LONG ASHTON RESEARCH STATION

WEED RESEARCH DIVISION

TECHNICAL REPORT No.86

THE ACTIVITY AND PRE-EMERGENCE SELECTIVITY OF SOME RECENTLY DEVELOPED HERBICIDES: METAZACHLOR, BUTAMIFOS, MT-124, TRIDIPHANE, MK 616 AND PRODIAMINE

MK 616 chlorphthalim, MT-124 is furyloxyfen

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THE ACTIVITY AND PRE-EMERGENCE SELECTIVITY OF SOME RECENTLY DEVELOPED HERBICIDES: METAZACHLOR, BUTAMIFOS, MT-124, TRIDIPHANE, MK616 AND PRODIAMINE

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SUMMARY

In a series of pot experiments in the glasshouse, six herbicides (five as soil surface sprays and one incorporated) were examined for pre-emergence selectivity on 44 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 four 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 52 weeks.

Metazachlor controlled a wide spectrum of annual grass and broad-leaved weeds with potential selectivity in large-seeded legume crops, especially dwarf bean and brassicas. A marked safening effect was found with maize and NA.

Butamifos controlled mostly annual broad-leaved weeds and some grasses in all four cereals, carrot and large-seeded legumes. Important weeds such as Veronica persica, Viola arvensis, Galium aparine and Alopecurus myosuroides featured in the weed spectrum.

MT-124 exhibited activity and selectivity typical of diphenyl-ether herbicides. Mainly broad-leaved annual species were susceptible, including V. persica, V. arvensis and G. aparine, while the usual defect of these type of herbicides was absent, as it controlled Stellaria media. Crop tolerance was confined to large-seeded legumes and cereals.

Tridiphane controlled certain annual grasses at lower doses, notably A. myosuroides, while annual broad-leaved weeds, including V. persica, were susceptible at higher doses. Dwarf bean was the most tolerant crop, while other large-seeded legumes, cereals, brassicas and carrot withstood lower doses.

MK 616 showed symptoms, activity and selectivity similar to diphenyl-ether herbicides. The wide spectrum of weed control included V. persica, V. arvensis, polygonaceous and composite weeds. Unlike most diphenyl ethers, S. media was susceptible. Crop tolerance was limited to certain brassicas, cereals, large-seeded legumes and carrot. The safening of maize by NA was outstanding.

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* Herbicide Group

Prodiamine showed characteristics of most other dinitroaniline herbicides. Several annual broad-leaved and grass weeds were controlled. Carrot and large seeded legumes were tolerant. Lucerne, barley, maize and brassicas also showed some degree of tolerance.

Soil persistence, as monitored by perennial ryegrass was short to moderate with tridiphane, butamifos and MK 616, moderate to long with MT-124 and long for metazachlor and prodiamine, 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.

This report gives pre-emergence selectivity data on six new herbicides. Results of activity experiments for four herbicides are also included to provide information on levels of phytotoxicity, type and route of action. Those for MT-124 and tridiphane were reported previously (Richardson and West, 1984).

METHODS 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-	post-		Spraying	Assessment	
					post-em	pre-em	post-em
Dwarf bean (*Phaseolus vulgaris*)	The Prince	3	2	2	2 unifoliate leaves	2.5 trifoliate leaves	2.5 trifoliate leaves
Kale (*Brassica oleraceae acephala*)	Marrowstem	10	5	0.5	1.5 leaves	4.5 leaves	4 leaves
Polygonum amphibium	WRO Clone 1	6	4	1	6-6.5 leaves	8 leaves	8-9 leaves
Perennial ryegrass (*Lolium perenne*)	S 23	12	5	0.5	3 leaves	8-9 leaves, tillering	10-16 leaves, tillering
Avena fatua	WRO 1978	10	5	1	2.5-3 leaves	4.5-8.5 leaves, some tillering	6-10 leaves, tillering
Elymus repens	WRO Clone 1	6	5	1	2-3 leaves	5.5-9 leaves, tillering	6-10 leaves, tillering

