LONG ASHTON RESEARCH STATION

WEED RESEARCH DIVISION

TECHNICAL REPORT No. 91

THE ACTIVITY, PRE-EMERGENCE SELECTIVITY AND PERSISTENCE OF SOME RECENTLY DEVELOPED HERBICIDES: DOWCO 453, QUIZALOFOP-ETHYL, BAS 517 00H, CINMETHYLIN, AC263,499 AND RST 20024H.

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim, DOWCO 453 is haloxyfop, RST 20024H is trimexachlor

W G RICHARDSON AND T M WEST

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Long Ashton Research Station, Weed Research Division,
Begbroke Hill, Yarnton, Oxford, OX5 1PF.

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W.G. Richardson and T.M. West

Long Ashton Research Station, Weed Research Division,
Begbroke Hill, Yarnton, Oxford OX5 1PF, UK

SUMMARY

In a series of pot experiments in the glasshouse, six herbicides were examined as pre-emergence surface sprays for selectivity on 37 crop and weed species. Wheat, barley, and maize were each treated with seed dressings of the safener 1,8-naphthalic anhydride (NA) to investigate possible protection from herbicide injury. The route of entry for three of the herbicides was examined in a separate test on six selected species. Persistence of the herbicides in the soil was examined over a period of 40 weeks.

Dowco 453 and quizalofop-ethyl were effective on most grass weeds, including Poa annua and were tolerated by all broad-leaved crops and onion. Wheat and barley at lower doses were also tolerant.

BAS 517 OOH was also very active on grass weeds and selective in broad-leaved crops and onion.

Cinmethylin, more active pre-emergence, controlled a wide range of important grass and broad-leaved weeds including Alopecurus myosuroides, Galium aparine, Viola arvensis and Veronica persica with potential selectivity in wheat and certain legume and brassica crops. The safener NA increased the tolerance of wheat.

AC 263,499 was more active pre-emergence, though also considerably effective post-emergence. A wide range of mainly broad-leaved weeds was controlled pre-emergence. Field bean was the only tolerant crop but NA gave some protection to wheat, barley and maize.

RST 20024 H controlled several important weeds pre-emergence. Legume, cereal and brassica crops, notably oilseed rape were tolerant. Wheat, barley and maize were protected to some extent by NA.

Soil persistence, as monitored by perennial ryegrass, was relatively short for BAS 517 OOH, RST 20024H and quizalofop-ethyl, but moderate to long for Dowco 453, cinmethylin and AC 263,499, this in comparison with cyanazine (short persistence) and simazine (moderate to long persistence).

INTRODUCTION

The pre- and post-emergence activities and selectivities of new herbicides are investigated at LARS Weed Research Division on a large number of crop and weed species grown in pots, which also gives experience of the type of effects produced by each compound. Persistence in the soil is also monitored and these data, in conjunction with crop susceptibilities, are useful in considering subsequent cropping of treated land. The limitations of these investigations are that only one crop variety or source of weed species is used; they are grown in one particular soil type, at only one depth of sowing and without interspecific competition. Consequently the results should only be used as a guide for further work, as plant responses in pot experiments can be very different from those in the field.

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim,
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This report gives pre-emergence activity and selectivity data on six new herbicides. Results of activity experiments for three herbicides are also included to provide information on levels of phytotoxicity, type and route of action. Those for Dowco 453, quizalofop-ethyl and RST 20024 H were reported previously (Richardson et al. 1983a and b; Richardson & West 1984).

MEDTHODS AND MATERIALS

Activity experiments (AE) These were carried out in the glasshouse on six selected species as described previously (Richardson and Dean, 1973). Four annual species were raised from seeds and two perennials from rhizome fragments. Herbicides were applied by four different methods.

i) a post-emergence spray to the foliage only, avoiding contact with the soil,

ii) post-emergence to the soil only, as a drench avoiding foliar contact,

iii) pre-emergence to the soil surface,

iv) pre-emergence with thorough incorporation to 5 cm depth before planting.

Table 1. Plant data for activity experiments

Species	Cultivar /source	No. per pot at spraying		Depth of planting (cm)	Stage of growth		
		pre-em	post-em		Spraying	Assessment	
					post-em	pre-em	post-em
Dwarf bean (Phaseolus vulgaris)	The Prince	3	2	2	2 unifoliate leaves	2.5 trifoliate leaves	2-2.5 trifoliate leaves
Kale (Brassica oleraceae acephala)	Marrowstem	8-10	5	0.5	2-2.5 leaves	4.5-5 leaves	4 - 5 leaves
Polygonum amphibium	WRO Clone 1	6	5	1	5.5-6.5 leaves	9-10 leaves	8-10 leaves
Perennial ryegrass (Lolium perenne)	S23	10-12	9 or 10	0.5	2-2.5 leaves	8-9 leaves, 1-3 tillers	6-10 leaves, 1-3 tillers
Avena fatua	WRO 1978	10-15	3-5	1	2.5-3 leaves	8-9 leaves, 1-2 tillers	9 leaves, 0-2 tillers
Elymus repens	WRO Clone 1	6	5	1	2.5-3 leaves	5-9 leaves, 0-2 tillers	5-10 leaves, 0-2 tillers

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim,
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Table 2. Soil and environment conditions

Experiment number, type and herbicide(s) included	AE 1 Cinmethylin	AE 2 BAS 517 OOH AC 263,499	Pre-emergence selectivity
Date of spraying	31.5.84 and 4.6.84	2.11.84	21.2.85
Main assessment completed	10.7.84	10.12.84	10.4.85
Organic matter (%)	2.2	2.2	2.2
Clay content	15.0	15.0	15.0
pH (water; 1:2 soil/ water)	7.5	7.5	7.5
Ammonium sulphate (g/kg)	0.5	0.4	0.4
Superphosphate (g/kg)	1.0	0.8	0.8
Potassium sulphate (g/kg)	0.5	0.4	0.4
Fritted trace elements (g/kg)	0.1	0.08	0.08
Hydrated Mg_2SO_4 (g/kg)	0.4	0.3	0.3
Temperature (oC)			
Mean	13	13	14
Maximum	23	23	24
Minimum	4	4	8
Relative humidity (%)			
Mean	52	52	52
Maximum	62	62	80
Minimum	30	30	21

Pre-emergence selectivity experiment

Techniques for the selectivity experiment were as described by Richardson and Dean (1973), herbicides being applied as surface pre-emergence treatments. Species were sown as detailed in Appendix 1, each being replicated twice for every treatment.

Radish (Raphanus raphanistrum) was included for ease of propagation and may be regarded as a crop or weed. To improve establishment Chenopodium album, seeds were kept in 0.1M potassium nitrate for 48 hours in the light.

To protect from soil-borne pathogens, all seeds (except wheat, barley, oat, A. fatua, C. segetum, G. aparine and most perennials) were pre-treated with one of the following:- thiram, captan, thiram + benlate (for onion only) bromophos + captan + thiabendazole (pea only). Maize seeds were purchased already treated with captan A + teraquinone. The seeds of kale, radish, swede and dwarf bean were treated with thiram, a 6% gum arabic solution being used prior to dressing, to give better adhesion. In addition, Cheshunt Compound (3 g litre^{-1}) fungicide solutions were applied to certain species as soil drenches. Root fragments of Cirsium arvense were washed in a 2 ml litre^{-1} colloidal copper solution.

A series of treatments were included for wheat, barley and maize in which seeds were treated with NA (1,8 naphthalic anhydride) at 0.5% w/w a.i. of seeds to investigate possible protection from herbicide injury.

Herbicides were applied using a laboratory sprayer embodying an 8002E Spraying Systems Tee Jet operating at a pressure of 207 kPa (30 lb/in^2) and moving at 0.54m/s, 30 cm above the soil. During the experiment, plants were raised in the glasshouse, normal daylight being supplemented by mercury vapour lighting to provide 14 h photoperiods. Watering was from overhead.

Assessment and processing of results

Results were processed as described by Richardson and Dean (1973). Survivors were counted and scored for vigour on a 0-7 scale where 0 = dead and 7 = as in untreated control. Certain species showed variable germination and in these cases the results were not analysed.

