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CONTROL OF SEEDLING CLEAVERS IN YOUNG ONIONS

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SUMMARY

The herbicides chloridazon/chlorbufam, ioxynil and chlorpropham were compared as post-emergence treatments on flag stage onions for control of seedling cleavers (*Galium aparine*). Best control without crop loss was achieved with ioxynil where two applications were made three weeks apart at 0.18 kg/ha. Chloridazon/chlorbufam at 2.7 kg/ha either as a single application or two half-rate sprays gave best control of cleavers but caused significant crop damage. Chlorpropham was least effective on cleavers and very damaging to young onions at the high rate (1.6 kg/ha) in one trial.

INTRODUCTION

In recent years cleavers has become a problem weed in some onion crops in the Pukekohe district. The use of the general contact herbicide diquat/paraquat as a standard treatment prior to crop emergence has contributed to this problem as it does not control this weed adequately (R.J. Wood pers comm). Well after crop establishment (2-3 leaf stage) bentazone or ioxynil are presently recommended for cleavers control. Information on alternative herbicides which might be used before the crop reaches the 2-3 leaf stage was sought which would permit control before cleavers became well established.

Among the early season residual herbicides used on onions propachlor and chlorthal-dimethyl are known to be ineffective on cleavers (Scheffer unpublished data). Chloridazon/chlorbufam, applied at the onion flag stage (either as a single spray or as a split application), is also used by growers for overall weed control, but insufficient information is available on its effect on this weed. Other post-emergence herbicides such as chlorpropham and ioxynil (at low rates) were also considered possible alternative treatments, and this paper reports on trial work which assessed these herbicides along with chloridazon/chlorbufam.

MATERIALS AND METHODS

Two trials were laid down in 1980 in a field where cleavers, in their first true leaf stage, threatened to become a major problem in a recently emerged onion crop. This commercial crop of Porters Early Globe onions were sown on 30 May on Patumahoe clay loam. Similar treatments (listed in Tables 1 and 2) were applied to onions at the crop flag stage on 11 July (Trial 1) and on 16 July (Trial 2). Each trial had four replicates as randomised blocks using a plot size of 5 x 1.65 m and containing six rows of onions at 20 cm centres.

Treatments were applied with a modified Oxford precision sprayer in 400 litres/ha of water at 200 kPa pressure. Weed control efficacy was assessed by plant count and green weight recordings of cleavers from an area of 2.7m² per plot 7 weeks after the initial treatment application.

In order to compare effects of the herbicides on the onion crop, all plots including untreated were hand weeded one week after the cleavers control assessment and maintained weed free until harvest. The crop was lifted on 17 December 1980 and bulb numbers and yield recorded on 5 January 1981, following partial drying of tops. Soil

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samples for organic carbon tests and mechanical analysis were taken on 5 January 1981 from all chlorpropham 1.6 kg/ha plots. The analyses of soil on both sites were very similar (18% sand, 19% silt, 52% clay, 2.5% organic carbon).

RESULTS

The best control of seedling cleavers without onion crop loss was with the repeat applications of ioxynil at low (0.18 kg/ha) rates (Tables 1 and 2). Chloridazon/chlorbufam at 2.7 kg/ha (either as a single application or two half-rate sprays) gave the best control of cleavers but caused significant reductions of both crop stand and final

TABLE 1: Effect of herbicides on cleavers control 7 weeks after treatment and onion crop tolerance (Trial 1).

Treatment	Rate (kg/ha)	Cleavers		Onions	
		Density (No./m ²)	Green weight (g/m ²)	Final stand No./m ²	Total yield (t/ha)
chloridazon/chlorbufam †	1.40	16 cd	2.0 de	51 ab	46 abc
chloridazon/chlorbufam † (2 applications)*	1.40	7 e	0.2 e	44 bc	44 bc
chloridazon/chlorbufam †	2.70	10 de	0.6 e	38 c	40 cd
ioxynil (2 applications)*	0.18	22 bc	3.6 cd	51 ab	49 abc
chlorpropham	0.80	26 b	4.7 bc	47 bc	50 ab
chlorpropham	1.60	27 b	6.5 b	25 d	34 d
untreated		43 a	32.8 a	62 a	54 a
CV%		25	42	16	13

† A non-ionic wetting agent was added to chloridazon/chlorbufam 1.4 kg/ha treatments at 2.8 litres/ha and to the 2.7 kg/ha treatment at half normal rate (1.4 litres/ha).