Table 2. Soil and environment conditions

Experiment number, type and herbicide(s) included	AE1 Metazachlor	AE 2 Prodiamine	AE 3 Butamifos	AE 4 MK616	Pre-emergence selectivity test
Date of spraying	13.10.82	20.5.83	29.9.83	31.5.84 & 4.6.84	7 & 8.2.84
Main assessment completed	16.11.82	21.6.83	1.11.83	10.7.84	27.3.84
Organic matter (%)	2.2	2.2	2.2	2.2	2.2
Clay content (%)	15.0	15.0	15.0	15.0	15.0
pH (water; 1:2 soil/ water)	7.5	7.5	7.5	7.5	7.5
Ammonium sulphate (g/kg)	-	-	-	0.5	0.4
Superphosphate (g/kg)	2.0	2.0	2.0	1.0	0.8
Potassium sulphate (g/kg)	-	-	-	0.5	0.4
Vitax QS fertilizer (g/kg)	2.5	2.5	-	-	-
Fritted trace elements (g/kg)	-	-	-	0.1	0.08
Hydrated Mg_2SO_4 (g/kg)	0.8	0.8	-	0.4	0.3
Temperature (^{o}C)					
Mean	19	19	18	22	16
Maximum	26	33	28	38	24
Minimum	12	11	8	12	7
Relative humidity (%)					
Mean	60	60	70	55	60
Maximmum	85	90	90	90	88
Minimum	32	20	33	24	25

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 or incorporated (prodiamine only). 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 of certain species, the following treatments were applied:- seeds of Chenopodium album were kept in 0.1 M 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), aldrin (cotton 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% 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 and sprays respectively, to protect against fungal diseases. 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 a safener to investigate possible protection from herbicide injury. Wheat, barley, and maize seeds were treated with NA (1,8-naphthalic anhydride) at 0.5% w/w a.i. of seeds.

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 0.54 m/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 to 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 pre-emergence selectivity experiment. Pots (7.5 cm diameter) for surface treatments and tins (19 cm long, 13 cm wide, 8 cm deep) for incorporated treatments, containing soil to the same depth as in the pots, were sprayed directly with herbicides. Incorporation was done by mixing the soil thoroughly in a polythene bag immediately after spraying. 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 0.5 cm 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 17^{o}C (minimum 5^{o}C, maximum 35^{o}C) and relative humidity 60% (minimum 20%, maximum 93%).

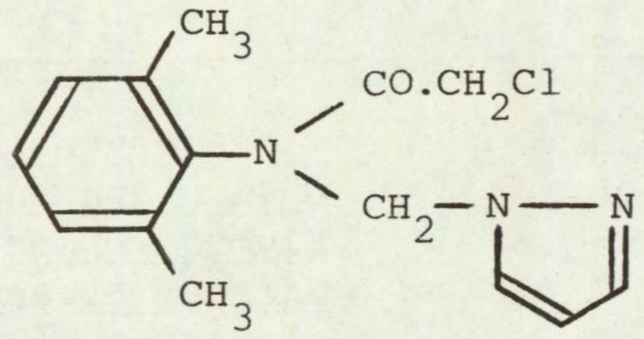
Metazachlor

Code numbers BAS 47900H
BAS 47902H

Trade name/s Butisan

Chemical name α-chloro-N-(1-pyrazolylmethyl)aceto-2',6'-xylidide

Structure



Source

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

Information available and suggested uses

Pre-emergence control of annual grass and broad-leaved weeds in winter rape at 1.25 kg a.i./ha; swedes at 1.0 to 1.25 kg a.i./ha; transplanted brassicas at 1.0 to 1.25 kg a.i./ha.

Formulation used: 50% a.i. suspension concentrate

Spray volume: 373 l/ha

RESULTS

Full results are given in the histograms on pages 10 to 14 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
4.00	None	None listed as no crops tolerant
1.00	dwarf bean maize+safener (NA)	Viola arvensis Galium aparine Elymus repens Cirsium arvense + species below
0.25	species above + barley+safener (NA) field bean pea rape kale radish	Bromus sterilis Festuca rubra Avena fatua Alopecurus myosuroides Poa annua Poa trivialis Sinapis arvensis Chrysanthemum segetum Matricaria perforata Senecio vulgaris Chenopodium album Stellaria media Veronica persica Rumex obtusifolius

Comments on results

Activity experiment

Although most phytotoxicity occurred via the soil, especially pre-emergence, the foliar spray was damaging, more so on broad-leaved than grass species. In the soil treatments, grasses were generally more susceptible than broad-leaved species. Pre-emergence, the surface treatments were more active than when the herbicide was incorporated with grasses and Polygonum amphibium, but this difference was not apparent with kale and dwarf bean.