Pairs of histograms are presented for each treatment, the upper representing plant survival and the lower, vigour score, both calculated as percentages of untreated controls. Each 'x' represents a 5% increment in the pre-emergence experiment but 7% in the activity experiments. A '+' indicates a value in excess of 100%; 'R' indicates a result based on one replicate only and 'M' represents a missing treatment.

A table of observed selectivities, using the criteria specified, is presented for each herbicide, along with comments to highlight salient points.

Several species, notably the perennials, were kept for an extra period to observe later effects or the degree of recovery from injury and these final observations are referred to in the text.

Persistence in the soil

This was monitored, by bioassay, in conjunction with the selectivity experiment. Pots (7.5 cm diameter) containing soil to a depth of 6.0 cm were sprayed directly with herbicides. All pots were then transferred to a temperate glasshouse together with untreated controls and watered as necessary, from overhead.

For each bioassay three replicate pots per treatment were selected and a sensitive species (perennial ryegrass) was sown 0.5cm deep, disturbing the soil as little as possible. Plants were harvested three or four weeks after sowing, at a predetermined growth stage, the number and fresh weight of shoots being recorded. Bioassays were repeated at six to eight week intervals for one year, unless the herbicides had disappeared before then, the first bioassay commencing within a day of spraying. Herbicides are considered to have disappeared when shoot fresh weights of the test plants are 80% or more as compared with the controls. Results are presented graphically for each herbicide and comments are made in the text. Standard treatments of cyanazine (short persistence) and simazine (moderate to long persistence) were included for comparison (see page 59). Average temperature during this period was 15°C (minimum 5°C, maximum 35°C) and relative humidity 60% (minimum 20%, maximum 93%).

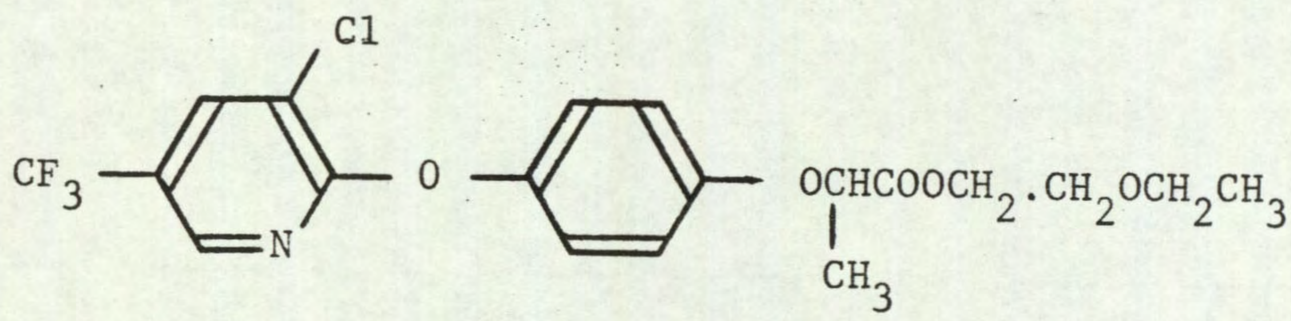
DOWCO 453

Code number DOWCO 453 **Trade name** Gallant

Common name Haloxyfop (proposed)

Chemical name 2-ethoxyethyl 2-[4-(3-chloro-5-trifluoromethyl-2-pyridyloxy) phenoxy]propionate

Structure



Source

Dow Chemical Co. Ltd.
Kings Lynn
Norfolk PE30 2JD
UK

Information available and suggested uses

For grass weed control in broad-leaved crops (sugar beet, pea, oilseed rape) at 0.0625 to 0.125 kg/ha; established perennial grasses at 0.25 to 0.5 kg/ha; industrial weed control (grasses) at 0.5 to 1.0 kg/ha.

Formulation used Emulsifiable concentrate 10.4% a.e.

Spray volume 373 l/ha

RESULTS

Full results are given in the histograms on pages 11-14 and potential selectivities are summarised in the following table.

RATE (kg a.i./ha)	CROPS: vigour reduced by less than 15%	WEEDS: number or vigour reduced by 70% or more
0.625	field bean pea* white clover lucerne rape kale swede radish carrot sugar beet	Beta vulgaris Bromus sterilis Veronica persica Viola arvensis Elymus repens Solanum nigrum + species below
0.125	species above + wheat ± safener (NA) barley ± safener (NA) onion dwarf bean	Avena fatua Poa annua Poa trivialis + species below
0.025	species above + oat maize ± safener (NA)	Alopecurus myosuroides

* Stand reduction, not due to herbicide

Comments on results

Activity data, post-emergence selectivities and symptoms produced on susceptible species were described previously (Richardson et al. 1983a). Grasses were susceptible and broad-leaved species tolerant. There was considerable activity pre- as well as post-emergence, with surface treatments usually more effective than when incorporated.

Soil persistence

A moderate period of persistence was found, using perennial ryegrass as the test species. Although the 0.025 and 0.125 kg/ha treatments were not toxic after 28 and 40 weeks respectively, the 0.625 kg/ha treatment still seriously affected plants at the latter date.

Pre-emergence selectivity

As expected from previous work (Richardson et al. 1983a) Dowco 453 was effective on graminaceous species. Alopecurus myosuroides was the most sensitive of the grass weeds, being controlled even at the lowest dose of 0.025 kg/ha. At 0.125 kg/ha Avena fatua and both Poa species (P. annua and P. trivialis) were controlled. At the highest dose of 0.625 kg/ha, the remaining grass weeds, Bromus sterilis and Elymus repens were susceptible. Surprisingly, four of the annual broad-leaved weeds were also controlled at this dose; Beta vulgaris, Veronica persica, Viola arvensis and Solanum nigrum). Otherwise, all other broad-leaved weeds were very resistant.

Crop tolerance was highest among broad-leaved species, all of which were resistant at the higher doses. Onion too, showed good tolerance. The tolerance of cereals was unexpected, wheat and barley withstanding 0.125 kg/ha and maize and oat, 0.025 kg/ha. Perennial ryegrass was very sensitive. There was no significant safening of wheat, barley or maize by NA.

Pre-emergence selectivity corresponds with that found post-emergence (Richardson, et al. 1983a) with control of grass weeds including Poa annua, a weed which has usually shown high susceptibility to new graminicides of the aryloxy-phenoxy group, while broad-leaved crops and onion are tolerant. However, potential selectivity in cereals pre-emergence is worth further study. The control of Beta vulgaris in sugar beet was not verified in a subsequent test (Richardson and West, unpublished data).

TRIAL NUMBER 534

DOWCO 453

PRE-EMERGENCE SELECTIVITY TEST

SPECIES		0.025 kg/ha	0.125 kg/ha	0.625 kg/ha
WHEAT	104	xxxxxxxxxxxxxxxxxxxx+	98 xxxxxxxxxxxxxxxxxxxx	85 xxxxxxxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	29 xxxxxx
WHEAT+S	102	xxxxxxxxxxxxxxxxxxxx	96 xxxxxxxxxxxxxxxxxxxx	38 xxxxxxxx
(2)	100	xxxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxxxx	29 xxxxxx
BARLEY	75	xxxxxxxxxxxxxxx	94 xxxxxxxxxxxxxxxxxxx	62 xxxxxxxxxxxx
(3)	93	xxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	29 xxxxxx
BARLEY+S	98	xxxxxxxxxxxxxxxxxxxx	91 xxxxxxxxxxxxxxxxxx	98 xxxxxxxxxxxxxxxxxxx
(4)	100	xxxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	43 xxxxxxxxx
OAT	102	xxxxxxxxxxxxxxxxxxxx	32 xxxxxx	0
(5)	93	xxxxxxxxxxxxxxxxxxx	29 xxxxxx	0
PER RYGR	19	xxxx	0	0
(6)	36	xxxxxxx	0	0
ONION	100	xxxxxxxxxxxxxxxxxxx	107 xxxxxxxxxxxxxxxxxxx+	67 xxxxxxxxxxxxx
(8)	100	xxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxxx
DWF BEAN	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	87 xxxxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxxx
FLD BEAN	109	xxxxxxxxxxxxxxxxxxx+	109 xxxxxxxxxxxxxxxxxxx+	109 xxxxxxxxxxxxxxxxxxx+
(10)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx
PEA	69	xxxxxxxxxxxxxx	92 xxxxxxxxxxxxxxxxxx	46 xxxxxxxxx
(11)	93	xxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
W CLOVER	162	xxxxxxxxxxxxxxxxxxx+	46 xxxxxxxxx	138 xxxxxxxxxxxxxxxxxxx+
(12)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
LUCERNE	106	xxxxxxxxxxxxxxxxxxx+	125 xxxxxxxxxxxxxxxxxxx+	100 xxxxxxxxxxxxxxxxxxx
(13)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx

