

B6 Crop-Topping/Desiccation, HRZ Mid North (Tarlee), HRZ Eyre Peninsula (Wangary) and HRZ South East (Bool Lagoon), South Australia

Aim

To determine the correct maturity timing for successful crop-topping practice and to identify lines suitable for crop-topping, showing minimal yield loss in faba bean.

Treatments

Sites: Bool Lagoon (South East) – AR = 500mm, Soil type: clay
Tarlee (Mid North) – AR = 500mm, Soil type: loam
Wangary (Eyre Peninsula) Soil type: loamy clay over sandy clay
Varieties: As listed in Table 1.

Table 1. Flowering and maturity patterns of faba bean crop-top varieties.

Variety	Flowering	Maturity
Farah*	E-M	E-M
Fiesta	E-M	E-M
Nura	M	E-M
PBA Rana	M-L	M-L
PBA Samira	E-M	E-M
AF07125	E-M	E
AF08161	M	E-M
AF09167	E-M	E-M
AF05095-1*	M-L	M-L
AF06104-1*	E	E
AF06125-2*	M	M
AF08035*	E	E
AF09062*	E-M	E-M
AF09169*	E-M	M
AF10089*	M	E-M
* Varieties sown in Tarlee trial only		

Treatments: Dates as provided in Table 2.

Nil – no desiccant applied

Early – applied 10-14 days pre ryegrass milky dough stage

Mid – applied at ryegrass milky dough stage

Late – applied 10-14 days post ryegrass milky dough stage

Other Details

Fertiliser: MAP + ZN 2% @ 90 kg/ha at sowing (Tarlee and Wangary)

Grain Legume Zn 2% @ 150kg/ha at sowing (Bool Lagoon)

Plant Density: 24 plants/m²

Fungicides: Carbendazim pre flowering/canopy closure and mid-September, 500 ml/ha

Procymidone early October (Tarlee and Wangary)

14 Aug Mancozeb 1 kg/ha + 29 Sept Mancozeb 2 kg/ha (Bool Lagoon)

Results and interpretation

- Bool Lagoon and Tarlee showed a crop-top timing response and a variety response, but no crop-top timing by variety interaction.
- The Wangary site was highly variable and experienced waterlogging. No late crop-topping treatment was applied. There was a variety response, but no crop-top timing response nor crop-top timing by variety interaction at this site.
- Crop-topping at the early time caused significant yield loss at Bool Lagoon and Tarlee (Table 2). The Tarlee and Bool Lagoon trials showed yield losses of 5% and 17% respectively from crop-topping at the early treatment compared to the Nil. No yield loss occurred at the mid (recommended) timing at either trial.
- Crop-topping at the early timing caused a significant reduction in grain weight at all three sites (Table 2).
- Crop-topping at the mid timing and late timing (Bool Lagoon and Tarlee only) had no effect on grain weights in these trials.
- Dry spring conditions post July resulted in lower yields than previous years. Fiesta was the highest yielding variety at Bool Lagoon (2.14 t/ha) and was similar to PBA Samira (1.99 t/ha), both of which yielded significantly more than Nura (1.64 t/ha) and the lowest yielding variety PBA Rana (1.50 t/ha). At Wangary, AF09167 was the highest yielding variety (1.51 t/ha) and was similar to Fiesta (1.41 t/ha) and PBA Samira (1.39 t/ha). Nura was the lowest yielding variety (0.90 t/ha) and was significantly lower yielding than Fiesta and PBA Samira. PBA Rana yielded 1.16 t/ha.
- At Tarlee a larger cohort of varieties were evaluated. AF10089 (3.71 t/ha), AF08035 (3.57 t/ha) and AF09062 (3.55 t/ha) out yielded all the commercial varieties. PBA Samira and Farah yielded the same (3.23 t/ha) and Fiesta, PBA Rana and Nura were similar (3.11 t/ha, 3.07 t/ha and 3.00 t/ha respectively). AF09167 was the lowest yielding line at 2.86 t/ha.

Table 2. Effect of crop-top timing on grain yield (% Nil) and grain weight (% of Nil) of faba bean varieties at Bool Lagoon, Tarlee and Wangary, South Australia.

Shaded figures represent significant differences to the corresponding Nil treatment.

Site	Timing		Yield (% of Nil)	LSD (P<0.05) (% of Nil)	Grain Weight (% of Nil)	LSD (P<0.05) (% of Nil)
Bool Lagoon	Early	24-Oct	83	11	86	2
	Mid	6-Nov	94		100	
	Late	19-Nov	99		98	
	Nil		1.93 t/ha		63 g/100 seeds	
Tarlee	Early	24-Oct	95	4	96	1
	Mid	5-Nov	98		101	
	Late	12-Nov	103		100	
	Nil		3.31 t/ha		67 g/100 seeds	
Wangary	Early	16-Oct	NS	NS	92	3
	Mid	30-Oct			101	
	Nil				66 g/100 seeds	

Key findings and comments

- Similarly to previous (2013) trials, there was no interaction between crop-top timing and variety. This means that the varieties evaluated in these trials had the same grain yield response at the different crop-top timings; therefore no variety was better suited to crop-topping than another. This finding has been consistent in faba beans over time but different to all other crops (lentil, field pea, chickpea).
- Yield losses associated with crop-topping were lower than experienced in previous seasons. This is most noted at the Eyre Peninsula site where in 2013 a 33% grain yield penalty was observed at the early timing, compared to no penalty in 2014. This is likely a result of the dry spring conditions and the moisture stress experienced in 2014.
- Crop-topping prior to ryegrass milky dough stage caused significant yield loss of 5% at Tarlee and 17% at Bool Lagoon but crop-topping at ryegrass milky dough stage and post ryegrass milky dough stage did not cause yield losses at Bool Lagoon or Tarlee.
- Variation in crop-topping responses between the sites, particularly Wangary, may be a result of a combination of differences in sowing dates, site yields, seasonal conditions, waterlogging and the maturity profiles of the local ryegrass biotype.
- Previous research has shown that sensitivity to crop-topping in pulse crops is generally related to variety maturity, where later maturing varieties generally show higher yield losses when crop-top is applied too early. These trial results showed no relationship between variety maturity and yield loss from crop-topping in 2014 (the same as in 2013 and 2012 research). Work will be on-going to identify varieties or plant types better suited to crop-topping for weed control in faba bean and to try and understand this lack of variety response.
- A reduction in grain weight from crop-topping prior to the ryegrass milky dough stage at all three sites supports previous trial results and research findings that untimely crop-topping of beans can result in reduced grain weight.