Canola response to phosphorous in the Forbes district

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Background: Canola has a large phosphorous (P) requirement. For every tonne of canola grown approximately 7 kg P/ha is removed in the grain. In comparison for every tonne of wheat grown approximately 2.6 kg P/ha is removed in the grain. Canola is typically sown with 15-20 kg P/ha as a starter fertiliser, which is generally replacing the P removed in grain. However, many of the soils in the Forbes district are low in P (ie. < 30 ppm Colwell). It has been suggested that P fertiliser rates on these soils need to be increased above 20kg P/ha in order to maximise canola yields. P is essential for plant growth being a major component of cell walls and DNA (genetic material). It is also vital for energy transfer within plant cells and starch formation. Plants with a P deficiency are typically stunted. Apart from affecting the vegetative growth of plants, P is particularly important for reproductive development.

Methods: Two P response trials were sown in 1998 being: Gunning Gap (10th June) and Marsden (31st April). A further trial was sown at Wirrinya in 1999 (17th June). The canola trials in 1998 were sown with a band seeder with the differing rates of MAP (10N:22P) being sown below the seed. No soil analysis was performed in 1998. In 1999, the canola trials were sown using a conventional combine fitted with baker boots, with the seed and MAP passing down the same sowing tube. Oil and protein were analysed only for the 1999 trials. The variety Oscar was used in all three trials which was sown at 4kg/ha. At Wirrinya 300 kg/ha of gypsum and 100 kg/ha of urea was applied presowing. Two I/ha of Treflan was sprayed prior to sowing and an early post emergence application of a mixture of Lontrel (0.3 1/ha) and Verdict (0.4 1/ha) was used to control weeds. Soil at Wirrinya was a clay loam with a pH 4.7 (CaC12) and a phosphorus level of 23 ppm (Colwell).

Results and Discussion: Canola yield responses to extra MAP were recorded at all three trial sites. Of particular interest was the 15% yield increase at Wirrinya by increasing MAP rates from 92 to 138 kg/ha, which increased the gross margin by $78/ha. Most of this yield response can be attributed to the extra P applied. All three sites were first year into crop after a pasture phase. The Wirrinya site also had 100kg of urea pre-sown. The small amount of N in MAP is not likely to have such a large impact on yield. The extra MAP had little effect on oil levels, but had a very small negative effect on protein levels.

Table 1. *Results from 1998 trials in Forbes district.*

MAP rate (kg/ha)	Amount ofP ..(kg/ha)....	Amount ofN (kg/ha)	1 Yield (t/ha) Gunning Gap (red loam)	2 Yield (t/ha) Marsden (grey clay)	1 Benefit ($/ha)	2 Benefit ($/ha)
0	**0**	**0**	2.18	2.00	**0**	0
80	18	**8**	2.41	2.06	**35**	-9
160	**35**	**16**	2.49	2.46	**53**	110

Table 2. *Results from 1999 trial at Wirrinya.*

MAP rate (kg/ha)	P (kg/ha)	N (kg/ha)	Yield (t/ha)	Oil (%)	Protein (%)	Benefit* ($/ha)
0	0	0	1.84	40.6	40.6	0
46	10	4.6	2.17	39.9	40.0	70
92	20	9.2	2.36	39.3	39.9	103
138	30	13.8	2.71	40.0	39.6	181
184	40	18.4	2.58	39.5	39.5	127

Mean yield 2.33, 5% LSD 0.27, Co. Var. 6.1% * assumes canola <at>. S270/1 and MAP <at> $400/t

These results highlight the potential for canola yields to be increased with extra P fertiliser rates above 20 kg P/ha. However, fertiliser research has indicated high rates of starter fertilisers such as MAP and DAP can have a negative impact on seedling germination due to fertiliser "burn". It is suggested that starter P rates above 20 kg P/ha should not be in contact with the seed. Emergence counts were not taken on any of these trials to confirm if the high P rates were affecting canola establishment. All trials were sown into ideal moisture conditions that allowed a quick emergence which is expected to have minimised the opportunity for fertiliser burn.

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