THE TOLERANCE OF OIL SEED RAPE TO HERBICIDES

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Summary

The tolerance of oil seed rape to a range of herbicides was tested and seed yields obtained from three field experiments. No significant seed yield reductions were caused by trifluralin, nitratin, diethamine, penoxalin, fluchlorulin, napropamide, propachlor, desmetryn, or dicamba when applied according to the manufacturers' recommendations, and under the conditions of the experiments. Picloram/nitrofen delayed ripening and reduced seed yields.

INTRODUCTION

The production and economics of oil seed rape were fully discussed at a recent oil seed symposium in New Zealand. In the Proceedings of that Symposium, Lammerink (1973), stated that a survey of rapeseed crops indicated low yields were 'probably caused by insufficient cultivation and weed control, lack of nitrogen and aphid infestation'. Although these comments were related to autumn sown crops, weed control in spring sown rape seed crops is likely to be an important factor in rapeseed production in Southland.

There is a wide range of herbicides available for use in brassica crops and this paper reports the tolerance of oil seed rape to some of them.

MATERIALS AND METHODS

Three field experiments were conducted in the Gore district of Southland. All herbicides were applied in 250 litres/ha by experimental small plot sprayer, and pre-plant soil incorporated herbicides (PPSI) were rotary-hoed into the seed bed to an approximate depth of 7.5 cm immediately after application. The variety of oil seed rape was Oro in the first two experiments, and Tower in the third.

Details of materials applied, rates, and dates, are shown in tables 1, 2 and 3. The third experiment was treated overall with 0.75 kg/ha of trifluralin on 16.10.74. Trial designs were four replicate randomised blocks.

The experiments were inspected at intervals for observations on weed infestation and crop tolerance. The first two experiments were cut and wind-rowed for one month before threshing on 26.3.74. The third was cut and wind-rowed for three weeks before threshing on 10.3.75. Moisture samples were taken and yields quoted are corrected to a standard moisture content of 10%.

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New Crops

RESULTS

Experiment 1: No weed control data were obtained as the trial area was virtually weed free. Desmetryn had suppressed the height of the crop by 5% when assessed 10.1.74, and the high rate depressed yield (Table 1).

TABLE 1: YIELD OF OIL SEED RAPE, SOWN 19.10.73

Treatment	Rate kg/ha	Date applied	Yield as % of Control
control yield (kg/ha)			4000 aA
trifluralin	1	9.10.73	98 abA
	1.5	9.10.73	99 abA
nitralin	1	9.10.73	100 abA
	1.5	9.10.73	97 abA
desmetryn	0.25	12.12.73	96 abA
		(post-em)	
	0.38	12.12.73	95 bA
		(post-em)	
CV %			5.6

Post-emergence treatment applied 4 to 5 true leaf stage. Soil organic matter 7.4%.

Experiment 2: This experiment was also weed free and no adverse effects on the growth of the crop were evident when inspected 10.1.74. Seed yields are shown in Table 2.

TABLE 2: YIELD OF OIL SEED RAPE, SOWN 19.10.73

Treatment	Rate kg/ha	Date applied	Yield as % of Control
control yield (kg/ha)			4100 a
dinitramine	0.5	10.10.73	98 a
	0.75	10.10.73	93 ab
penoxalin	1.0	10.10.73	97 ab
	2.0	10.10.73	96 ab
fluchloralin	1.0	10.10.73	98 a
	1.5	10.10.73	101 a
napropamide	1.5	10.10.73	99 a
trifluralin	1.5	10.10.73	93 ab
propachlor	4.0	24.10.73	98 a
picloram/nitrofen	1.2	30.11.73	94 ab
		(post-em)	
	1.8	30.11.73	88 b
CV %			6.6

Post-emergence treatment applied 3 to 4 true leaf. Soil organic matter 7.4%.

Rape seed from picloram/nitrofen plots was tested for picloram residues with negative results.