Symptoms on susceptible species

The foliar spray caused necrosis on leaves of broad-leaved species and perennial ryegrass and growth was retarded. Some leaves of dwarf bean and ryegrass became darker green in colour. Similarly in all soil treatments growth was retarded and necrosis usually followed colour changes such as chlorosis or a deeper green colouration of leaves. Pre-emergence at higher doses plants often died back before, at or very soon after emergence. At lower doses necrosis usually followed retardation of growth and the colour changes noted above. Thus, symptoms are typical of other acetanilides, such as alachlor.

Persistence in the soil

Using perennial ryegrass as the sensitive test species, a relatively long period of soil persistence was found. Doses of 1.0 and 4.0 kg/ha still reduced shoot fresh weight by 67 and 95%, 52 weeks after treatment.

Pre-emergence selectivity

A broad spectrum of weed control was found. All annual grasses were controlled at the lowest dose of 0.25 kg/ha, including Avena fatua, Alopecurus myosuroides and Bromus sterilis. Eight broad-leaved species were controlled at this dose and a further four weeds at 1.0 kg/ha including Galium aparine and two perennials, Elymus repens and Cirsium arvense. Raphanus raphanistrum and Convolvulus arvensis were not controlled, even at the highest dose of 4.0 kg/ha.

Dwarf bean was the most tolerant crop, withstanding 1.0 kg/ha. At 0.25 kg/ha, other large-seeded legumes (pea and field bean) and three brassica crops were tolerant (rape, kale and radish), but not swede. Safening was found with all three cereals, notably barley and maize, the former tolerating 0.25 kg/ha while the latter, sensitive at this dose alone, was safened even at four times this rate (1 kg/ha) with NA.

Perennial ryegrass, onion, white clover, carrot and lettuce were very sensitive.

The high activity and broad-weed control spectrum is impressive. Metazachlor would appear to be more effective on broad-leaved weeds than other acetanilides which are often weak on this group. The potential control for grass weeds, notably A. fatua, A. myosuroides and B. sterilis in oil-seed rape (and field bean) could be advantageous where these are used as break crops in intensively grown wheat and barley systems. The useful control of broad-leaved weeds is an added benefit. It is interesting to note the potential control of the crucifer, Sinapis arvensis in brassica crops, a feature common to only a very few herbicides. The potential for safening of cereals and possibly other grass crops needs further study in view of this and other work (Wuerzer et al., 1983).

It may be worth pointing out that in view of the long persistence of this herbicide in the soil, there may be danger to subsequent cereal crops in the rotation' but that this could possibly be overcome by treating the cereal seeds with safener/s.

ACTIVITY EXPERIMENT

METAZACHLOR

		0.25 kg/ha	1.0 kg/ha	4.0 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxx xxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxx xxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx
KALE	F	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxx xxxxxxx
	P	xxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxx xxxxxxx	xxxxxxx xxxxxx
	I	xxxxxxxxxxxxx+ xxxxxxxxxxx	xxxxxxxxxxxxx+ xxxxxxxxx	xxxxxxxxxxxxx+ xxxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxx xxxxxx
	S	xxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxx xxxxx
	P	xxxxxxxxxx xxxxxxxxxx	o o	o o
	I	xxxxxxxxxxxxx xxxxxxxxxxx	xxxxx xxxx	x xx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxx xxxxxx
	S	xxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxx xxx
	P	o o	o o	o o
	I	xxxxxxxxxx xxxxxx	o o	o o
AVENA FATUA	F	xxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxx xxx
	P	xxxxx xxxxxx	o o	o o
	I	xxxxxxxxxxxxx xxxxxxxxxxx	o o	o o
ELYMUS REPENS	F	xxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxx xxxxxxx	xxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxx xxxxx
	P	xxxxxxxxxx xxxxxxx	o o	o o
	I	xxxxxxxxxxxxx xxxxxxxx	o o	o o