PRE-EMERGENCE SELECTIVITY TEST

TRIAL NUMBER 534

DOWCO 453

SPECIES	0.025 kg/ha		0.125 kg/ha		0.625 kg/ha	
RAPE	96	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxx
(14)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
KALE	99	xxxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxx+	80	xxxxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
SWEDE	101	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
(17)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
CARROT	100	xxxxxxxxxxxxxxxxxx	70	xxxxxxxxxxxxxx	120	xxxxxxxxxxxxxxxxxx+
(18)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
SUG BEET	111	xxxxxxxxxxxxxxxxxx+	111	xxxxxxxxxxxxxxxxxx+	121	xxxxxxxxxxxxxxxxxx+
(22)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
BETA VUL	71	xxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	27	xxxxx
(23)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx
BROM STE	87	xxxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxxx	0	
(24)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	0	
AVE FATU	113	xxxxxxxxxxxxxxxxxx+	67	xxxxxxxxxxxxx	40	xxxxxxxx
(26)	79	xxxxxxxxxxxxxxxx	21	xxxx	14	xxx
ALO MYOS	31	xxxxxx	10	xx	0	
(27)	21	xxxx	7	x	0	
POA ANN	73	xxxxxxxxxxxxxxx	0		0	
(28)	57	xxxxxxxxxxx	0		0	
POA TRIV	75	xxxxxxxxxxxxxxx	0		0	
(29)	36	xxxxxxx	0		0	
SIN ARV	90	xxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
(30)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx

TRIAL NUMBER 534

DOWCO 453

SPECIES		0.025 kg/ha	0.125 kg/ha	0.625 kg/ha
RAPH RAP	97	xxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx	101 xxxxxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
CHRY SEG	33	xxxxxxx	33 xxxxxxx	67 xxxxxxxxxxxx
(32)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
MAT PERF	26	xxxxx	26 xxxxx	143 xxxxxxxxxxxxxxxxxxx+
(33)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
POL LAPA	87	xxxxxxxxxxxxxxxxx	150 xxxxxxxxxxxxxxxxxxx+	100 xxxxxxxxxxxxxxxxxxx
(35)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxxx
GAL APAR	136	xxxxxxxxxxxxxxxxxxx+	136 xxxxxxxxxxxxxxxxxxx+	55 xxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
CHEN ALB	158	xxxxxxxxxxxxxxxxxxx+	67 xxxxxxxxxxxx	117 xxxxxxxxxxxxxxxxxxx+
(39)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
STEL MED	91	xxxxxxxxxxxxxxxxx	97 xxxxxxxxxxxxxxxxxx	81 xxxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx
VER PERS	104	xxxxxxxxxxxxxxxxxxx+	78 xxxxxxxxxxxxxxx	13 xxx
(42)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	36 xxxxxxx
VI ARVE	47	xxxxxxxxx	79 xxxxxxxxxxxxxxx	0
(43)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	0
RUM OBTU	95	xxxxxxxxxxxxxxxxxx	95 xxxxxxxxxxxxxxxxxx	91 xxxxxxxxxxxxxxxxx
(44)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxxx
EL REPEN	116	xxxxxxxxxxxxxxxxxxx+	97 xxxxxxxxxxxxxxxxxx	48 xxxxxxxxxx
(47)	100	xxxxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx	14 xxx
CIRS ARV	82	xxxxxxxxxxxxxxxx	68 xxxxxxxxxxxxxx	41 xxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx

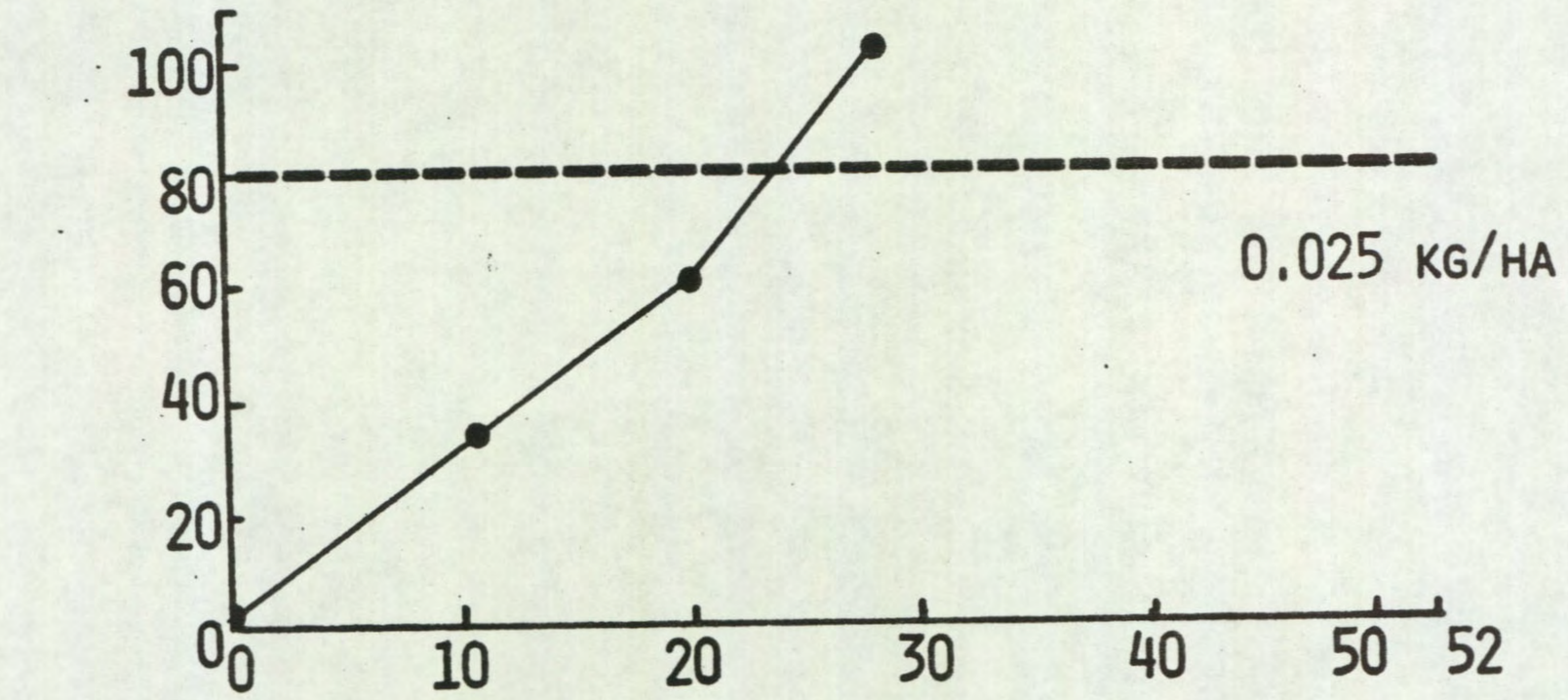
TRIAL NUMBER 534

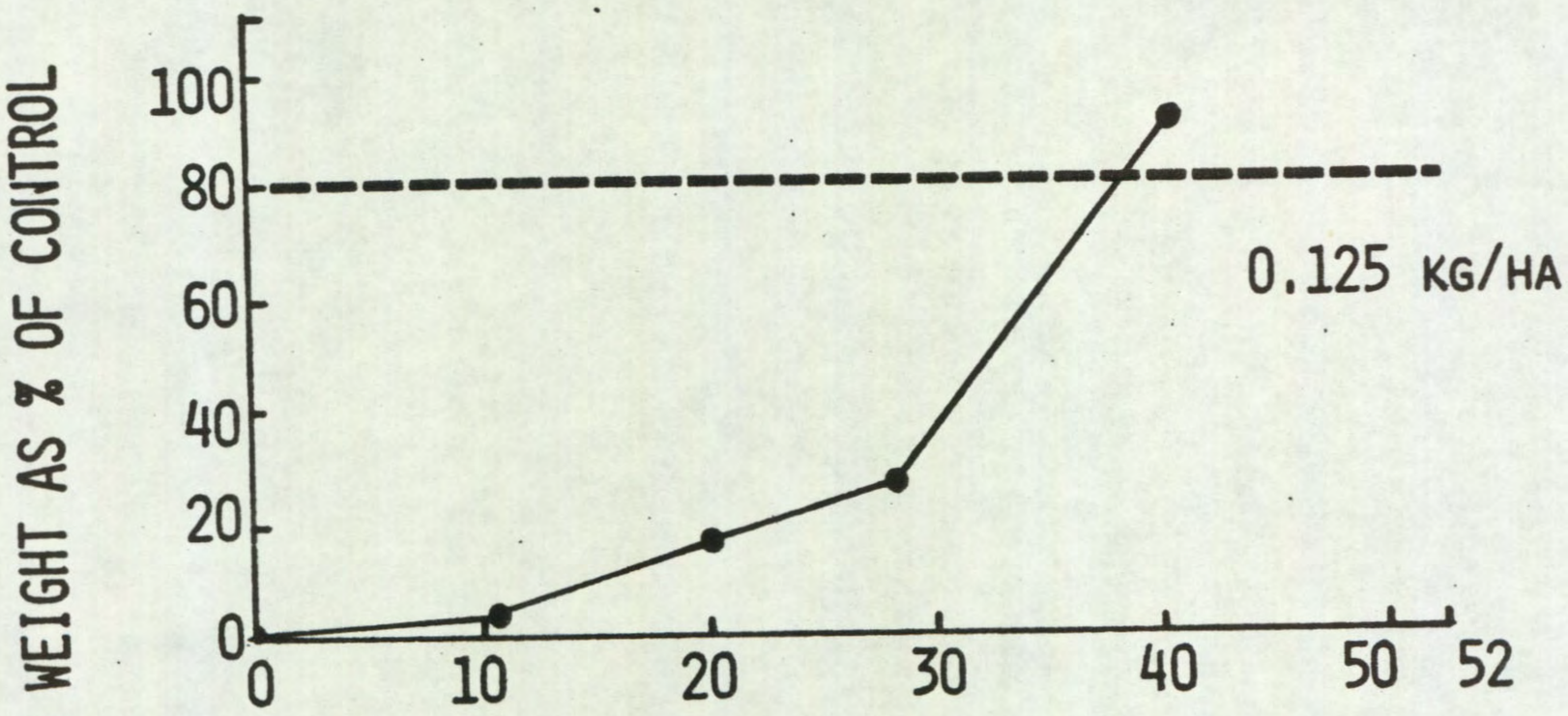
DOWCO 453

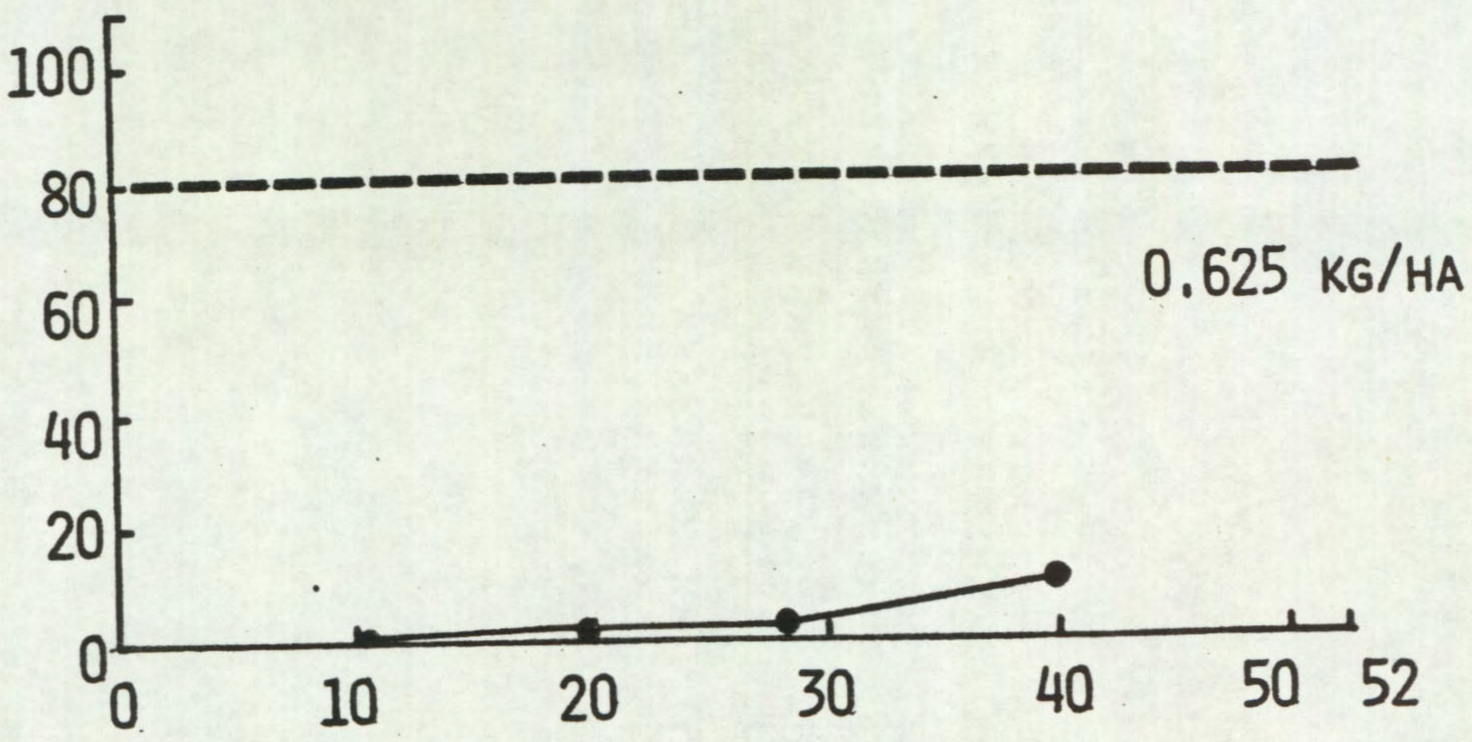
SPECIES		0.025 kg/ha		0.125 kg/ha		0.625 kg/ha
CONV ARV	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	114	xxxxxxxxxxxxxxxxxxxx+
(52)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
MAIZE+S	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	62	xxxxxxxxxxx
(56)	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	14	xxx
MAIZE	104	xxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx
(57)	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	14	xxx
SOL NIG	57	xxxxxxxxxx	86	xxxxxxxxxxxxxxxx	29	xxxxxx
(81)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	21	xxxx

PERSISTENCE OF DOWCO 453

SPECIES: PERENNIAL RYEGRASS







TIME OF SOWING

WEEKS AFTER TREATMENT

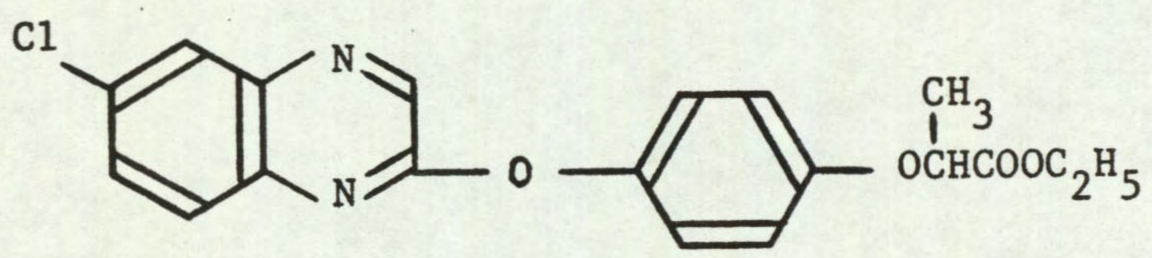
Quizalofop-ethyl

Code number FBC 32197
NCI 96683

Trade name Pilot

Chemical name Ethyl 2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propionate

Structure



Source

FBC Limited
Agrochemicals Division
Chesterford Park Research Station
Saffron Walden
Essex CB10 1XL, UK

Information available and suggested uses

For control of grass weeds in broad-leaved crops, Dose range 0.125 kg/ha (annual grasses) or 0.25 kg/ha (perennial grasses).

