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CONTROL OF WIREWEED AND RAYLESS CHAMOMILE IN ONIONS

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Summary

Four post emergence trials on onions are described. Chlormethazole at rates between 0.5 and 1 kg/ha gave good control of established wireweed (*Polygonum aviculare*) when applied during a period of rapid growth but 1.5 kg/ha was required following a period of dry weather. Early spraying, at the onion first leaf stage, caused crop damage. Control of established rayless chamomile (*Matricaria matricarioides*) was achieved with bentazone at 1 kg/ha without affecting onion crop yields.

INTRODUCTION

Onion growing in Pukekohe now depends completely on chemical weed control. The crop must remain substantially weed free for a period of five to seven months from emergence until harvest. Even on properties with low weed populations a minimum of four separate herbicide applications are made, and more commonly, six or seven applications are used. In spite of the number of applications and the broad range of herbicides used populations of wireweed and rayless chamomile have increased and become major problems. Ioxynil was the most successful of a range of herbicides tested against these weeds (Wilson 1971) but this treatment has been far from adequate on both weeds.

Good post-emergence control of rayless chamomile with bentazone was reported by Fellowes (pers comm) when compared with ioxynil in Pukekohe field trials. Ioxynil was not included in these trials as it is known from field experience that 0.75 kg/ha is needed to scorch young rayless chamomile and that crop damage may also occur at this rate. Rayless chamomile is susceptible to both aziprotryn and desmetryn (Fryer and Makepeace 1972).

METHOD

Treatments in all four trials were applied with a modified Oxford sprayer (Cox 1968) using 400 litres/ha at 200 kPa pressure. Plot size varied from 6-9 m² depending on the site using randomised block design with 5 or 6 replications.

Wireweed control

Chlormethazole and methabenzthiazuron were applied at rates between 0.5 and 2.0 kg/ha in three onion trials, the first in spring 1973 (Trial 1) and subsequently in spring and early summer 1976

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(Trials 2 and 3). Wireweed occurred as a problem species at all trial sites with the highest population of 300 plants/m² in trial 2. At the time of application most wireweed plants had developed five to seven leaves and two basal shoots. Other important weeds occurring in the trial sites were fumitory (*Fumaria* spp), twin cress (*Coronopus didymus*), speedwell (*Veronica persica*), and poa annua (*Poa annua*). Treatments were applied at crop growth stages between one true leaf (1½ times the height of the flag stage) and the onion 2 leaf stage (Table 1). After weed control assessment all trial plots were hand weeded and kept weed free. In trial 2, control plots had a high wireweed population, and instead of hand weeding were treated with chlormethazole at 1.0 kg/ha 17 days after the other treatments. The details of herbicide application rates and times are given in Table 1.

Rayless chamomile

Three herbicides were compared at normal and twice normal rates on one site where rayless chamomile density was 106 plants/m². Aziprotrryn at 1.5 and 3.0 kg/ha, desmetryn at 0.25 and 0.5 kg/ha and bentazone (in two formulations as wettable powder (WP) and emulsifiable concentrate (EC) at 1.0 and 2.0 kg/ha were applied on 15 October 1976 when the crop had three well developed leaves. At this stage the rayless chamomile was 5-20 cm in height with a similar range of spread. Other problem weeds present in the site at densities of 12-32 plants/m² included twin cress, shepherd's purse (*Capsella bursa-pastoris*), speedwell and poa annua. All plots were hand weeded two months after treatment application (on 15 December 1976).

Yields

Bulb yields were recorded from all trials when the crops matured. Records were taken of total yield and of first grade yield (bulbs above 4 cm in diameter).

RESULTS

Wireweed

Chlormethazole gave better control of wireweed than methabenzthiazuron. Split applications of both herbicides (0.5 + 0.5 kg/ha) were no better than single applications of 1 kg/ha for weed control. Chloromethazole at 0.5 kg/ha gave a 99% kill of wireweed in Trial 2 but 1.5 kg/ha of methabenzthiazuron was needed to provide similar control. Excellent wireweed control was also achieved with the late application of chlormethazole at 1.0 kg/ha even though weed growth was more advanced. On late sown onions in the final trial a slightly higher rate of chlormethazole (1.0 kg/ha) was necessary to provide control equal to that of the previous trial, but occasional larger wireweed plants with a spread greater than 10 cm needed 1.5 kg/ha chlormethazole for adequate control.

Both herbicides controlled a broad spectrum of weed species at the seedling to young plant growth stage. Chlormethazole gave more effective control of wireweed and poa annua but failed to con-

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trol fumitory and speedwell which were susceptible to low rates of methabenzthiazuron.