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

TRIAL NUMBER 533

METAZACHLOR

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
WHEAT	98	xxxxxxxxxxxxxxxxxxx	59	xxxxxxxxxxx	0	
(1)	57	xxxxxxxxxxx	29	xxxxxx	0	
WHEAT+S	93	xxxxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxx	40	xxxxxxxx
(2)	64	xxxxxxxxxxxxx	50	xxxxxxxxxx	21	xxxx
BARLEY	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(3)	64	xxxxxxxxxxxxx	36	xxxxxxx	14	xxx
BARLEY+S	102	xxxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
(4)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	36	xxxxxxx
OAT	94	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx
(5)	71	xxxxxxxxxxxxxx	21	xxxx	21	xxxx
PER RYGR	0		0		0	
(6)	0		0		0	
ONION	10	xx	0		0	
(8)	14	xxx	0		0	
DWF BEAN	104	xxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxx+
(9)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
FLD BEAN	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	0	
(10)	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0	
PEA	71	xxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxxx	53	xxxxxxxxxxx
(11)	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	29	xxxxxx
W CLOVER	20	xxxx	0		0	
(12)	14	xxx	0		0	
LUCERNE	84	xxxxxxxxxxxxxxxx	36	xxxxxxx	0	
(13)	50	xxxxxxxxxx	29	xxxxxx	0	

Pre-emergence selectivity test

TRIAL NUMBER 533

METZACHLOR

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
RAPE	91	xxxxxxxxxxxxxxxxx	59	xxxxxxxxxxxx	0	
(14)	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
KALE	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	25	xxxxx
(15)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	29	xxxxxx
SWEDE	65	xxxxxxxxxxxxx	6	x	0	
(17)	57	xxxxxxxxxxx	14	xxx	0	
CARROT	23	xxxxx	0		0	
(18)	29	xxxxxx	0		0	
LETTUCE	0		0		0	
(20)	0		0		0	
SUG BEET	112	xxxxxxxxxxxxxxxxxxx+	83	xxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx
(22)	64	xxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
BETA VUL	94	xxxxxxxxxxxxxxxxxx	53	xxxxxxxxxxx	53	xxxxxxxxxxx
(23)	57	xxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
BROM STE	38	xxxxxxxx	19	xxxx	0	
(24)	21	xxxx	14	xxx	0	
FEST RUB	0		0		0	
(25)	0		0		0	
AVE FATU	82	xxxxxxxxxxxxxxxxx	76	xxxxxxxxxxxxxxx	18	xxxx
(26)	29	xxxxxx	14	xxx	7	x
ALO MYOS	0		0		0	
(27)	0		0		0	
POA ANN	0		0		0	
(28)	0		0		0	

Pre-emergence selectivity test

TRIAL NUMBER 533

METAZACHLOR

SPECIES	0.25 kg/ha		1.00 kg/ha		4.00 kg/ha	
POA TRIV	0		0		0	
(29)	0		0		0	
SIN ARV	10	xx	10	xx	10	xx
(30)	29	xxxxxx	14	xxx	7	x
RAPH RAP	80	xxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx
(31)	93	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	43	xxxxxxxxx
CHRY SEG	0		0		0	
(32)	0		0		0	
MAT PERF	0		0		0	
(33)	0		0		0	
SEN VULG	21	xxxx	0		0	
(34)	14	xxx	0		0	
POL LAPA	91	xxxxxxxxxxxxxxxxxx	7	x	0	
(35)	57	xxxxxxxxxxx	7	x	0	
GAL APAR	130	xxxxxxxxxxxxxxxxxxxx+	39	xxxxxxxx	0	
(38)	50	xxxxxxxxxx	29	xxxxxx	0	
CHEN ALB	17	xxx	8	xx	0	
(39)	29	xxxxxx	14	xxx	0	
STEL MED	0		0		0	
(40)	0		0		0	
VER PERS	0		0		11	xx
(42)	0		0		14	xxx
VI ARVE	62	xxxxxxxxxxx	10	xx	0	
(43)	43	xxxxxxxxx	14	xxx	0	