Experiment 3: The overall application of trifluralin 0.75 kg/ha prior to laying down this experiment failed to give complete control of spurrey (*Spergula arvensis*), and 10% cover of this weed was noted at the time of application of the experimental treatments. Only minor differences in spurrey control between different experimental treatments were noted later in the season; the rapid smothering effect of the crop possibly reduced the competitiveness of this weed and masked differential control between treatments. A scattered infestation of Californian thistles (*Cirsium arvense*) was evident only in seven out of the eight control plots at the time of windrowing, and none in treated plots.

Although the final seed yields from the higher 0.21 and 0.28 kg/ha application rates of dicamba were not significantly less than yields from the lower rate dicamba treatments and the untreated plots, there was definite evidence of phytotoxicity. Plants from the higher rate dicamba treatments were some 7% shorter than those from untreated plots, seed pods were shorter and fewer with, at windrowing, a considerable reduction in the percent that were ripe. Both rates of picloram/nitrofen tested, produced similar though slightly greater phytotoxic symptoms. Additionally, however, a significant yield reduction occurred.

Seed yields and effect of treatments on the condition of the crop at harvest are shown in Table 3.

TABLE 3: YIELD AND CONDITION AT HARVEST OF OIL SEED RAPE, SOWN 18.10.74

Treatment	Rate kg/ha	Date applied	Yield as % of control	Crop height cm	% Ripe pods	Leaf
control yield (kg/ha)			2230 abA	150	70	Shrivelled
dicamba	0.1	29.11.74	112 aA	150	70	Shrivelled
	0.14	29.11.74	103 abA	150	70	Shrivelled
	0.21	29.11.74	90 bAB	140	5-10	Shrivelled
	0.28	29.11.74	93 abAB	140	5-10	Shrivelled
picloram/nitrofen	1.2	29.11.74	70 cBC	130	0-5	Green
	1.8	29.11.74	52 cC	130	0	Green
CV %			14.9			

Trifluralin 0.75 kg/ha was applied over all the trial area 16.10.74. Post-emergence treatments applied 4 true leaf. Soil organic matter 4.8%.

DISCUSSIONS AND CONCLUSIONS

Crop Tolerance:

Judging by seed yields cultivar Oro of oil seed rape was tolerant to trifluralin, nitralin, dinitramine, penoxalin, fluchloralin, napropamide, and propachlor at the rates tested; taking into account the soil organic matter (7.4%) and adequate soil moisture at this site, it is anticipated that this would probably apply to most of the South Otago/Southland area.

Desmetryn caused a minor but non-significant yield depression at the 0.25 kg/ha rate. A small but significant yield depression from the higher rate (0.38 kg/ha) occurred in the first experiment. The manufacturers however recommend that this rate be reserved for use where crop development is past the 6-leaf stage.

Significant yield reductions were caused by picloram/nitrofen in Experiment 2 at 1.8 kg/ha, but in Experiment 3 even 1.2 kg/ha caused highly significant reductions. Experiment 3 showed oil seed rape to be tolerant to dicamba up to rates of 0.14 kg/ha; at higher rates, slight, but in these trials non-significant, yield reductions occurred. This corroborates the work of Taylor (1967) on vegetative yields of brassicas and indicates that rates of dicamba in excess of 0.14 kg/ha should not be used, but raises the question as to whether the rapeseed cultivar (Tower) used in this experiment may be more sensitive to herbicide effect; particularly picloram/nitrofen.

Weed Control:

No critical weed control data were obtained in these experiments, but technical data supplied by manufacturers showed that with the exception of picloram/nitrofen, all materials tested should give satis-

New Crops

factory control of the two main weeds of the area, fathen (*Chenopodium album* agg.) and spurrey. Picloram/nitrofen may give poor control of spurrey even if applied early.

There is a need for a post emergence herbicide that will give satisfactory control of Californian thistle, both dicamba and picloram/nitrofen should achieve this in brassica crops. The above work shows that the former herbicide is preferable for this purpose in oil seed rape crops.

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