Formulation used Emulsifiable concentrate 10% a.i.

Spray volume 373 l/ha

RESULTS

Full results are given in the histograms on pages 19-22 and potential selectivities are summarised in the following table.

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
0.625	dwarf bean field bean pea white clover lucerne rape kale swede radish carrot sugar beet	Bromus sterilis Avena fatua + species below
0.125	species above+ wheat±safener (NA) barley±safener (NA) oat onion	Alopecurus myosuroides Poa annua + species below
0.025	species above+ maize	Poa trivialis

Comments on results

Activity, post-emergence selectivity and the type of symptoms produced on susceptible species were described previously (Richardson et al. 1983b). Activity was restricted to grass species, broad-leaved species being tolerant. The foliar spray was the most effective means of application, but pre-emergence treatments were also significantly active.

Soil persistence

A short to moderate period of persistence was found. Perennial ryegrass was unaffected, 10 and 28 weeks after treatment at 0.025 and 0.125 kg/ha, respectively. However the high dose of 0.625 kg/ha was still reducing shoot fresh weights by about 60%, 40 weeks after treatment.

Pre-emergence selectivity

Only grass weeds were susceptible, Poa trivialis at 0.025 kg/ha, Poa annua and Alopecurus myosuroides at 0.125 kg/ha and Bromus sterilis and Avena fatua at 0.625 kg/ha. Elymus repens was reduced in vigour by 64% at this latter dose. All broad-leaved weeds were resistant.

All broad-leaved crops and onion tolerated the higher doses. Temperate cereals (wheat, barley, oat) tolerated 0.125 kg/ha and maize 0.025 kg/ha. There

was some safening of barley by NA at the high dose. Perennial ryegrass was very sensitive.

The selective control of annual grasses in broad-leaved crops and onion is interesting. Control of Poa annua is also noteworthy this species being fairly tolerant post-emergence (Richardson et al. 1983b) as it is to most aryloxy phenoxy type herbicides. Potential control of Alopecurus myosuroides in cereals is also interesting, such tolerance suggesting these latter species may not be adequately controlled when they are found as volunteer weeds. Activity and selectivity looks more promising, post-emergence (Richardson, et al. 1983b).

QUIZALOFOP-ETHYL

TRIAL NUMBER 534

SPECIES		0.025 kg/ha	0.125 kg/ha	0.625 kg/ha
WHEAT (1)	104 100	xxxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx	91 93	xxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx	91 43	xxxxxxxxxxxxxxxxxx xxxxxxxxx
WHEAT+S (2)	102 100	xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx	102 93	xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxx	83 64	xxxxxxxxxxxxxxxxx xxxxxxxxxxxxx
BARLEY (3)	100 100	xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx	100 93	xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxx	81 29	xxxxxxxxxxxxxxxx xxxxxx
BARLEY+S (4)	104 100	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx	104 93	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxx	98 64	xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxx
OAT (5)	102 100	xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx	96 93	xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxx	26 36	xxxxx xxxxxxx
PER RYGR (6)	83 79	xxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxx	22 43	xxxx xxxxxxxxx	0 0	
ONION (8)	53 93	xxxxxxxxxxx xxxxxxxxxxxxxxxxxx	53 93	xxxxxxxxxxx xxxxxxxxxxxxxxxxxx	60 79	xxxxxxxxxxxx xxxxxxxxxxxxxxx
DWF BEAN (9)	100 100	xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx	87 100	xxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx	100 100	xxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxx
FLD BEAN (10)	109 100	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx	109 100	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx	109 100	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx
PEA (11)	46 100	xxxxxxxxx xxxxxxxxxxxxxxxxxxx	92 86	xxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxx	115 100	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx
W CLOVER (12)	46 100	xxxxxxxxx xxxxxxxxxxxxxxxxxxx	46 100	xxxxxxxxx xxxxxxxxxxxxxxxxxxx	231 100	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx
LUCERNE (13)	125 100	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx	119 100	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx	131 100	xxxxxxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxxxxxx

TRIAL NUMBER 534

QUIZALOFOP-ETHYL

SPECIES	0.025 kg/ha		0.125 kg/ha		0.625 kg/ha	
RAPE	91	xxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxxx	101	xxxxxxxxxxxxxxxxxxxx
(14)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
KALE	99	xxxxxxxxxxxxxxxxxxx	84	xxxxxxxxxxxxxxxxx	99	xxxxxxxxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SWEDE	97	xxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx
(17)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
CARROT	80	xxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(18)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SUG BEET	116	xxxxxxxxxxxxxxxxxxx+	137	xxxxxxxxxxxxxxxxxxx+	116	xxxxxxxxxxxxxxxxxxx+
(22)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
BETA VUL	47	xxxxxxxxx	34	xxxxxxx	88	xxxxxxxxxxxxxxxxx
(23)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
BROM STE	104	xxxxxxxxxxxxxxxxxxx+	87	xxxxxxxxxxxxxxxxx	35	xxxxxxx
(24)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	29	xxxxxx
AVE FATU	67	xxxxxxxxxxxxx	67	xxxxxxxxxxxxx	53	xxxxxxxxxxx
(26)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	29	xxxxxx
ALO MYOS	57	xxxxxxxxxxx	5	x	0	
(27)	64	xxxxxxxxxxxx	7	x	0	
POA ANN	102	xxxxxxxxxxxxxxxxxxx	22	xxxx	0	
(28)	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0	
POA TRIV	19	xxxx	37	xxxxxxx	0	
(29)	21	xxxx	29	xxxxxx	0	
SIN ARV	100	xxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	113	xxxxxxxxxxxxxxxxxxx+
(30)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx

TRIAL NUMBER 534

QUIZALOFOP-ETHYL

SPECIES		0.025 kg/ha	0.125 kg/ha	0.625 kg/ha
RAPH RAP	101	xxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxxx	89 xxxxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
CHRY SEG	67	xxxxxxxxxxxxx	167 xxxxxxxxxxxxxxxxxxx+	117 xxxxxxxxxxxxxxxxxxx+
(32)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx
MAT PERF	143	xxxxxxxxxxxxxxxxxxx+	157 xxxxxxxxxxxxxxxxxxx+	209 xxxxxxxxxxxxxxxxxxx+
(33)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
POL LAPA	162	xxxxxxxxxxxxxxxxxxx+	125 xxxxxxxxxxxxxxxxxxx+	150 xxxxxxxxxxxxxxxxxxx+
(35)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
GAL APAR	164	xxxxxxxxxxxxxxxxxxx+	191 xxxxxxxxxxxxxxxxxxx+	136 xxxxxxxxxxxxxxxxxxx+
(38)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
CHEN ALB	133	xxxxxxxxxxxxxxxxxxx+	75 xxxxxxxxxxxxxxx	75 xxxxxxxxxxxxxxx
(39)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxxx
STEL MED	105	xxxxxxxxxxxxxxxxxxx+	85 xxxxxxxxxxxxxxxxx	87 xxxxxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
VER PERS	91	xxxxxxxxxxxxxxxxx	130 xxxxxxxxxxxxxxxxxxx+	91 xxxxxxxxxxxxxxxxx
(42)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
VI ARVE	95	xxxxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxxx	63 xxxxxxxxxxxxx
(43)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
RUM OBTU	114	xxxxxxxxxxxxxxxxxxx+	91 xxxxxxxxxxxxxxxxx	105 xxxxxxxxxxxxxxxxxxx+
(44)	100	xxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx
EL REPEN	106	xxxxxxxxxxxxxxxxxxx+	106 xxxxxxxxxxxxxxxxxxx+	106 xxxxxxxxxxxxxxxxxxx+
(47)	93	xxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	36 xxxxxxx
CIRS ARV	82	xxxxxxxxxxxxxxxx	41 xxxxxxxx	55 xxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx

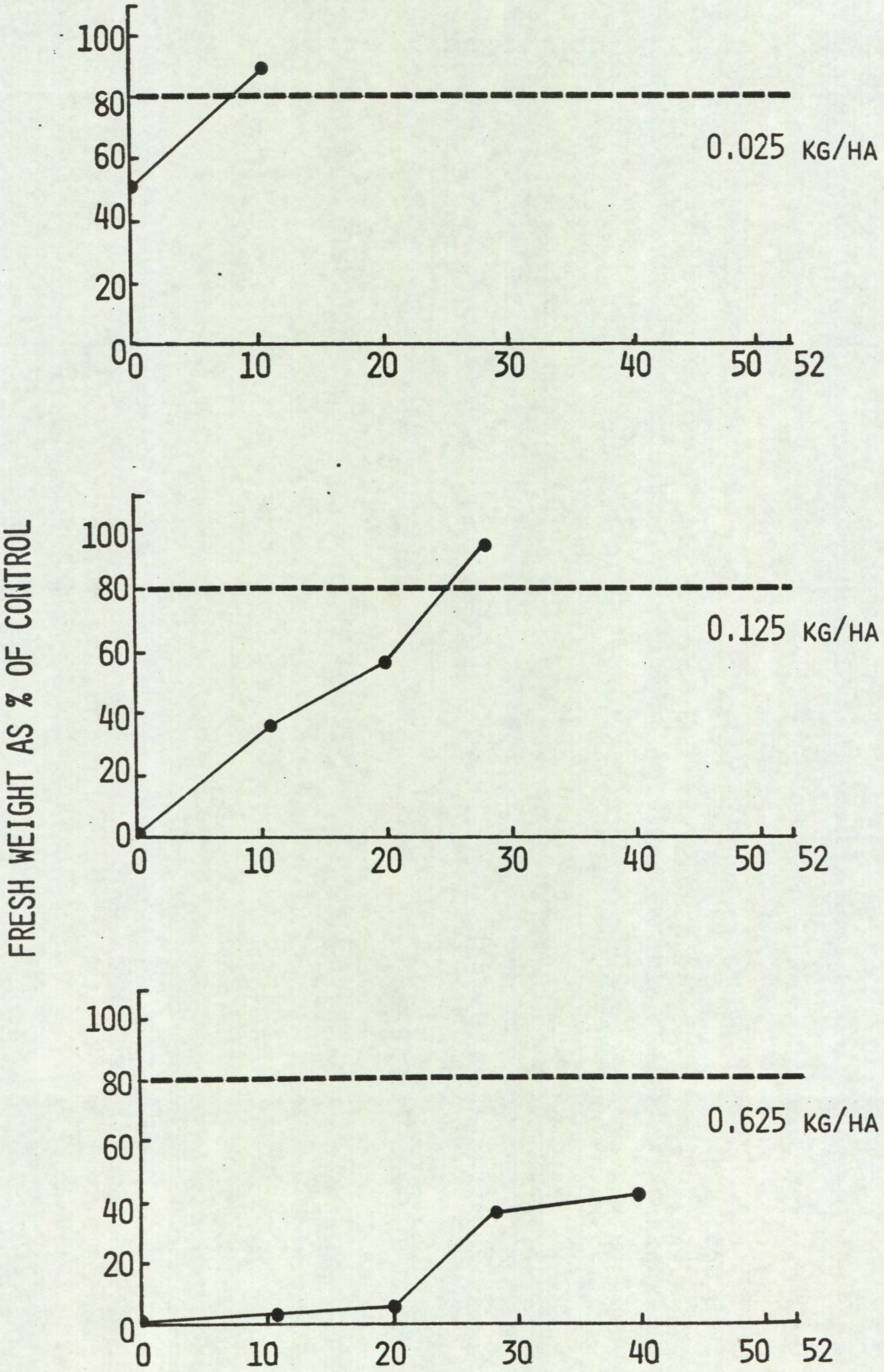
TRIAL NUMBER 534

QUIZALOFOP-ETHYL

SPECIES	0.025 kg/ha		0.125 kg/ha		0.625 kg/ha	
CONV ARV	57	xxxxxxxxxxx	129	xxxxxxxxxxxxxxxxxxxx+	143	xxxxxxxxxxxxxxxxxxx+
(52)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
MAIZE+S	87	xxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(56)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
MAIZE	104	xxxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx+
(57)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxxx
SOL NIG	57	xxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
(81)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx

PERSISTENCE OF QUIZALOFOP-ETHYL

SPECIES: PERENNIAL RYEGRASS



TIME OF SOWING

WEEKS AFTER TREATMENT

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim,
DOWCO 453 is haloxyfop, RST 20024H is trimexachlor

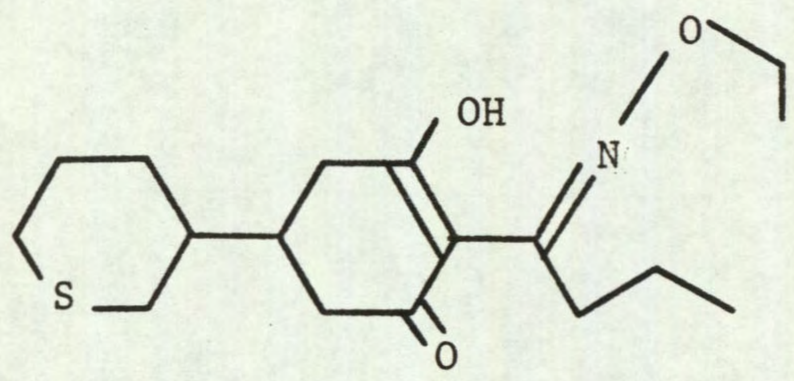
BAS 517 OOH

Code number BAS 517 OOH

Common name Cycloxydim (proposed)

Chemical name 2-[1-(ethoxyimino)butyl]-3-hydroxy-5-(2H-tetrahydrothiopyran-3-yl)-2-cyclohexen-1-one

Structure



Source BASF (UK) Ltd
Agricultural Division
Lady Lane
Hadleigh
Suffolk IP7 6BQ

Information available and suggested uses

Control of annual grasses (0.1 to 0.2 kg/ha) and perennial grasses (0.15 to 0.4 kg/ha) in broad-leaved crops.

Formulation used Emulsifiable concentrate 20% a.i.

Spray volume 373 l/ha

RESULTS

Full results are given in the histograms on pages 27-31 and potential selectivities are summarised in the following table.

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
0.625	field bean pea white clover lucerne rape kale swede radish sugar beet	Poa annua Poa trivialis Elymus repens + species below
0.125	species above + onion dwarf bean	Bromus sterilis Avena fatua Alopecurus myosuroides
0.025	None listed as no weeds controlled	None

Comments on results

Activity experiment

A very high level of activity was found on grasses with all four application methods, while broad-leaved species were highly tolerant. Post-emergence, the soil drenches were as effective as the foliar spray, although the latter was marginally more effective on Elymus repens. Pre-emergence, the surface spray tended to be more active than when incorporated, except perhaps with Avena fatua.

Symptoms on susceptible species

Severe stunting and necrosis of grasses was the most prominent symptom, seen with all four methods of application. Occasionally paleness or chlorosis of leaves developed. At higher doses pre-emergence, grasses failed to emerge from the soil.

Soil persistence

A short period of persistence in the soil was found. Perennial ryegrass was virtually unaffected, 10 weeks after treatment at all three doses, all of which had been lethal initially.

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim,
DOWCO 453 is haloxyfop, RST 20024H is trimexachlor

Pre-emergence selectivity

Bromus sterilis, Avena fatua and Alopecurus myosuroides were controlled at 0.125 kg/ha, the latter being reduced by more than 50% in number and vigour even at 0.025 kg/ha. Both Poa species, (P. annua as well as P. trivialis) and Elymus repens were controlled at 0.625 kg/ha, the latter being reduced severely at 0.125 kg/ha also. All broad-leaved weeds were resistant.