Pre-emergence selectivity test

Pre-emergence selectivity test

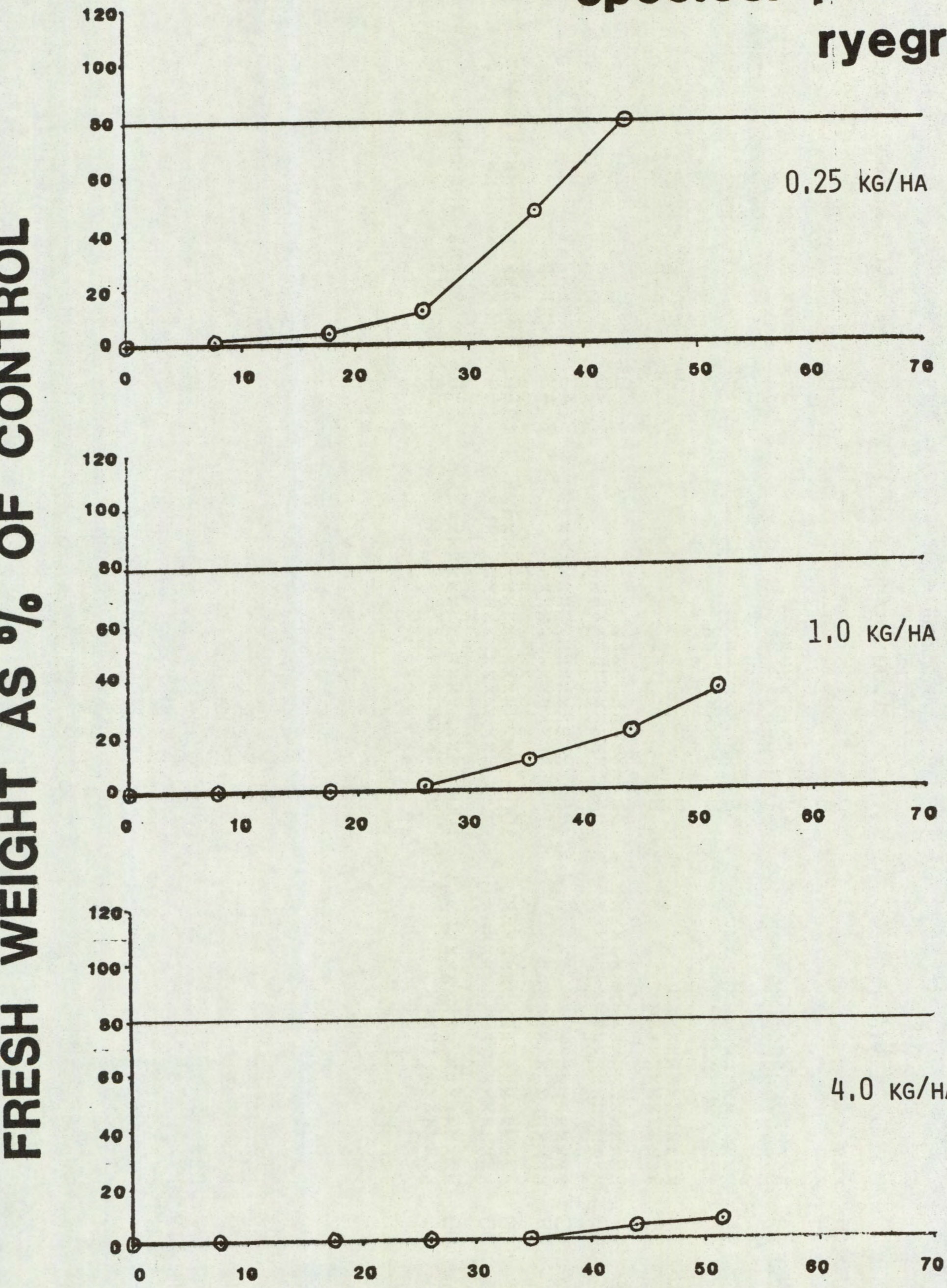
METZACHLOR

TRIAL NUMBER 533

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
RUM OBTU	15	xxx	0		0	
(44)	14	xxx	0		0	
EL REPEN	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	51	xxxxxxxxxx
(47)	64	xxxxxxxxxxxxx	21	xxxx	14	xxx
ALL VIN	94	xxxxxxxxxxxxxxxxxx	56	xxxxxxxxxxx	19	xxxx
(49)	64	xxxxxxxxxxxxx	50	xxxxxxxxxx	7	x
CIRS ARV	71	xxxxxxxxxxxxxx	0		0	
(50)	71	xxxxxxxxxxxxxx	0		0	
TUS FARF	109	xxxxxxxxxxxxxxxxxxx+	55	xxxxxxxxxxx	0	
(51)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0	
CONV ARV	43	xxxxxxxxx	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
(52)	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
MAIZE+S	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(56)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx
(57)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	36	xxxxxxx

