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HOE 23408 – A NEW HERBICIDE FOR CONTROL OF WILD OATS AND SUMMER GERMINATING GRASSES

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Summary

Hoe 23408 is a new post-emergent herbicide for controlling wild oats (*Avena fatua*) and annual grasses. It is not effective against broadleaf weeds. In two seasons of experimental use, Hoe 23408 has shown selectivity in a wide range of crops at rates of up to 1.5 kg/ha. Hoe 23408 has shown some activity in pre-emergent application, but the soil must be moist and high application rates used.

INTRODUCTION

Hoe 23408 is a new selective herbicide, of low mammalian toxicity, which controls wild oats and many annual grasses by a systemic and contact action. Susceptible species die within three weeks of application: the growth of the leaves and roots is arrested approximately a fortnight after application. At this stage, it is easy to pull the plants out of the soil and in the end the growing point dies and consequently the plant.

Hoe 23408 has shown selectivity to wheat (*Triticum* spp), linseed (*Linum usitatissimum*), lucerne (*Medicago sativa*), and a variety of vegetable crops. It is effective for controlling wild oats, barnyard grass (*Echinochloa crus-galli*), smooth witch grass (*Panicum dichotomiflorum*) perennial ryegrass (*Lolium perenne*) and many others (Anon 1976).

The optimum stage for application is during the 2-4 leaf stage of the grasses, but some grasses can be controlled until tillering. At later stages, a higher rate of application must be used. The stage of development of the crop is of no importance as long as it is not covering, and thereby protecting the weeds. This activity at later stages in growth allows flexibility in application.

Hoe 23408 exhibits some soil activity but the compound ceases to be herbicidally active after approximately 3-4 weeks. Combinations of Hoe 23408 with other herbicides for the control of broadleaf weeds must be chosen with caution. Combinations with phytohormones or dinoseb herbicides lead to an antagonism in the action against the grasses but not against broadleaf species. This antagonism refers to biological effectiveness only. This paper reports on four of ten trials in linseed, tomatoes, onions and peas, and observation from one trial in beans.

METHOD

The experiments were situated in a variety of locations, see Table

- 1.

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TABLE 1:

Trial information:

Trial number	1	2	3	4
Location:	Hinds, Canterbury	Waiuku, Sth Auck.	Gisborne	Gisborne
Soil type:	Silt loam	Clay loam	Clay loam	Clay loam
Sowing date:	14.10.76	28.9.76	17.11.76	17.11.76
Herbicide application date:	8.11.76	4.11.76	15.12.76	3.12.76
Stage of weed at application	2-4 Leaf	2-4 Leaf	2-4 Leaf	2-4 Leaf
Weed count:	8.11.76 & 20.12.76	—	—	—
Weed scores:	—	19.11.76	11.1.77	11.1.77
Harvest:	21.3.77	10.3.77	—	6.3.77

The chemicals and rates chosen are shown in Table 2. In the tomato, onion and pea trials, other herbicides were used either as tank mix or separate sprays to control broadleaf weeds. The plot size was 2 x 5 m and these were replicated five or six times. The herbicide application was made using a gas-operated precision sprayer operating at 200 kPa, using fan Teejet nozzles 730 154s, and delivering 300-400 litres/ha.

The population was assessed either by counting or scoring, and results expressed as per cent ground cover of the weed species.

RESULTS AND DISCUSSION

Results of four experiments are shown in Table 2.

Trial 1 Linseed

Hoe 23408 reduced wild oat numbers significantly but there was no significant difference between rates. All treatments increased linseed yield significantly. Although 0.75 kg/ha gave the highest percent weed control it was evident some weakly surviving plants may have seeded at time of harvest.

After spraying, there was no sign of any phytotoxicity caused by Hoe 23408 on the linseed. However, on a visual basis only, there appeared to be a slight shortening of straw at the high rate 1.5 kg/ha. Where spray had been overlapped, there was a definite shortening of the straw.