Yield from Trials 1, 2 and 3 are shown in Table 1. In the first trial chlormethazole at up to 2.0 kg/ha did not affect yields when applied to onions at the 1½ true leaf stage. A similar pattern was shown in the later sown crop (Trial 3), where chlormethazole at rates of up to 1.5 kg/ha was applied at the two leaf stage. Chlormethazole at 1.0 and 1.5 kg/ha applied at the first true leaf stage in the second trial, while giving complete wireweed control, caused the young onion plants to flag (as if wilting) for approximately 10 days and in some cases die. Final bulb yield was reduced by chlormethazole at 1.5 kg/ha. Application of 1 kg/ha chlormethazole 17 days later (to control plots) did not reduce yields. Methabenzthiazuron at 1.0-2.0 kg/ha did not reduce bulb yields, although the young plants were scorched with these rates in trial 2.

TABLE 1: Effect of chlormethazole and methabenzthiazuron on onion bulb total yield t/ha.

Treatment	kg/ha	Trial	1	2	3
		Applica- tion date	28.8.73	12.10.76	9.11.76
		Crop	1½ leaf	1 leaf	2 leaf
chlormethazole	0.5		42.7 a	33.0 a	41.9 a
chlormethazole	0.5 + 0.5*		—	31.7 ab	—
chlormethazole	1.0		—	31.0 ab	49.4 a
chlormethazole	1.5		43.8 a	27.6 b	49.4 a
chlormethazole	2.0		42.6 a	—	—
methabenzthiazuron	0.5 + 0.5*		43.2 a	30.7 ab	—
methabenzthiazuron	1.0		—	33.3 a	—
methabenzthiazuron	1.5		—	30.0 ab	—
methabenzthiazuron	2.0		—	31.0 ab	—
Hand weeded control			43.6 a	—	47.5 a
chlormethazole — 17 days after other treatments	1.0		—	32.9 a	—
CV %			3.8	10.9	12.1

* application 8 days apart.

Rayless chamomile control

Good control of rayless chamomile was achieved with both formulations of bentazone at 1 and 2 kg/ha. Overall the EC formulation gave slightly better control than the WP.

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Aziprotrryn and desmetryn both failed to provide acceptable rayless chamomile control. Desmetryn caused excessive onion leaf tip scorch at both 0.25 and 0.5 kg/ha. Bentazone effectively controlled shepherd's purse but had no effect on poa annua, speedwell, or fumitory. Established twin cress received a slight check.

The yields given in Table 2 indicate the effect of rayless chamomile competition as the major weed species in this onion crop. During the period of two months which elapsed before the plots were hand weeded (15 December 1976) the unsprayed plots or those with poor control became smothered with a dense mat of rayless chamomile. The improved weed control with bentazone EC compared with the WP formulation is indicated by yield differences in Table 2. The effect of high weed competition in treatments with poor weed control is also indicated by a lower proportion of first grade sized bulbs.

TABLE 2: Effect of aziprotrryn, bentazone and desmetryn on onion bulb yields t/ha.

Treatment	aziprotrryn		bentazone				desmetryn		Un- treat- ed	CV %
	1.5	3.0	WP 1.0	2.0	EC 1.0	2.0	0.25	0.5		
First grade bulbs 4cm diameter	21.3 cD	21.8 cD	31.2 bBC	34.5 bB	38.9 abAB	46.4 aA	20.1 cD	22.5 cCD	16.7 cD	23.3
Total yield tonnes/ha	23.4 cCD	23.5 cCD	32.4 bBC	35.2 bB	39.8 abAB	47.3 aA	21.6 cD	23.9 cCD	19.2 cD	21.2

DISCUSSION

Wireweed control

Chlormethazole at rates between 0.5 and 1.5 kg/ha can give efficient post-emergence control of wireweed. Test applications by growers in the 1976-77 season confirm that early season wireweed control may be achieved with rates below 1.0 kg/ha, but later applications, especially following a dry period, might require rates of 1.5 kg/ha.

Experience in trial 2 suggests that crop tolerance is improved if chlormethazole application is delayed until the onions have two true leaves. This is confirmed by English experience (Roberts and Bond 1972).

Chlormethazole at higher rates (2.0-4.0 kg/ha) after the crop had formed three true leaves in other unreported trials had no adverse effect on foliage growth or subsequent crop development. In other instances, large spreading wireweed plants up to 1 m in diameter were effectively controlled by 2 kg/ha chlormethazole.

Methabenzthiazuron 1.5 and 2 kg/ha gave adequate wireweed control in the second trial but district experience has proved that these rates are likely to cause considerable damage on young onions with less than three true leaves.

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In the trials reported methabenzthiazuron killed susceptible weed species within 5-7 days. Chlormethazole required 14 days before weeds were completely killed.

Rayless chamomile

Bentazone particularly as the EC formulation gave effective control and high yields, while aziprotryn and desmetryn failed to provide control.

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