PERSISTENCE OF METAZACHLOR

species: perennial ryegrass



TIME OF SOWING

weeks after treatment

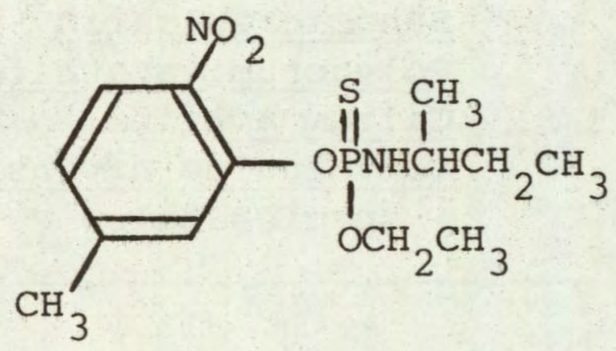
Butamifos

Code number S-28
S-2846
HER-26910

Trade name: Tufler

Chemical name O-ethyl-O-(5-methyl-2-nitrophenyl)N-s-butylphosphoramidothionate

Structure



Source Sumitomo Chemical Co Ltd
15 Kitahama 5-chome
Higashi-ku
Osaka 541
Japan

Information available and suggested uses

Pre-plant or pre-emergence control of annual broad-leaved and grass weeds in soyabean, barley, carrot, lettuce, strawberry, tomato, onion, water melon and cabbage at 1.0 to 2.0 kg a.i./ha; in turf at 3.0 to 6.0 kg/ha (autumn) or 5 to 10 kg/ha in spring.

Formulation used: 50% a.i. emulsifiable concentrate.

Spray volume: 373 l/ha

RESULTS

Full results are given in the histograms on pages 19-23 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
4.00	wheat±safener (NA) barley±safener (NA) oat maize±safener (NA) dwarf bean pea carrot	Beta vulgaris Alopecurus myosuroides Sinapis arvensis Chrysanthemum segetum Matricaria perforata Senecio vulgaris Polygonum lapathifolium Galium aparine Convolvulus arvensis + species below
1.00	species above + field bean	Festuca rubra Poa annua Chenopodium album Stellaria media Viola arvensis + species below
0.25	lucerne rape kale swede radish lettuce sugar beet	Poa trivialis Veronica persica Rumex obtusifolius

Comments on results

Activity experiment

The foliar spray affected dwarf bean and kale but not grasses. These effects were not lethal however. Soil treatments were generally more effective, particularly the surface pre-emergence sprays to the smaller-seeded perennial ryegrass and kale. Perennials and larger-seeded species tended to be more resistant.

Symptoms on susceptible species

Foliar sprays retarded growth of dwarf bean and kale, newer leaves showing deformities such as cupping and twisting. Dwarf bean leaves became darker green but chlorosis near leaf bases was seen in kale. Similar symptoms occurred in the soil treatments. Perennial ryegrass at higher doses pre-emergence was killed before, at or just after emergence. At lower doses leaf trapping and looping resulted. These treatments caused a swelling of the stem bases of kale, such that plants tended to be bent over at an angle, the stem bases protruding from the soil revealing inhibited root primordia. With higher doses, incorporated pre-emergence, Avena fatua and Elymus repens leaf blades were narrow, plant shoots assuming a dart-like appearance and these were weakly rooted in the soil.

Persistence in the soil

Using perennial ryegrass as the sensitive test species, a moderate period of persistence in the soil was found. Although 0.25 kg/ha was undetectable after 18 weeks, and 1.0 kg/ha after 36 weeks, the high dose of 4.0 kg/ha was still reducing shoot fresh weight by 56% after 52 weeks.

