

## **B2. Faba Bean Sowing Date x Plant Density, South East (Moyhall), South Australia**

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### **Aim**

To determine optimum sowing dates and sowing densities for maximising yield and agronomic performance 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 (Mid)

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

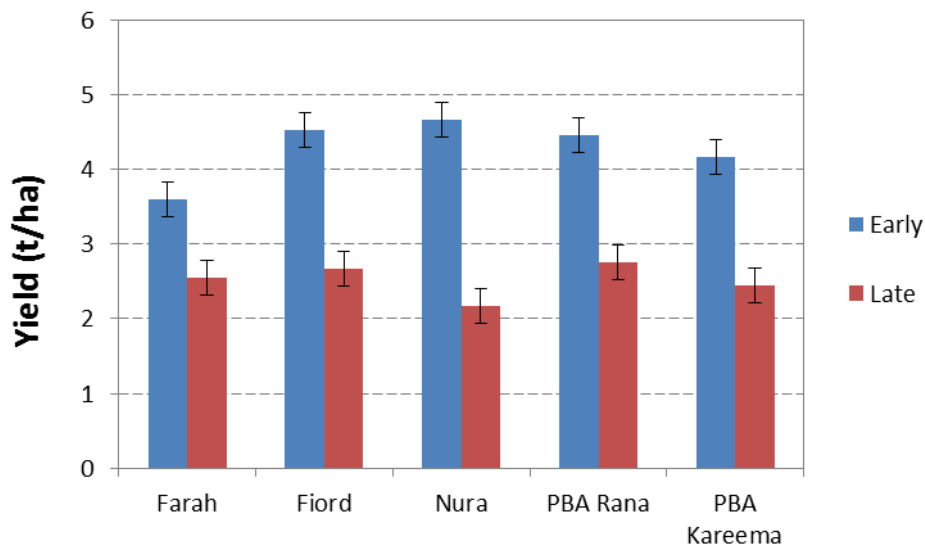
Fertiliser: Map + Zn @ 100kg/ha at sowing

### **Results and Interpretation**

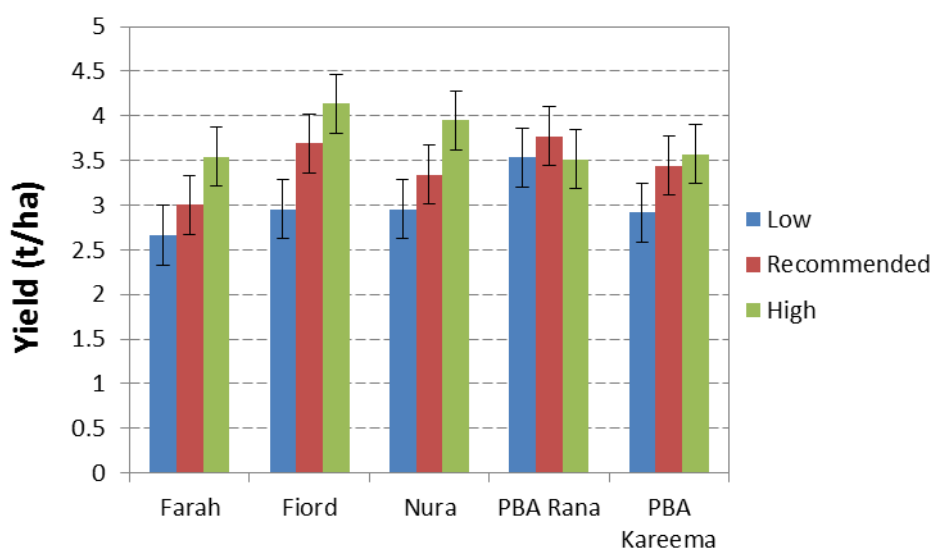
Grain Yield – Bean yields averaged 3.6t/ha across all varieties, sowing dates and plant densities in 2012. This was lower than previous seasons where bean yields averaged 4.9t/ha and 4.3t/ha in 2010 and 2011, respectively, but still high considering the low growing season rainfall.

A significant sowing date by variety interaction occurred for grain yield (Figure 1). All varieties showed a yield penalty from delayed sowing. Nura showed the greatest yield penalty from delayed sowing (53%) and Farah showed the least (29%). Nura, Fiord and PBA Rana were the highest yielding varieties sown early and Farah the lowest. At the late sowing date Nura was the lowest yielding variety but similar to PBA Kareema and Farah.

