBA Samira is a high yielding faba bean variety that is widely adapted in southern Australia. PBA Bendoc with improved tolerance to imidazolinone herbicides produced yields that were 15% (0.27 t/ha) lower than the PBA Samira. PBA Zahra was the lowest yielding faba bean variety, which was 34% (0.5 t/ha) lower than PBA Samira.

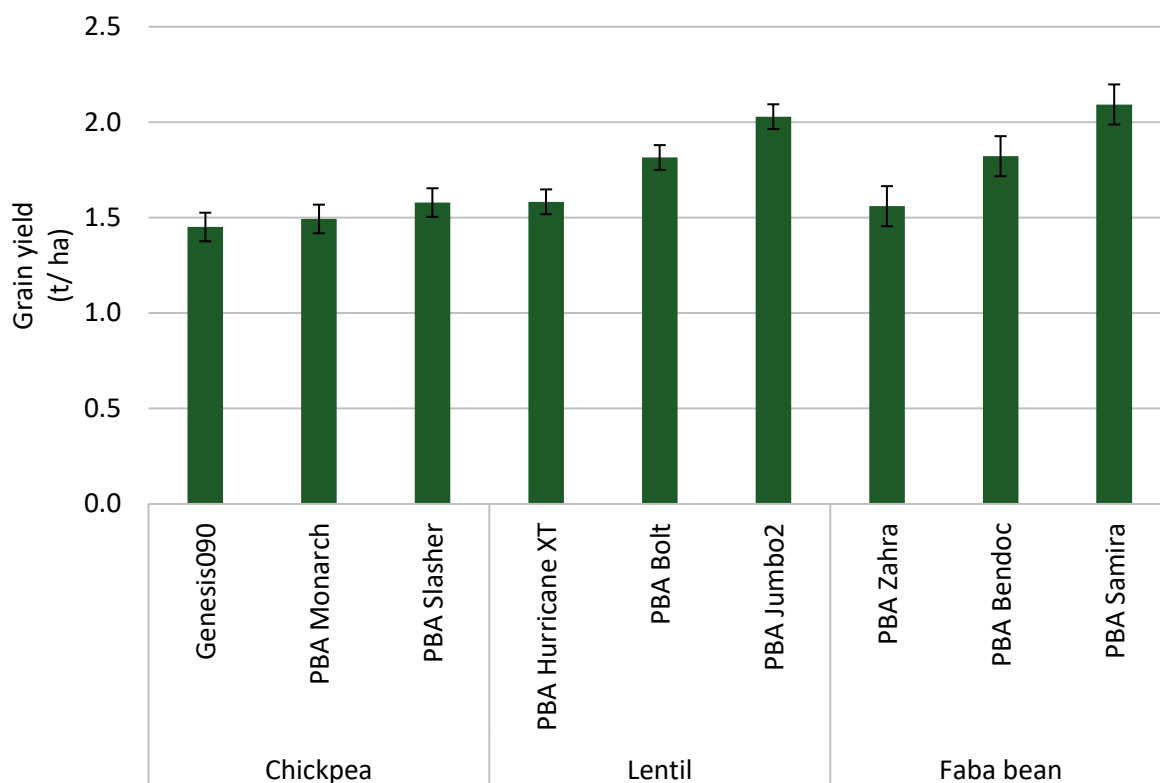


Figure 2. Grain yields (DM t/ha) of chickpea, lentil and faba bean varieties at Riverton, 2019. Error bars represent least significant difference ($P<0.05$).

- Harvest index: Soil amendments had no effect on harvest index. Mean harvest index for chickpea was 43% and 44% for lentil (not shown). Faba bean varieties differed in their harvest index (Figure 3). For example, harvest index of PBA Zahra was 33% lower than that for PBA Samira. This is because higher biomass yield and lower grain yield of PBA Zahra decreases its harvest index compared to other varieties. This suggests that at Riverton in the 2019 season PBA Zahra demonstrated lower reproductive efficiency.

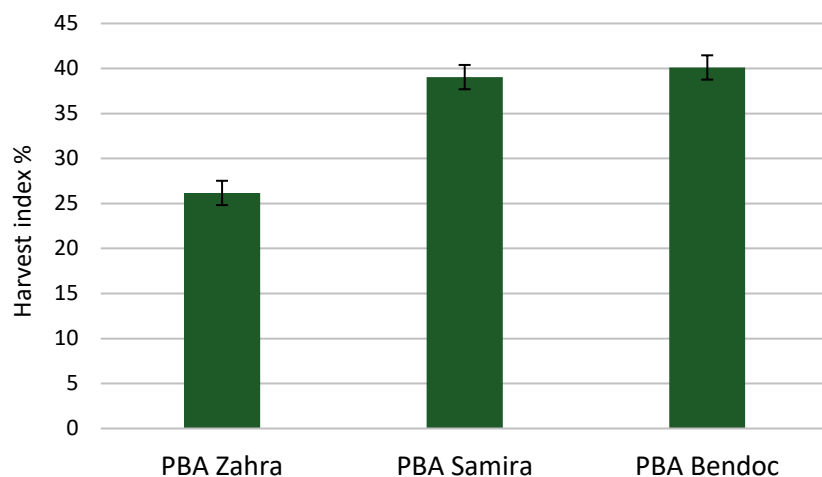


Figure 3. Harvest index (%) of faba bean varieties at Riverton, 2019. Error bars represent least significant difference ($P<0.05$).

Acknowledgements

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Lentil, field pea and faba bean, frost management, LRZ Eyre Peninsula (Kimba), South Australia
Lentil, field pea and faba bean, frost management, MRZ Mid North (Farrell Flat), South Australia

Authors

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Aim

To understand the impact of frost, and the interaction of stubble management, ripping and frost on pulses.

Treatments

Table 1. Treatments included in frost management trials at Kimba and Farrell Flat, 2019.

Kimba – treatments	1. Ripping + nutrition 2. Ripping – nutrition 3. Non-ripping + nutrition 4. Non-ripping – nutrition
Kimba – varieties	Lentil: PBA Bolt, PBA Blitz, PBA Jumbo2 Field pea: Kspa, PBA Gunyah, PBA Butler Faba bean: PBA Marne, PBA Samira, Farah
Farrell Flat - treatments	1. Standing stubble + nutrition 2. Standing stubble – nutrition 3. Removed stubble + nutrition 4. Removed stubble – nutrition
Farrell Flat - varieties	Lentil: PBA Bolt, PBA Blitz, PBA Jumbo2 Field pea: Kspa, PBA Gunyah, PBA Butler Faba bean: PBA Marne, PBA Samira, Farah

Results and Interpretation

- Key messages: Although we reached harvest at both Kimba and Farrell Flat, multiple environmental factors coinciding with bacterial blight infection meant that data was compromised, and no sound conclusions could be drawn from this work.

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