Pre-emergence selectivity

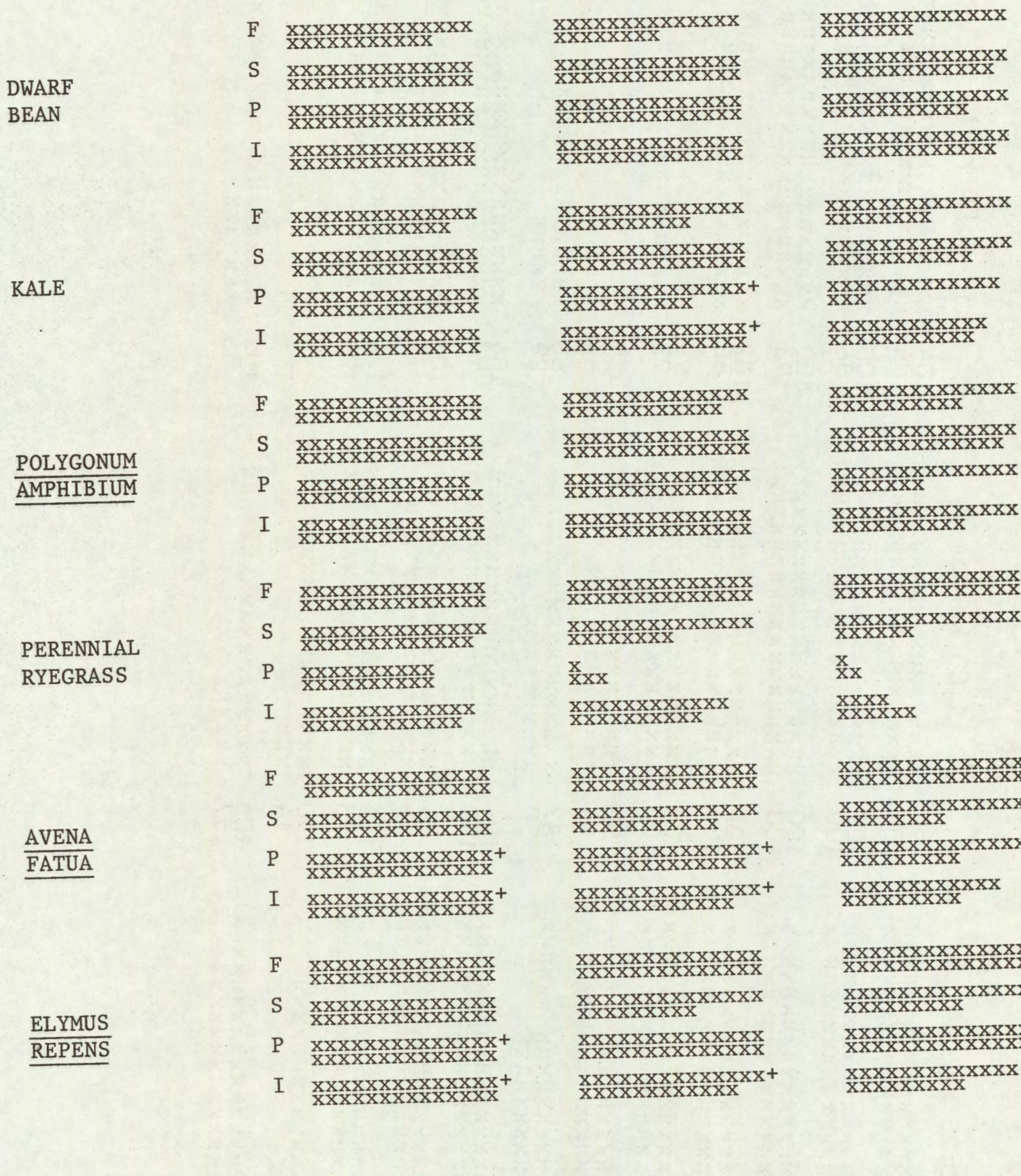
Several annual broad-leaved and grass weeds were controlled. These included, most interestingly, Veronica persica at 0.25 kg/ha, Viola arvensis at 1.0 kg/ha, Galium aparine and Alopecurus myosuroides at 4.0 kg/ha. In addition, all composite weeds were controlled at the latter dose. However, Avena fatua, Bromus sterilis and all perennial weeds were resistant.