* chloridazon/chlorbufam and ioxynil repeat treatments 3 weeks apart.

TABLE 2: Effect of herbicides on cleavers control 7 weeks after treatment and onion crop tolerance (Trial 2)

Treatment	Rate (kg/ha)	Cleavers		Onions	
		Density (No./m ²)	Green weight (g/m ²)	Final stand No./m ²	Total yield (t/ha)
chloridazon/chlorbufam †	1.00	34 b	8.9 b	50 c	44 bc
chloridazon/chlorbufam †	1.40	26 bc	3.5 c	41 d	42 c
chloridazon/chlorbufam † (2 applications)*	1.40	9 d	0.5 d	41 d	39 cd
chloridazon/chlorbufam	2.70	13 d	1.8 cd	37 d	35 d
ioxynil (2 applications)*	0.18	20 c	2.4 cd	63 a	52 a
chlorpropham	0.80	31 bc	8.9 b	59 ab	53 a
chlorpropham	1.60	29 bc	7.5 b	54 bc	49 ab
untreated		51 a	29.9 a	63 a	52 a
CV%		29	38	7.0	7.6

† A non-ionic wetting agent was added to chloridazon/chlorbufam 1.0 and 1.4 kg/ha treatments at 2.8 litres/ha and to the 2.7 kg/ha treatment at half normal rate (1.4 litres/ha).

* chloridazon/chlorbufam and ioxynil repeat treatments 3 weeks apart.

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bulb yield. Chloridazon/chlorbufam at 1.4 and 1 kg/ha was less effective on cleavers, but still caused a crop yield reduction in Trial 2. Chlorpropham produced the least effective control of cleavers and caused a major crop yield reduction at the 1.6 kg/ha rate in Trial 1.

DISCUSSION

Chloridazon/chlorbufam applied at the onion flag stage is used by most Pukekohe onion growers for early season weed control. While it provided good control of young cleavers in these trials, this herbicide may unpredictably damage the crop, an effect considered to be more prevalent on "lighter" areas of Patumahoe clay loam. Chloridazon/chlorbufam damage to the crop is also thought to vary depending on weather conditions around application time (Elliot pers comm). Results of these trials confirm earlier evidence of crop thinning and yield reductions with chloridazon/chlorbufam (Wilson and Scheffer 1981).

A promising alternative treatment for cleavers as well as general seedling weed control was ioxynil at two low rate (0.18 kg/ha) applications. Currently this herbicide is recommended for a wide spectrum of contact weed control at 0.5 kg/ha but only on onions which have at least two well developed leaves. The suggested use, from these trials, at the younger crop flag stage at 0.18 kg/ha requires further testing before making commercial recommendations.

Crop thinning and yield reduction following chlorpropham application at 1.6 kg/ha was considerably higher in Trial 1 than in Trial 2 but the reasons are not clearly understood as the soil characteristics between the sites were similar, as was the soil moisture status at the time of treatment application.

As an alternative to the standard pre-crop emergence diquat/paraquat, recent findings (Scheffer unpublished data) have shown that seedling cleavers at this stage can be satisfactorily controlled with a low (0.36 kg/ha) rate of glyphosate. Where follow-up treatment is necessary the successful herbicides reported in this paper offer additional control.

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REFERENCES

Wilson, G.J. and Scheffer, J.J.C., 1981. Pre- and early post- emergence weed control in onions. *Proc. 6th Aust. Weed Control Conf*: in press.