Trial 2 Onions (*Allium cepa*)

In this trial there was a significant difference in percentage weed control figures between treatments. All rates of Hoe 23408 gave better weed control than the treatment of propachlor plus

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aziprotryne. The statistical analysis of yield data revealed that the Hoe 23408 followed by chlormethazole was superior to propachlor plus aziprotryne. The treatment of 1.0 kg/ha Hoe 23408 plus 1.5 kg of chlormethazole provided the cleanest area in the trial site. The areas treated with Hoe 23408 later became infested with broadleaf weeds because the grasses were effectively controlled. In the areas treated with propachlor followed by aziprotryne, the grasses were the major problem. Hoe 23408 was a superior post-emergent grass herbicide to propachlor followed by aziprotryne: it would have perhaps, been preferable to have sprayed aziprotryne on at the same time as the Hoe 23408 was applied.

TABLE 2: Summary of results from four trials

Treatment	Rate kg/ha	% Weed WO	% Weed Control BYG SWG		% Weed cover	Yield data (untreated = 100)
Trial 1, Linseed cv 'Redwood'						
Hoe 23408	0.75	97	—	—	7 * b	362 a
Hoe 23408	1.00	94	—	—	14 * b	374 a
Hoe 23408	1.50	95	—	—	12 * b	360 a
Untreated		0	0	0	206 * a	100 b
Control yield 650 kg/ha						
Trial 2 Onions cv 'Yates Ultra'						
1st Grade Bulbs						
Hoe 23408	0.75	—	86	89	12 c	159 ab
Hoe 23408	1.00	—	95	95	4 c	127 b
Hoe 23408	1.50	—	98	98	1 c	179 ab
propachlor plus	6.0)	—	20	20	70 b	120 b
aziprotryne	)					
Hoe 23408	)					
plus	)	—	—	—	—	263 a
chlormethazole	)	—	0	0	88 a	100 b
Untreated (hand-weeded)	—					
Trial 2 Peas cv 'Puget'						
Hoe 23408	0.75	—	96	—	2 b	—
Hoe 23408	1.0	—	95	—	3 b	—
Hoe 23408	1.5	—	98	—	1 b	—
Untreated		—	0	—	57 a	—
Trial 4 Tomatoes cv 'R220 Castlalong'						
Hoe 23408	0.75	—	92	—	6 a	—
Hoe 23408	1.0	—	96	—	3 b	—
Hoe 23408	1.5	—	99	—	0.5 b	—
Untreated		—	0	—	67 a	—

WO = wild oats BYG = barnyard grass SWG = smooth witchgrass

* Not Scores — actual weed counts expressed as wild oats/m²

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Trial 3 Peas (*Pisum sativa*)

Hoe 23408 reduced barnyard grass numbers significantly but there was no significant difference between rates. Yield data were not obtained. In this experiment dinoseb acetate was applied to all plots 9 days after application of Hoe 23408 to control broadleaf weeds. No phytotoxic effects were observed at any level of Hoe 23408. Although statistically there was no difference between treatments, 0.75 kg/ha Hoe 23408 is not quite sufficient. A rate of 1.0 kg/ha gives superior results.

Trial 4 Tomatoes (*Lycopersicum esculentum*)

Hoe 23408 reduced barnyard grass numbers significantly but there was no significant difference between rates. It was intended to harvest this trial but unfortunately, owing to a misunderstanding between the growers and harvesters, this was not possible. Metribuzin was applied to all plots at the four-leaf stage of the tomatoes to obtain broadleaf weed control. Hoe 23408 was applied while the tomatoes were at the cotyledon stage: there were no visual signs of any phytotoxic effects, caused by the chemical.

Observation on beans (*Phaseolus vulgaris*)

This observation was conducted in the Gisborne area and the chemical was applied by the grower. Hoe 23408 was sprayed as a band spray on beans which were being harvested for freezing. Inter-row cultivation was employed for weed control between the rows. The beans were at the 6-8 leaf stage, while the barnyard grass was at the 4-6 leaf stage. There was no visual phytotoxic effects caused by Hoe 23408 and it provided a good control of the barnyard grass which had infested the rows of beans.

CONCLUSIONS

Hoe 23408, at 1.0 kg/ha showed no phytotoxic effects on linseed, onions, tomatoes, peas and beans and gave a high level of control of wild oats and summer grasses.

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REFERENCES

Anon, 1976. Hoe 23408. Tech. Inf: (Sept), 5-7.