Onion and all broad-leaved crops were tolerant. Perennial ryegrass was the most sensitive of all species tested, being killed at the lowest dose of 0.025 kg/ha. Oat was also quite sensitive. There was no evidence of safening with NA.

Results with BAS 517 OOH correspond closely to those found with other new graminicides e.g. aryloxy-phenoxy and herbicides such as alloxydim and sethoxydim. However, activity of BAS 517 OOH on grass weeds is as high, or even higher than with these other herbicides. In comparison with alloxydim and sethoxydim, persistence of BAS 517 OOH is very short, which must be a desirable feature in many broad-leaved crops.

Although Poa annua and Poa trivialis are less sensitive than the other grass weeds, their control is possible at higher doses, contrasting somewhat with alloxydim and sethoxydim.

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim,
DOWCO 453 is haloxyfop, RST 20024H is trimexachlor

ACTIVITY EXPERIMENT

BAS 517 OOH

		0.05 kg/ha	0.25 kg/ha	1.25 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx
	I	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
KALE	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxx
	I	xxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx+ xxxxxxxxxxxxxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
	I	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxxx xxxx	xxxxxxxxxxxxxxx xx	xxxxxxxxxxxxxxx xx
	S	xxxxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxxxx xx	xxxxxxxxxxxxxxx xx
	P	o o	o o	o o
	I	xx xxx	o o	o o
AVENA FATUA	F	xxxxxxxxxxx xxxxxx	o o	o o
	S	xxxxxxxxxxx xxx	o o	o o
	P	xxxxxxxxxxxxxx xxxxxx	xxxxxxx xxx	x x
	I	xxxxxxxxxxxxxx+ xxxxxx	xxxxxx xx	o o
ELYMUS REPENS	F	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxx	xxxxxxxxxxxxxxx xx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxxx xx
	P	xxxxxxxxxxxx xxxxxxxxxx	x x	o o
	I	xxxxxxxxxxxxxx+ xxxxxxxxxxxx	xxxxxxxxx xxxxx	o o

Key: F = post-emergence, foliar application
S = post-emergence, soil drench
P = pre-emergence, surface film
I = pre-planting, incorporated

PRE-EMERGENCE SELECTIVITY TEST

TRIAL NUMBER 534

BAS 517 OOH

SPECIES		0.025 kg/ha		0.125 kg/ha		0.625 kg/ha
WHEAT	104	xxxxxxxxxxxxxxxxxxx+	65	xxxxxxxxxxxxx	0	
(1)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0	
WHEAT+S	96	xxxxxxxxxxxxxxxxxx	77	xxxxxxxxxxxxxxx	0	
(2)	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
BARLEY	94	xxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	0	
(3)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	0	
BARLEY+S	104	xxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxx+	0	
(4)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0	
OAT	102	xxxxxxxxxxxxxxxxxxx	38	xxxxxxxx	0	
(5)	79	xxxxxxxxxxxxxxxx	29	xxxxxx	0	
PER RYGR	0		0		0	
(6)	0		0		0	
ONION	120	xxxxxxxxxxxxxxxxxxx+	87	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx
(8)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
DWF BEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
FLD BEAN	109	xxxxxxxxxxxxxxxxxxx+	109	xxxxxxxxxxxxxxxxxxx+	109	xxxxxxxxxxxxxxxxxxx+
(10)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx
PEA	138	xxxxxxxxxxxxxxxxxxx+	92	xxxxxxxxxxxxxxxxxx	69	xxxxxxxxxxxxxx
(11)	86	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
W CLOVER	162	xxxxxxxxxxxxxxxxxxx+	185	xxxxxxxxxxxxxxxxxxx+	138	xxxxxxxxxxxxxxxxxxx+
(12)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
LUCERNE	125	xxxxxxxxxxxxxxxxxxx+	112	xxxxxxxxxxxxxxxxxxx+	94	xxxxxxxxxxxxxxxxxxx
(13)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim,
DOWCO 453 is haloxyfop, RST 20024H is trimexachlor

TRIAL NUMBER 534

BAS 517 OOH

SPECIES	0.025 kg/ha		0.125 kg/ha		0.625 kg/ha	
RAPE	96	xxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxx
(14)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
KALE	106	xxxxxxxxxxxxxxxxxx+	99	xxxxxxxxxxxxxxxxxx	84	xxxxxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SWEDE	89	xxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx
(17)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
CARROT	120	xxxxxxxxxxxxxxxxxxx+	60	xxxxxxxxxxx	110	xxxxxxxxxxxxxxxxxxx+
(18)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SUG BEET	126	xxxxxxxxxxxxxxxxxxx+	111	xxxxxxxxxxxxxxxxxxx+	105	xxxxxxxxxxxxxxxxxxx+
(22)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
BETA VUL	88	xxxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxx	47	xxxxxxxxx
(23)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
BROM STE	96	xxxxxxxxxxxxxxxxxx	26	xxxxx	0	
(24)	93	xxxxxxxxxxxxxxxxxx	29	xxxxxx	0	
AVE FATU	87	xxxxxxxxxxxxxxxx	33	xxxxxxx	0	
(26)	71	xxxxxxxxxxxxxx	14	xxx	0	
ALO MYOS	41	xxxxxxxx	10	xx	0	
(27)	43	xxxxxxxxx	14	xxx	0	
POA ANN	102	xxxxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxx	7	x
(28)	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	21	xxxx
POA TRIV	131	xxxxxxxxxxxxxxxxxxx+	75	xxxxxxxxxxxxxxx	19	xxxx
(29)	64	xxxxxxxxxxxx	57	xxxxxxxxxx	21	xxxx
SIN ARV	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx
(30)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx

PRE-EMERGENCE SELECTIVITY TEST

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim,
DOWCO 453 is haloxyfop, RST 20024H is trimexachlor

TRIAL NUMBER 534

BAS 517 OOH

SPECIES		0.025 kg/ha	0.125 kg/ha	0.625 kg/ha
RAPH RAP	93	xxxxxxxxxxxxxxxxxxx	101 xxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
CHRY SEG	117	xxxxxxxxxxxxxxxxxxx+	33 xxxxxxx	133 xxxxxxxxxxxxxxxxxxx+
(32)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
MAT PERF	M		52 xxxxxxxxxx	78 xxxxxxxxxxxxxxxx
(33)			86 xxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxxx
POL LAPA	137	xxxxxxxxxxxxxxxxxxx+	125 xxxxxxxxxxxxxxxxxxx+	150 xxxxxxxxxxxxxxxxxxx+
(35)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
GAL APAR	164	xxxxxxxxxxxxxxxxxxx+	109 xxxxxxxxxxxxxxxxxxx+	109 xxxxxxxxxxxxxxxxxxx+
(38)	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
CHEN ALB	50	xxxxxxxxxx	117 xxxxxxxxxxxxxxxxxxx+	117 xxxxxxxxxxxxxxxxxxx+
(39)	93	xxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx
STEL MED	93	xxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx	101 xxxxxxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx
VER PERS	91	xxxxxxxxxxxxxxxxx	130 xxxxxxxxxxxxxxxxxx+	117 xxxxxxxxxxxxxxxxxx+
(42)	100	xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx
VI ARVE	126	xxxxxxxxxxxxxxxxxx+	79 xxxxxxxxxxxxxxxx	32 xxxxxx
(43)	100	xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx
RUM OBTU	105	xxxxxxxxxxxxxxxxxx+	82 xxxxxxxxxxxxxxxx	91 xxxxxxxxxxxxxxxxx
(44)	100	xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx
EL REPEN	116	xxxxxxxxxxxxxxxxxx+	39 xxxxxxxx	0
(47)	86	xxxxxxxxxxxxxxxx	43 xxxxxxxxx	0
CIRS ARV	82	xxxxxxxxxxxxxxxx	82 xxxxxxxxxxxxxxxx	95 xxxxxxxxxxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxx

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim,
DOWCO 453 is haloxyfop, RST 20024H is trimexachlor

