SELECTIVE CONTROL OF RAYLESS CHAMOMILE IN ONIONS

G. J. WILSON and J. J. C. SCHEFFER

Horticultural Research Station, MAF, Pukekohe

Summary

Bentazone, bromofenoxim and ioxynil were compared as post emergence treatments on established onions where rayless chamomile (*Matricaria matricarioides*) was a major problem. Outstanding control was achieved with ioxynil where two applications were made 7 days apart at 0.5 kg/ha. Bentazone gave good control at the recommended 1 kg/ha rate, but was less effective than repeat ioxynil spraying. Bromofenoxim at rates up to 1 kg/ha caused excessive crop scorch and gave poor control of rayless chamomile.

INTRODUCTION

Rayless chamomile is a serious weed problem in early season growth of some onion crops. Previously, Wilson (1977) reported good control with bentazone as a post emergence herbicide when compared with aziprotrryn and desmetryn. In the Pukekohe area standard practice for the control of this weed is bentazone applied at the recommended label rate of 1 kg/ha after the onions have developed three true leaves.

Three trials on grower sites in 1977 are reported to further evaluate bentazone in comparison with two alternative herbicides, bromofenoxim and ioxynil, not previously tested against rayless chamomile.

METHOD

Treatments in all trials were applied with a modified Oxford sprayer (Cox 1968) using 400 litres/ha at 200 kPa pressure. Dimensions of all plots were 5 x 1.5 m.

A preliminary early season study compared bentazone at 0.5 and 1.0 kg/ha with bromofenoxim at 0.25, 0.5 and 1.0 kg/ha. These treatments were applied on 29th July when the second true leaf of the onion was emerging, but at a stage considered too early for adequate crop safety. The high population of rayless chamomile seedlings (163 plants/m²) on this site had between four to eight true leaves and a spread of two to four cm. Weeds killed and herbicide effect on the crop were recorded on 7th September, 6 weeks after treatment application (Table 1). No attempt was made to record crop yields on this two replicate observation.

The main trial compared bentazone, bromofenoxim and ioxynil at the rates detailed in Table 2. Treatments were replicated five times in randomised blocks. This early June sown crop was at the three to four true leaf stage when treated on 23rd September. Rayless chamomile was the main weed species present with a recorded plant count of 63/m². Growth stages varied from 3-12 true leaves with a spread of 1-5 cm. The other important weeds present in the trial site and their density /m² were: wireweed (*Polygonum aviculare*) 43; redroot (*Amaranthus powellii*) 23; cress spp (*Coronopus* spp) 13 and fathen (*Chenopodium album* agg) 3.

Crop Weeds

Details recorded were:

Weeds surviving (as a percentage of the untreated controls) on 18th October, 25 days after treatment application.

Marketable yield and bolters (seed stalk production) were recorded separately on 26th January, 10 days after the crop had been lifted at maturity and dried.

In a supplementary two replicate trial on more advanced rayless chamomile, bentazone at increased rates was further compared with ioxynil (Table 2). Herbicides were applied four weeks after the main trial application on 20th October. This site was a border section of the main trial and previously unsprayed. The rayless chamomile plants were 17-20 cm tall with flower heads emerging on the largest plants. Weeds surviving (as a percentage of the main trial unsprayed controls) were recorded on 25th November, 36 days after treatment application.

RESULTS

In the preliminary early trial, bentazone at 1 kg/ha substantially reduced the rayless chamomile population but also caused a slight reduction in the crop (Table 1). Bromofenoxim at all rates tested failed to provide adequate control of rayless chamomile and at the highest rate caused excessive damage to the crop.

TABLE 1: Preliminary trial treatment effect on rayless chamomile and crop, 6 weeks after treatment.

