Faba Bean, Sowing Time and Plant Density, HRZ Western District (Lake Bolac), Victoria

Aim

To test the adaptability of faba beans to changes in sowing date and plant density in the Victorian high rainfall zone (HRZ).

Treatments

- Sowing dates: 26 April, 17 May
- Target plant populations: 15, 25, 35 plants/m^2

Table 1. Other Site Details

Variety	PBA Samira
Stubble management	Burnt
Row spacing (cm)	20
Fertiliser[1] (kg/ha)	60

1. MAP

Results and Interpretation

- **Key Messages:** Sowing early (April 26) produced the highest grain yields in 2018.
- In a drier than average year there was a yield benefit from very high sowing rates on narrow row spacings, with significant gains from 21 to 31 plants/m^2, and from 31 to 45 plants/m^2.
- 2018 was a low disease year and there was no disease penalty from higher sowing rates. Yield benefits from higher plant densities should be weighed against higher disease risks in wetter years.

- **Summary:** Sowing crops early can increase their yield potential by allowing them to take advantage of a longer growing season. However, it can also increase the risk of disease, which may negate any potential gains in grain yield. This fact is of particular concern in the Victorian high rainfall zone (HRZ) where fungal disease such as chocolate spot (*Botrytis sp.*) can be a major constraint to faba bean production. Disease risk can be mitigated by adjusting the sowing rate and hence canopy size, but this must also be weighed against the effect on grain yield, the initial cost of seed and weed control (GRDC, *Faba Bean GrowNotes – Southern Region,* 2017). Much of the previous work examining this involved older varieties, so the trials in 2018 were conducted to explore the effect of plant density on faba bean yield and disease incidence for a given sowing date using newer varieties and improved fungicide options in the Victorian HRZ.
- Differences in crop establishment were achieved with sowing rates targeting three plant densities (Table 2). Higher plant density did not lead to more incidence of disease at either site in 2018, a low disease pressure year.

- Sowing date and plant density significantly changed crop and pod height. Sowing earlier increased average crop height from 67cm to 82cm, which was associated with a 5cm increase in the height to the first pod from the soil surface (Table 2). Crop height was also increased by raising the plant density from 21 to 31 plants/m^2, with no further increase at 45 pl/m^2. There was an interaction between sowing date and plant density where the high plant density increased crop height for the April 26 sowing date but not the May 17 sowing date. This dependence on sowing date was also observed in the data for the height to the first pod, which when averaged across both sowing dates increased at 45 plants/m^2, but here again there was an increase for the April 26 but not May 17 sown plots.
- The proportion of a plot that had symptoms of necking increased with plant density. The necking was probably caused by high temperatures combined with drying soil and windy conditions that occurred in November and December. It appears that earlier sowing or higher plant densities resulted in taller canopies that were slightly weaker and susceptible to damage by unusual weather events near harvest.
- There was no interaction between sowing date and plant density for grain yield. Sowing on April 26 increased yields across all plant densities by 0.7 t/ha compared with May 17. Higher plant densities increased grain yields, with the yield at 15 plants/m^2 being approximately 20% and 25% less than at 25 or 35 plants/m^2, respectively. The results match findings from previous work on similar row spacings on

older varieties that in a dry year with low disease pressure there is a yield benefit from higher sowing rates. On wider row spacing (e.g. 36cm), seeding rates of 15-20 plants/m^2 have been economically optimum. It is important to consider the economic implications of increasing seeding rates, as for beans each increase of 10 plants/m^2 in density equates to approximately an increase of 65kg/ha and $100/ha cost on the seeding operation.

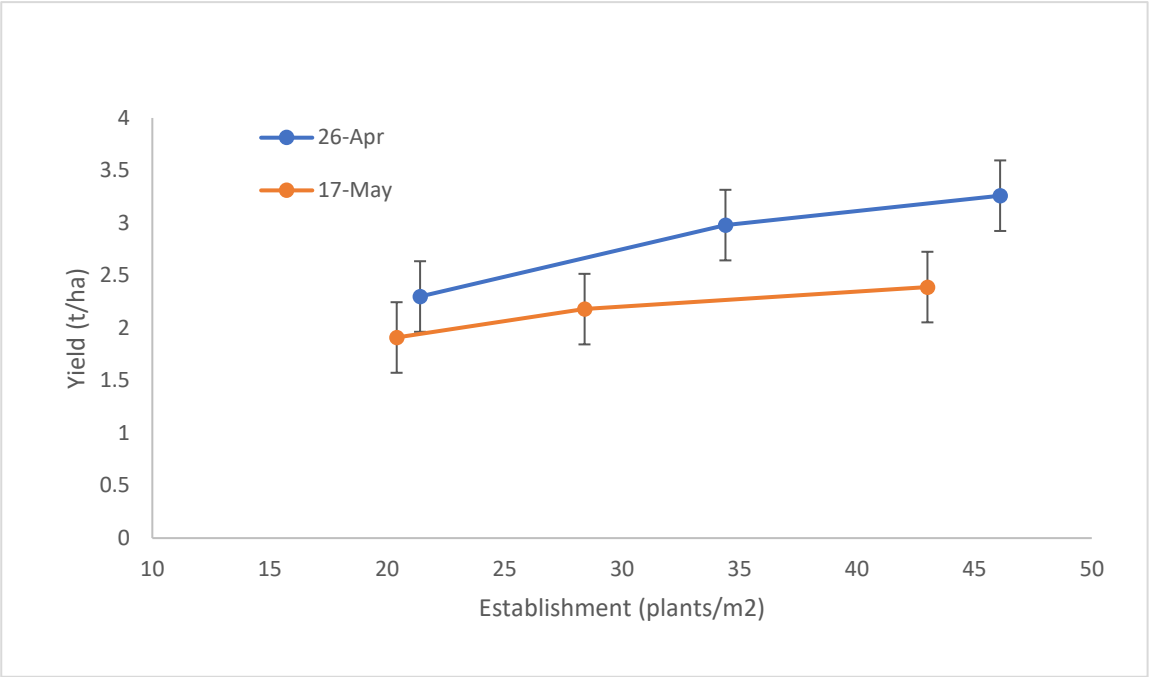

Figure 1. Grain yield of PBA Samira faba beans sown on two dates with three plant densities at Lake Bolac. Error bars are the LSD for the interaction of sowing date x plant density (P<0.05).

Table 2. Plant establishment and height to first pod, canopy height and necking at maturity of PBA Samira faba beans sown in April or May with three plant densities at Lake Bolac, Victoria.

Treatment	Establishment (plants/m2)		Height to first pod (cm)		Crop height (cm)		Necking (% of plot area)	
				Sowing date				
April 26	34	-	35	a	82	a	21	-
May 17	30	-	30	b	67	b	14	-
LSD (P<0.05)	**3**		**4**		**3**		**8**	
				Target plant density				
15 pl/m^2	21	c	29	b	71	b	9	c
25 pl/m^2	31	b	32	b	75	a	16	b
35 pl/m^2	45	a	37	a	77	a	27	a
LSD (P<0.05)	**5**		**5**		**4**		**6**	
				Sowing date x plant density				
April 26, 15 pl/m^2	21	-	31	-	77	b	13	-
May 17, 15 pl/m^2	20	-	27	-	65	c	6	-
April 26, 25 pl/m^2	34	-	33	-	81	b	21	-
May 17, 25 pl/m^2	28	-	30	-	70	c	12	-
April 26, 35 pl/m^2	46	-	42	-	88	a	29	-
May 17, 35 pl/m^2	43	-	32	-	66	c	24	-
LSD (P<0.05)	**7**		**7**		**5**		**8**	