

## Faba Beans

### B1 Faba Bean Sowing Date x Plant Density, Mid North (Tarlee), South Australia

#### Aim

To determine optimum sowing dates and sowing densities for maximising yield of new faba bean varieties in high rainfall areas.

#### Treatments

Varieties: Faba bean - Nura, Farah, Fiord, PBA Rana

Broad bean - PBA Kareema

Sowing dates: 30 April (Early), 31 May (Late)

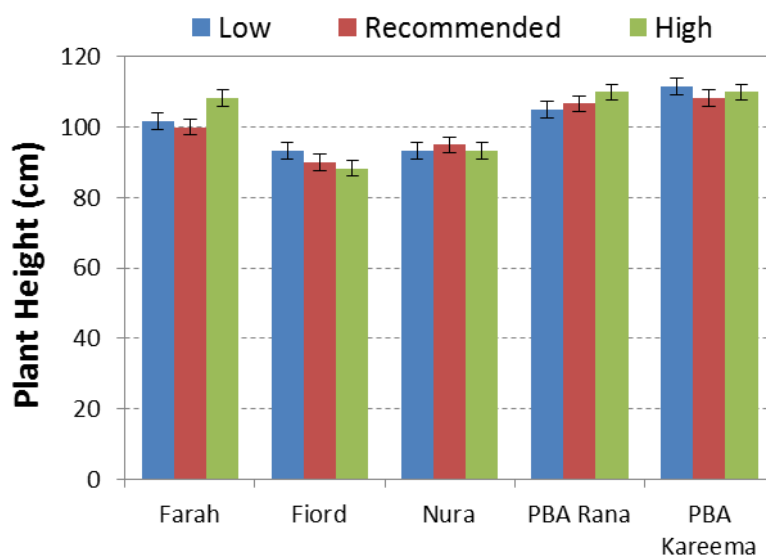
Plant densities:

Treatment Name	% of Recommended sowing rate	Plant Density (plants/m <sup>2</sup> )	
		Faba bean	Broad bean
Low	66%	16	8
Recommended	100%	24	12
High	133%	32	16

Fertiliser: Map + Zn @ 100kg/ha at sowing

#### Results and Interpretation

- Disease – disease infection was generally low in 2012, and controlled using standard management practices representative of grower practice.
- Plant Height – a plant density x variety response was generated for plant height (Figure 1). Farah and PBA Rana showed increased plant height at the High plant density compared to the Low and Recommended. Fiord showed decreasing plant height with increasing plant density, while Nura and PBA Kareema showed no plant height differences between plant densities.
- Lodging – only low levels of lodging were observed in 2012. However differences in lodging were still apparent between sowing dates and varieties. Extent of lodging was greater for Early sown beans (Table 1). Farah, Fiord and the broad bean PBA Kareema showed more lodging than Nura and PBA Rana, which showed only minor lodging (Table 2).
- Necking – (where the top part of the stem collapses and bends over sharply, but does not break completely) was observed to a small extent in the 2012 trials, and a sowing date x variety response was produced (Figure 2). Necking was the highest in PBA Kareema and to a lesser extent Farah. All varieties except Farah showed similar levels of necking at Early and Late sowing dates. Necking increased in Farah as sowing date was delayed.
- Pre-harvest grain loss – grain losses due to shattering and pod drop were higher than usual in 2012, likely due to several post-maturation wind events. A significant variety response was observed. PBA Kareema had the highest pre-harvest losses, averaging 38 grains/m<sup>2</sup> across the trial, and a greater proportion of this was due to pod loss rather than shattering compared to other varieties (data not shown). All other varieties had similar pre-harvest losses (Table 2). Sowing date had no significant effect on shattering or pod drop.
- Grain Yield – grain yield was high considering the rapid season finish, buoyed by the lack of disease and mild winter and early spring conditions. Significant variety and plant density responses were generated, but there was no significant sowing date response.
- Farah and Fiord were the highest yielding varieties, averaging 18% higher than Nura and PBA Rana, which performed similarly (Table 2). The broad bean PBA Kareema yielded the lowest, 25% (1t/ha) lower than Farah and Fiord, and 11% lower than Nura and PBA Rana. A plant density response showed that grain yield was greater at the Recommended (7% higher) and High (9% higher) plant densities compared to the Low plant density treatment (Table 3).



**Figure 1:** Plant height of faba and broad bean varieties sown at Low (66%), Recommended (100%) and High (133% of Recommended) plant densities, Tarlee 2012