A two-way interaction between sowing date and plant density showed that yield of Farah, Fiord and Nura increased from the Low density (16 plants/m<sup>2</sup>) to the High density (32 plants/m<sup>2</sup>) (Figure 2). There was no advantage of increasing plant density over the Recommended density for each bean type however Fiord did incur a yield loss at the Low plant density which was not seen in any other variety. PBA Rana and the broad bean variety PBA Kareema showed no effect of plant density on yield. Within each plant density all varieties performed similarly except that PBA Rana yielded higher than Farah at the Low and Recommended plant densities. Fiord was the most responsive variety to plant density, showing a 29% increase in yield when plant density was increased from 16 to 32 plants/m<sup>2</sup>.



**Figure 1:** Yield of five bean varieties at two sowing dates, Bool Lagoon sowing date trial, 2012.



**Figure 2:** Yield of five bean varieties at three plant densities, Bool Lagoon sowing date trial, 2012.

### Key Findings and Comments

- Despite relatively low growing season rainfall in 2012, bean yields were still reasonably high at Bool Lagoon in 2012. It is likely that yields were buoyed by high December 2011 rainfall, lack of disease, and the relatively mild (although dry) finish to the 2012 season.
- In the recent run of seasons with favourable finishes (2009 to 2011) time of sowing has not been important for maximising grain yield of beans in this region. However due to the low growing season rainfall and lack of disease in 2012 beans benefited significantly from early sowing in this trial. This complements previous findings that early sowing offers higher yield potential providing disease, weed issues and other agronomic practices (eg spraying, harvesting) can be managed. Sowing date by plant density trials at Bool Lagoon and Tarlee in the states mid north, have shown that the later maturing and larger biomass types generally show the highest yield losses from delayed sowing. These later maturing plant types are also more reliant on long favourable seasons for yield stability, and are best suited to higher rainfall, longer growing season areas.
- Nura showed the greatest benefit from early sowing at Bool Lagoon in 2012. Sowing date trials at Bool Lagoon and Tarlee have shown Nura to be well suited to early sowing due to its combination of shorter plant type, mid flowering and improved chocolate spot and rust

resistance compared to other varieties. These characteristics favour this variety in areas where late season humidity-driven diseases (eg chocolate spot and rust) are common.

- Bean sowing density trials over the last three seasons have shown that yield gains are possible by increasing plant density from 16 to 32 plants/m<sup>2</sup>. Recommended sowing rate of faba beans is 24 plants/m<sup>2</sup>, while broad beans are recommended to be sown at 12 plants/m<sup>2</sup>. However this target may vary significantly in practice where growers base seeding rate on a kg/ha output and may not allow for variations in grain weight and germination percentages across seasons and varieties. The yield increase was more prominent where sowing was delayed, such that increasing plant density was able to recapture some of the yield loss caused by delayed sowing. However, previous research has shown a link to increased disease pressure at higher plant densities, which may negate any potential yield advantage from this high seeding rate if disease is not managed. Fiord was the most responsive variety to plant density in 2012, while in 2011 it was the most responsive variety to increasing plant density when sown early but was the only variety not to respond to plant density when sown late. Preliminary results from bean experiments where plant and pod traits were measured have shown that Fiord produces more branches per plant than other varieties tested. Further to this, sowing at higher plant densities reduced total branch production per plant more in Fiord than in other varieties. This could indicate that Fiord may be more responsive to exploiting soil moisture by producing extra branches than other varieties, however increasing plant density may provide a more effective method of converting biomass into grain yield. This is likely to be of greater importance in seasons with a rapid finish where late branches do not get the opportunity to produce and set many pods.
- PBA Rana (faba bean) and PBA Kareema (broad bean) showed no grain yield response to plant density in 2012. This may be related to their later maturity timing than the other varieties evaluated. These varieties had grain yields similar to earlier maturing varieties at this site in 2012 despite their later maturity and the relatively low growing season rainfall. This is somewhat surprising given the season and results from the Mid North of SA in 2012, and highlights the suitability of these varieties to the South East region, where the longer growing season can favour their later maturity.