Effect of sowing date and applied phosphorus on canola grain yield – 2014 and 2015

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Key findings

- There was no significant interaction between sowing time and phosphorus (P) response in 2014 and 2015.
- Both sites and years responded positively to P fertiliser with 10 kg P/ha achieving a relative yield of 88% and 97% in 2014 and 2015 respectively.
- Further research is required to determine if winter canola requires less applied P than slow spring phenology types (due to the longer vegetative phase to accumulate biomass by flowering).

Introduction

Recent research has identified potential grain yield advantages from planting canola earlier than the traditional date of 25 April. It is assumed that this shift in sowing time could have interactions with other components of the farming system, including P management.

Previous research on wheat (Batten et al. 1999) demonstrated that less fertiliser P is required to achieve maximum grain yield when the crop is sown early. The research found that plants take up more P during both the vegetative and reproductive phases of crop growth. In wheat, much of the P uptake benefits from early sowing are related to increased P diffusion to the roots (i.e. delayed sowing reduces root growth) and a longer vegetative phase of crop development ranging from 95 to 103 days in wheat.

This experiment tested the hypothesis that less fertiliser P is required to achieve maximum grain yield if a mid-maturing variety (Hyola® 559TT) is sown earlier than the traditional date of 25 April.

This report provides only grain yield results. A more detailed paper, to be published later in 2016, will report on P uptake and use within the canola plant.

Site details

	2014	2015
Location	Cowra	Cargo
Soil type	Red chromosol	Red chromosol
Previous crop	Wheat	Oats
Colwell P (0–10 cm)	19 ppm	21 ppm
Applied nitrogen (N) fertiliser	80 kg N/ha (pre-drilled)	80 kg N/ha (pre-drilled)
Variety	Hyola® 559TT	Hyola® 559TT

Treatments

	2014	2015
Time of sowing	TOS 1: 17 Apr	TOS 1: 16 Apr
	TOS 2: 5 May	TOS 2: 2 May
	TOS 3: 20 May	TOS 3: 17 May
P fertiliser rate*	0, 10, 20 and 30 kg P/ha	
* P was applied at sowing and placed 2 cm below the seed		

Results

Grain yield

In both 2014 and 2015 grain yield was significantly affected by time of sowing ($P = 0.004$, $P < 0.001$) and phosphorus fertiliser rate ($P < 0.003$, $P < 0.001$). The interaction between sowing time and P fertiliser was not significant in either year, indicating that P fertiliser rates need to be maintained across all sowing times.

In 2014, grain yield declined by an average of 0.21 t/ha for every week sowing was delayed beyond 17 April with grain yield reducing by 0.31 t/ha and 0.96 t/ha for the 7 May and 22 May sowing times respectively (Figure 1).

In 2015 however, there was no significant grain yield difference between sowing on 16 April and 2 May, but there was a 0.79 t/ha yield penalty for sowing on 15 May (Figure 1).

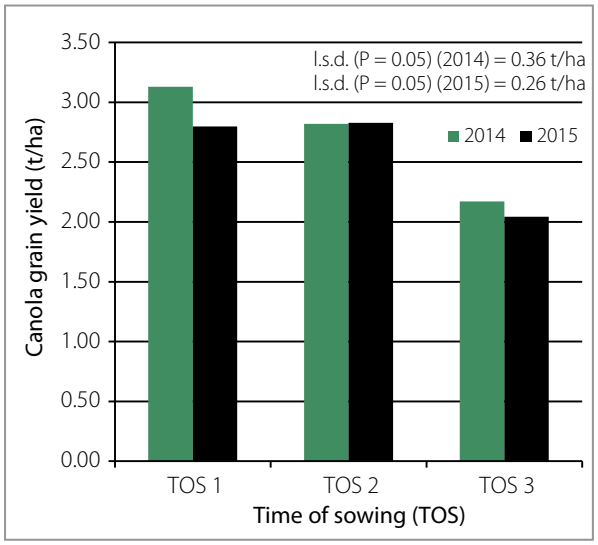

Figure 1. Average canola grain yield for three sowing dates across two years.

Grain yield responded positively to applied P in both years. In 2014 the 10, 20 and 30 kg P/ha produced a grain yield benefit of 0.19 t/ha, 0.23 t/ha and 0.54 t/ha respectively over the nil P fertiliser treatment (Figure 2). In 2015, the highest grain yield was achieved from 10 kg P/ha with a 0.59 t/ha grain yield benefit. The 10 kg P/ha achieved a relative yield of 88% and 97% of maximum yield in 2014 and 2015 respectively.

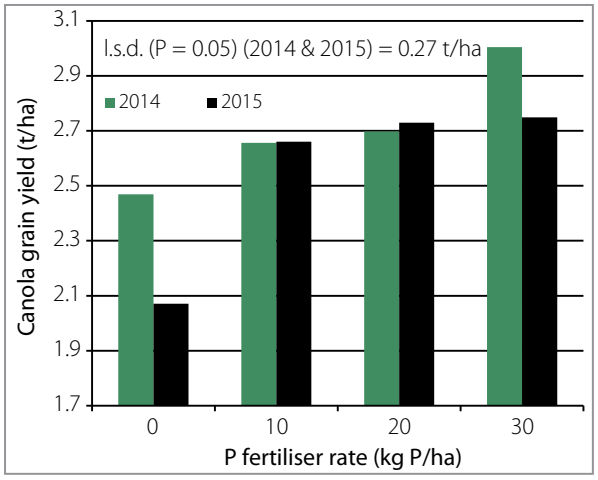

Figure 2. Average canola grain yield over four phosphorus rates, three sowing dates and two years.

Discussion

Research results from McCormick (2012) showed that approximately 5 t/ha canola dry matter is required at flowering to maximise grain yield at Wagga Wagga. Sowing a longer season canola variety (i.e. winter type) early might require less P than a quicker maturing variety sown late as the longer season canola type would have an extra 30–40 days to achieve optimum biomass at flowering. Further research is required to investigate the relationship between vegetative length before flowering and P response.

Results from this experiment suggest that P fertiliser rates should not be reduced if sowing a mid-maturing spring canola in mid-April compared with mid-May.

References

Batten, GD, Fettell, NA, Mead, JA & Khan, MA 1999, 'Effect of sowing date on the uptake and utilisation of phosphorus by wheat (cv. Osprey) grown in central New South Wales', *Australian Journal of Experimental Agriculture*, vol. 39, pp. 161–170.

McCormick, JI, Virgona, JM & Kirkegaard, JA 2012, 'Growth, recovery and yield of dual-purpose canola (*Brassica napus*) in the medium-rainfall zone of south-eastern Australia', *Crop and Pasture Science*, vol. 63, pp. 635–646.

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