

## TOLERANCE OF LINSEED CULTIVARS TO HERBICIDES

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*Summary.* Two field experiments were conducted in 1988 and 1989 to screen linseed cvv. Glenelg and Areco for differential tolerance to herbicides. Trifluralin and triallate reduced the emergence of both cultivars, and significantly reduced grain yield with the recommended rate of trifluralin in 1989. Symptoms of injury were observed in both cultivars from post-emergence application of MCPA, bromoxynil plus MCPA and picloram plus MCPA, but these did not translate into large yield losses.

## INTRODUCTION

Linseed (*Linum usitatissimum*) is a potential alternative to winter cereal crops (2). Few herbicides are registered in Australia for use in linseed, and most have limited selectivity (1). However, there is no information on the differential response of linseed cultivars to herbicides. This paper reports two field trials conducted at Wagga Wagga, NSW in 1988 and 1989, evaluating the responses of linseed cvv. Glenelg and Areco to the recommended rate and twice the recommended rate of six herbicides available for weed control.

## METHODS

The experimental design was a split-plot, with the herbicide treatments as the main plots and the two cultivars as the split-plots. All treatments were replicated three times. Weed-free conditions were maintained by: pre-season weed control; application of pendimethalin at 0.33 kg/ha 28 days before sowing; and hand-weeding during the growing season. Linseed was sown at a rate of 1.5 kg/ha with 72 kg/ha double superphosphate on 3 June 1988 and 8 June 1989. The herbicides were applied at the rates shown in Table 1., in 100 L/ha water with a tractor-mounted compressed-air sprayer at 150 kPa. Trifluralin and triallate were applied to the soil and incorporated two days after sowing. In 1988, fluazifop-P, bromoxynil plus MCPA and MCPA were applied seven weeks after sowing, while picloram plus MCPA was applied 11 weeks after sowing. In 1989, fluazifop-P, picloram plus MCPA and bromoxynil plus MCPA were applied 12 weeks after sowing when the crop was 15 cm tall. Fluazifop-P was applied with a non-ionic organic surfactant (BS1000) at 0.25% v/v. A hail storm in December 1988, just prior to harvest, reduced the grain yield of all treatments. Grain yield was harvested from the whole plots (8 rows wide by 8 m long), weighed and analysed by neighbour analysis.

Table 1. Reduction in grain yield (as a % of controls) of linseed cvv. Areco and Glenelg from herbicides<sup>a</sup>.

Herbicide	Rate (kg/ha)	Areco		Glenelg	
		1988	1989	1988	1989
Trifluralin	0.8	116	78*	106	69*
	1.6	99	59*	104	56*
Triallate	0.8	100	-	108	-
	1.6	119	-	84*	-
MCPA (amine)	0.5	108	-	106	-
	1.0	113	-	113	-
Bromoxynil + MCPA	0.4 + 0.4	121	91	114	89
Picloram + MCPA	0.8 + 0.8	110	84	99	69*
Picloram + MCPA	0.022 + 0.353	101	106	101	96
Fluazifop-P	0.044 + 0.706	99	92	105	93
	0.106	86	86	106	90
Unsprayed controls (t/ha)	0.212	98	96	106	107
		0.90	1.53	1.07	1.31

<sup>a</sup> Values followed by asterisks indicate a significant reduction ( $P=0.05$ ) in grain yield.

## RESULTS AND DISCUSSION

The reductions in the grain yield of weed-free linseed treated with herbicides are shown in Table 1. Trifluralin reduced crop emergence and seedling vigour at both rates of application in 1988 and 1989. The severity of the symptoms was greater in Areco than in Glenelg, and the crops remained stunted and retarded until maturity. Significant reductions in grain yield were recorded in both cultivars in 1989 but not in 1988. A hail storm just before harvest in 1988 could have reduced the yields of the unsprayed controls relatively more than the herbicide treated plots, thus masking yield differences. Triallate at 1.6 kg/ha reduced the seedling vigour of Glenelg in 1988 and there was a reduction in the grain yield. The post-emergence herbicides MCPA, bromoxynil plus MCPA and picloram plus MCPA caused wilting of the crop, cupped leaves, and a floppy habit within one day of spraying, especially in Glenelg, but the plants recovered within 7 to 14 days. Bromoxynil plus MCPA caused the most severe symptoms and a significant yield reduction in Glenelg in 1989, whereas the other treatments did not reduce the grain yield. There were no symptoms of injury or yield loss from fluazifop-P.

Trifluralin has a very narrow safety margin in linseed, with damage occurring in some conditions. The response of linseed to these herbicides is influenced by the environment, and needs to be tested over a wider range of conditions. There are small cultivar differences in the responses to herbicides. If linseed becomes a more important crop, a wider range of new herbicides will need to be assessed for crop tolerance.

## ACKNOWLEDGEMENTS

This work was funded by the Oilseeds and Grain Legumes Research Councils of Australia and contributions from various chemical manufacturers.

## REFERENCES

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