TRIAL NUMBER 534

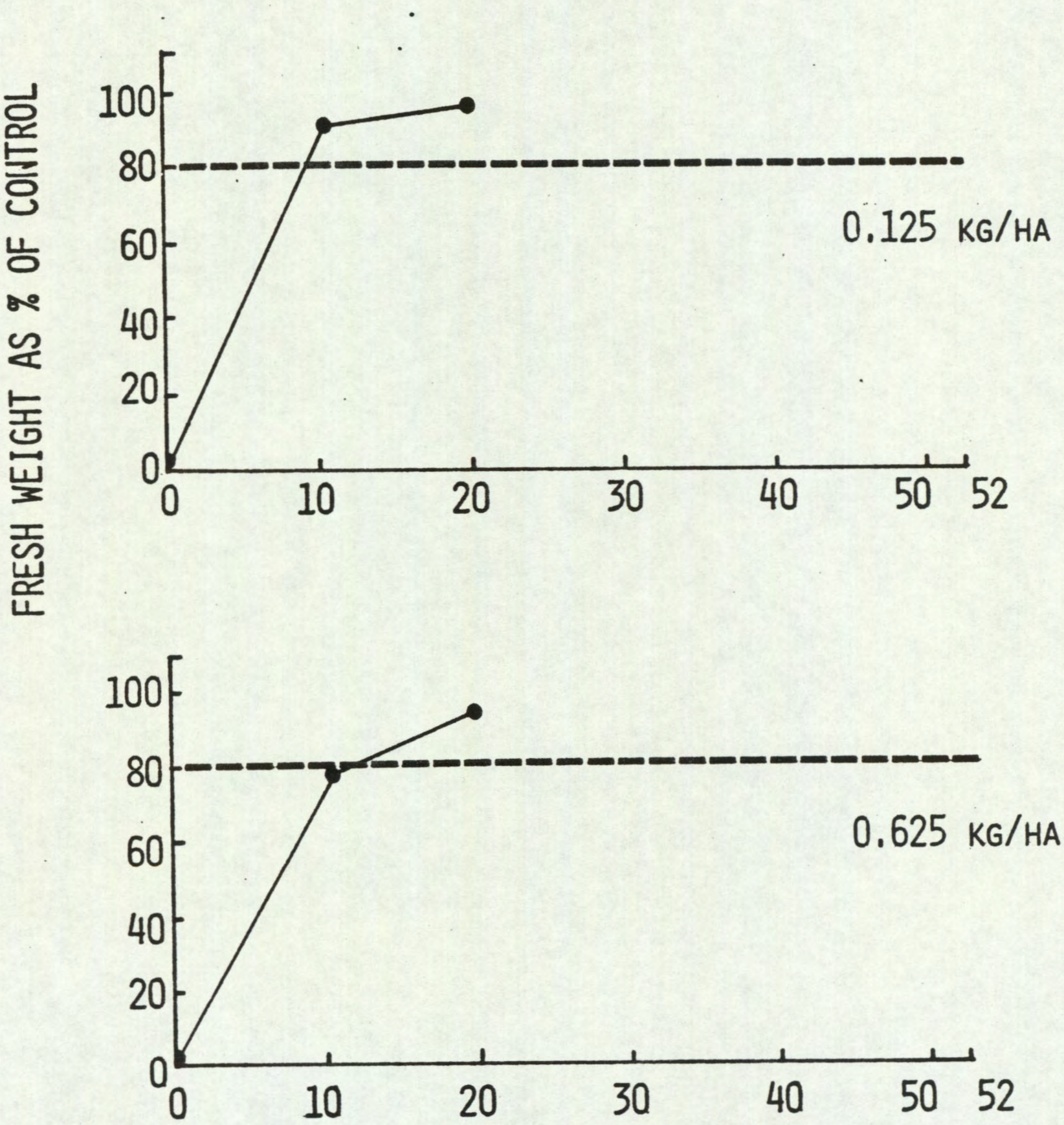
BAS 517 OOH

SPECIES		0.025 kg/ha		0.125 kg/ha		0.625 kg/ha
CONV ARV	43	xxxxxxxxx	43	xxxxxxxxx	71	xxxxxxxxxxxxx
(52)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
MAIZE+S	100	xxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx	12	xx
(56)	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	7	x
MAIZE	104	xxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxx+	65	xxxxxxxxxxxx
(57)	100	xxxxxxxxxxxxxxxxxxx	36	xxxxxxx	14	xxx
SOL NIG	114	xxxxxxxxxxxxxxxxxxx+	0		71	xxxxxxxxxxxxx
(81)	100	xxxxxxxxxxxxxxxxxxx	0		64	xxxxxxxxxxxx

NB: AC 263,499 is imazethapyr, BAS 517 00H is cycloxydim,
DOWCO 453 is haloxyfop, RST 20024H is trimexachlor

PERSISTENCE OF BAS 517 00H

SPECIES: PERENNIAL RYEGRASS



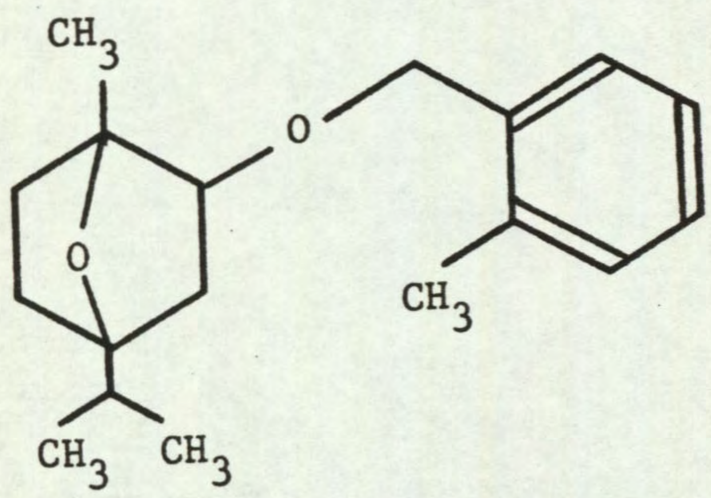
Cinmethylin

Code number SD 95481

Trade name Cinch

Chemical name 7-oxabicyclo (2.2.1) heptane, 1-methyl-4-(1-methylethyl)-2-(2-methylphenylmethoxy)-, exo-.

Structure



Source

Shell Biosciences Laboratory
Sittingbourne Research Centre
Sittingbourne
Kent ME9 8AG

Information available and suggested uses

Pre-emergence annual grass weed control in soyabean, cotton and groundnuts at 0.75 to 1.0 kg/ha.

Formulation used Emulsifiable concentrate 83.9% a.i.

Spray volume 373 l/ha

RESULTS

Full results are given in the histograms on pages 36-40 and potential selectivities are summarised in the following table.

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
4.0	None	None listed as no crops tolerant
1.0	wheat + safener (NA)	Avena fatua Chrysanthemum segetum Chenopodium album Stellaria media + species below
0.25	species above + wheat dwarf bean lucerne rape swede radish	Alopecurus myosuroides Poa annua Poa trivialis Matricaria perforata Galium aparine Veronica persica Viola arvensis Rumex obtusifolius Cirsium arvense

Comments on results

Activity experiment

Activity was greatest, pre-emergence, perennial ryegrass being the most sensitive species. However, considerable effects were seen on both perennial species. There was a tendency to greater effects with incorporation rather than the surface spray, at least with broad-leaved species. Post-emergence, soil drenches were much more effective than the foliar spray.

Symptoms on susceptible species

Localized, necrotic scorch spots or patches developed on broad-leaved species within 24 hours of spraying, which with kale became holes where the scorch had been severe. The most common symptom in all soil treatments was severe growth inhibition which was usually followed by necrosis and death of plant tissue. Broad-leaved plants treated pre-emergence were usually stopped at the cotyledon leaf stage, such leaves often being yellow. Where true leaves developed they were often lanceolate, reminiscent of plant growth regulator type herbicides. Often plants were miniature. At higher doses pre-emergence, P.amphibium and grasses often failed to emerge either from soil, or the coleoptile, or died back soon after emergence. Roots of grasses were inhibited and shoots were dart-like, while bent stems and prostrate plants were often seen in broad-leaved species.

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