Treatment applied 29 July	Rate kg/ha	% survival	
		Onions	Rayless chamomile
bentazone	0.5	95	51
bentazone	1.0	90	12
bromofenoxim	0.25	95	48
bromofenoxim	0.5	90	28
bromofenoxim	1.0	50	21
untreated	-	100	100

In the main trial excellent control of rayless chamomile was achieved with ioxynil where two applications at 0.5 kg/ha were applied 7 days apart (Table 2). The kill was better than that achieved by 1 kg/ha bentazone, the commercially recommended rate. Bromofenoxim again failed to provide adequate control of rayless chamomile at the rates tested and caused severe foliage scorch on the onion crop. Up to 20% of the onion leaf area was scorched at the highest bromofenoxim rate (1 kg/ha) five days after application. Ioxynil caused twisting and slight yellowing of the young onion plants. This was most pronounced following two applications, but the overall foliage effect was considerably less damaging than the bromofenoxim treatments.

Although bromofenoxim at 1 kg/ha caused a major plant check soon after application, final yields were not affected (Table 2). Ioxynil, on the other hand, reduced total yields (when bolters were included) but not marketable yields. It was unfortunate that a high percentage waste occurred in the trial site due to bolters, with 22% occurring in the hand weeded controls. Bolting loss was appreciably reduced where ioxynil was applied in two 0.5 kg/ha applications or as a single spray at 1 kg/ha.

Crop Weeds

The supplementary late trial confirmed that ioxynil in two applications would also provide excellent control of rayless chamomile in a more advanced growth stage (Table 2). Furthermore, the repeat application of ioxynil at a reduced rate (0.3 kg/ha) gave equal control to the higher 0.5 kg/ha rate. The herbicides tested in this application had little apparent effect on crop growth.

TABLE 2: (a) Effect of herbicide treatments in the 'main trial' onion crop.

Treatment and rate (kg/ha) applied 23 Sept.	rayless chamomile % surviving after 25 days	marketable bulbs t/ha	bolters t/ha	total yield (incl. bolters) t/ha
hand weeded control	0	58.9 abc	22.5 a	81.4 a
bentazone 0.7	25	59.5 abc	12.9 bc	71.4 b
bentazone 1.0	4	52.4 c	20.6 a	73.0 ab
bentazone 2.0	0.6	53.6 c	19.6 ab	73.2 ab
bromofenoxim 0.7	55	57.4 bc	11.8 cd	69.2 b
bromofenoxim 1.0	18	64.5 a	10.6 cd	75.1 ab
ioxynil 0.5	11	62.5 ab	12.9 bc	75.4 ab
ioxynil 0.5 + 0.5*	0.2	63.0 ab	5.0 d	68.0 b
ioxynil 1.0	1.4	63.4 ab	5.6 d	69.0 b
CV %	-	7.8	39.2	8.4

(b) Supplementary trial: 20th October application.

	after 36 days
ioxynil 0.5 + 0.3*	0.5
ioxynil 0.5 + 0.5*	0.8
bentazone 1.5	6.0
bentazone 3	1.2

* two applications, seven days apart.

DISCUSSION

Currently, bentazone is the most common choice of herbicide for post-emergence control of rayless chamomile, but results are sometimes variable. These trials have demonstrated that improved control can be achieved with repeat applications of ioxynil.

Ioxynil repeat spraying had the added advantage of controlling a broad spectrum of other weeds not controlled by bentazone. The main trial showed these to include; twin cress (*Coronopus didymus*); wart cress (*Coronopus squamatus*); wireweed; redroot; fathen; black nightshade (*Solanum nigrum*) and speedwell (*Veronica persica*).

Cool, moist weather prevailing at the time of the main trial would have favoured results from ioxynil compared with bentazone (maximum temperature on 28th September 14.3°C). However, warm temperatures (19.2°C max.) on 20th October at the time of the supplementary trial again resulted in better control with ioxynil than with bentazone.

Local experience on use of ioxynil over a range of weed species indicates that when cool moist conditions prevail, two ioxynil applications at 0.3 kg/ha may be adequate. The trial results suggest the margin of crop safety with ioxynil may be small and further work is warranted to check weed control success with low application rates.

Crop Weeds

The mechanism by which ioxynil reduced the number of bolters (Table 2) is not understood. Some lesser reductions resulted from other treatments, but the pattern was not consistent.

ACKNOWLEDGEMENTS

We thank the onion growers who provided trial sites, the technical staff at Pukekohe for conducting the field trials and Biometrics Section, Levin, for statistical analyses.

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