**Table 1:** Effect of sowing date on lodging (1-9 score\*), Tarlee 2012.

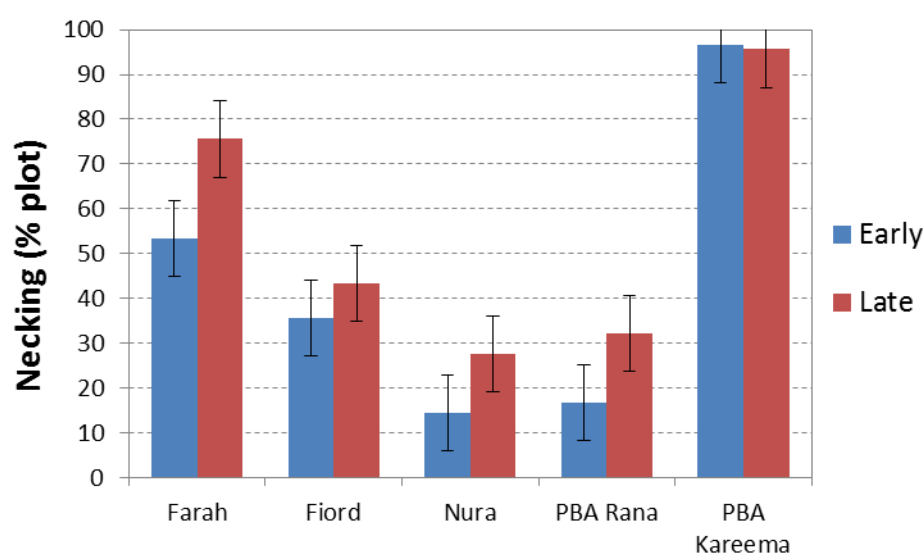
TOS	Early	Late	LSD (P<0.05)
Lodging (1-9) *	8.3	8.7	0.3

\* Lodging score: 1 = prostrate, 9 = erect

**Table 2:** Lodging (1-9 score\*), pre-harvest grain losses (# beans per m2) and grain yield (t/ha) of faba bean and broad bean varieties, Tarlee 2012.

Variety	Farah	Fiord	Nura	PBA Rana	PBA Kareema	LSD (P<0.05)
Lodging (1-9) *	8.3	8.3	8.9	8.8	8.2	0.41
Pre-harvest Grain Loss (# beans/m2)	25.7	23.3	21.9	28.6	38.2	7
Grain Yield (t/ha)	4.0	4.0	3.4	3.4	3.0	0.3

\* Lodging score: 1 = prostrate, 9 = erect



**Figure 2:** Effect of sowing date on necking (% of plot necked) of faba and broad bean varieties, Tarlee 2012.

**Table 3:** Grain yield of faba and broad beans sown at Low (66%), Recommended (100%) and High (133% of Recommended) plant densities, Tarlee 2012.

Plant Density	Low	Recommended	High	LSD (P<0.05)
Grain Yield (t/ha)	3.4	3.6	3.7	0.2

### Key Findings and Comments

- Plant height was shorter than normal for the Tarlee area, likely due to the drier than average spring in 2012. A plant density x variety response showed that Fiord was the only variety to show decreased plant height with increasing plant density. Previous studies have shown that high plant density can cause increased disease pressure in Fiord (the most disease sensitive variety in the trial). Despite only low levels of disease in the 2012 trial, this may have resulted in reduced growth and plant height at the High plant density of Fiord in this trial. Farah and PBA Rana showed increased plant height from increasing plant density. These are medium height beans (shorter than the broad bean PBA Kareema but taller than other faba beans), and this response is likely a phototropic response due to increased competition for sunlight at the higher plant density. Nura (a short faba bean) and PBA Kareema (a tall broad bean) showed no response in plant height to varying plant densities. Although PBA Kareema was the tallest variety in the trial, it is sown at half the plant density of the faba beans, which may have resulted in less plant to plant competition for sunlight.
- Pre-harvest grain losses were high in 2012, most likely due to either isolated wind events (causing the pods to break off) or the rapid maturation and high pre-harvest temperatures in 2012 (causing the pods to become brittle and shatter more easily). The broad bean PBA Kareema showed the highest pre-harvest losses. This is the latest maturing variety in this trial, and also produces the largest grain (110-120g/100 seeds versus 55-75g/100 seeds in faba bean varieties). The high pod losses in this variety are probably due to the heavier pods, and brittle stems due to the rapid maturation in this late maturing variety.
- Despite the rapid season finish there was no sowing date response for grain yield in this trial. This is probably due to the lack of disease and relatively low amounts of lodging. Farah and Fiord were the highest yielding varieties. This supports existing knowledge that in the absence of disease the older (disease susceptible) variety Fiord has very high yield potential, particularly under dry finishing conditions, however its yield has been limited in recent seasons with high disease pressure.
- Yield of PBA Rana was lower than Farah and Fiord, likely due to its later maturity and the dry season finish in 2012. PBA Rana is best suited to the more favourable bean growing areas such as the lower South East and the high rainfall areas of the lower and mid-North of South Australia, where long term yields have generally equal to or greater than Fiesta VF and Farah. It is unclear why Nura showed lower grain yield than Farah and Fiord in this trial.
- PBA Kareema showed the lowest grain yield of all varieties in this trial. As a broad bean it is taller and later maturing than the faba bean varieties, and may have “hayed off” due to the high biomass and dry finish to the season. However, lower grain yields are boosted by higher grain prices for broad bean grain.
- Thinly sown beans (ie 66% of the recommended sowing rates of 24 plants/m<sup>2</sup> for faba beans and 12 plants/m<sup>2</sup> for broad bean) were lower yielding than recommended and above recommended sowing rates. Previous research has shown that yield gains are possible by increasing plant density, but may also contribute to higher disease and increased lodging in some seasons.