All four cereals (wheat, barley, oat, maize) were tolerant as were carrots and large-seeded legumes, pea and dwarf bean tolerating 4.0 kg/ha while field bean was only marginally reduced in vigour at that dose. At the lowest dose, all four brassicas (rape, kale, swede, radish) were tolerant as were lettuce, sugar beet and lucerne. White clover was highly sensitive. Due to the high tolerance, safening effects with NA could not be observed with wheat, barley and maize.

Further study of potential control of weeds such as V. persica, V. arvensis, G. aparine and A. myosuroides in cereals and tolerance in carrots, legume and brassica crops is desirable. Lettuce and onion were more sensitive than expected from the manufacturer's information. Edaphic factors or varietal factors may account for these discrepancies. In the latter context, the selectivity in wheat found here is interesting.

ACTIVITY EXPERIMENT

BUTAMIFOS



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

TRIAL NUMBER 533

BUTAMIFOS

SPECIES	0.25 kg/ha	1.00 kg/ha	4.00 kg/ha
WHEAT (1)	98 100	98 100	104 86
WHEAT+S (2)	100 100	107 100	100 86
BARLEY (3)	100 100	100 100	100 93
BARLEY+S (4)	102 100	102 100	102 86
OAT (5)	100 100	100 100	94 93
PER RYGR (6)	80 79	52 64	4 21
ONION (8)	102 71	87 50	68 29
DWF BEAN (9)	104 100	104 100	104 93
FLD BEAN (10)	107 100	64 86	107 71
PEA (11)	71 100	106 93	124 86
W CLOVER (12)	80 14	140 14	20 7
LUCERNE (13)	120 86	108 57	102 36

Pre-emergence selectivity test

TRIAL NUMBER 533

BUTAMIFOS

SPECIES	0.25 kg/ha		1.00 kg/ha		4.00 kg/ha	
RAPE	102	xxxxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx
(14)	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
KALE	93	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
SWEDE	100	xxxxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxxx+	76	xxxxxxxxxxxxxxx
(17)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	21	xxxx
CARROT	162	xxxxxxxxxxxxxxxxxxx+	150	xxxxxxxxxxxxxxxxxxx+	127	xxxxxxxxxxxxxxxxxxx+
(18)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
LETTUCE	118	xxxxxxxxxxxxxxxxxxx+	87	xxxxxxxxxxxxxxxxx	0	
(20)	93	xxxxxxxxxxxxxxxxxx	29	xxxxxx	0	
SUG BEET	127	xxxxxxxxxxxxxxxxxxx+	97	xxxxxxxxxxxxxxxxxx	67	xxxxxxxxxxxxx
(22)	86	xxxxxxxxxxxxxxxxx	29	xxxxxx	21	xxxx
BETA VUL	76	xxxxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxxxx	47	xxxxxxxxx
(23)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	29	xxxxxx
BROM STE	96	xxxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxxx
(24)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
FEST RUB	37	xxxxxxx	0		37	xxxxxxx
(25)	36	xxxxxxx	0		7	x
AVE FATU	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(26)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
ALO MYOS	93	xxxxxxxxxxxxxxxxxxx	59	xxxxxxxxxxxx	20	xxxx
(27)	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx
POA ANN	62	xxxxxxxxxxxx	16	xxx	0	
(28)	50	xxxxxxxxxx	21	xxxx	0	

Pre-emergence selectivity test

TRIAL NUMBER 533

BUTAMIFOS

SPECIES	0.25 kg/ha	1.00 kg/ha	4.00 kg/ha
POA TRIV (29)	0 0	0 0	0 0
SIN ARV (30)	109 71	109 43	98 14
RAPH RAP (31)	104 100	80 79	80 43
CHRY SEG (32)	91 64	104 57	91 29
MAT PERF (33)	79 64	69 43	28 14
SEN VULG (34)	107 71	54 64	64 14
POL LAPA (35)	94 86	112 71	87 29
GAL APAR (38)	104 100	104 57	117 29
CHEN ALB (39)	83 43	33 29	25 14
STEL MED (40)	88 36	74 14	62 14
VER PERS (42)	33 14	33 14	22 14
VI ARVE (43)	197 50	248 29	83 21

Pre-emergence selectivity test

Pre-emergence selectivity test

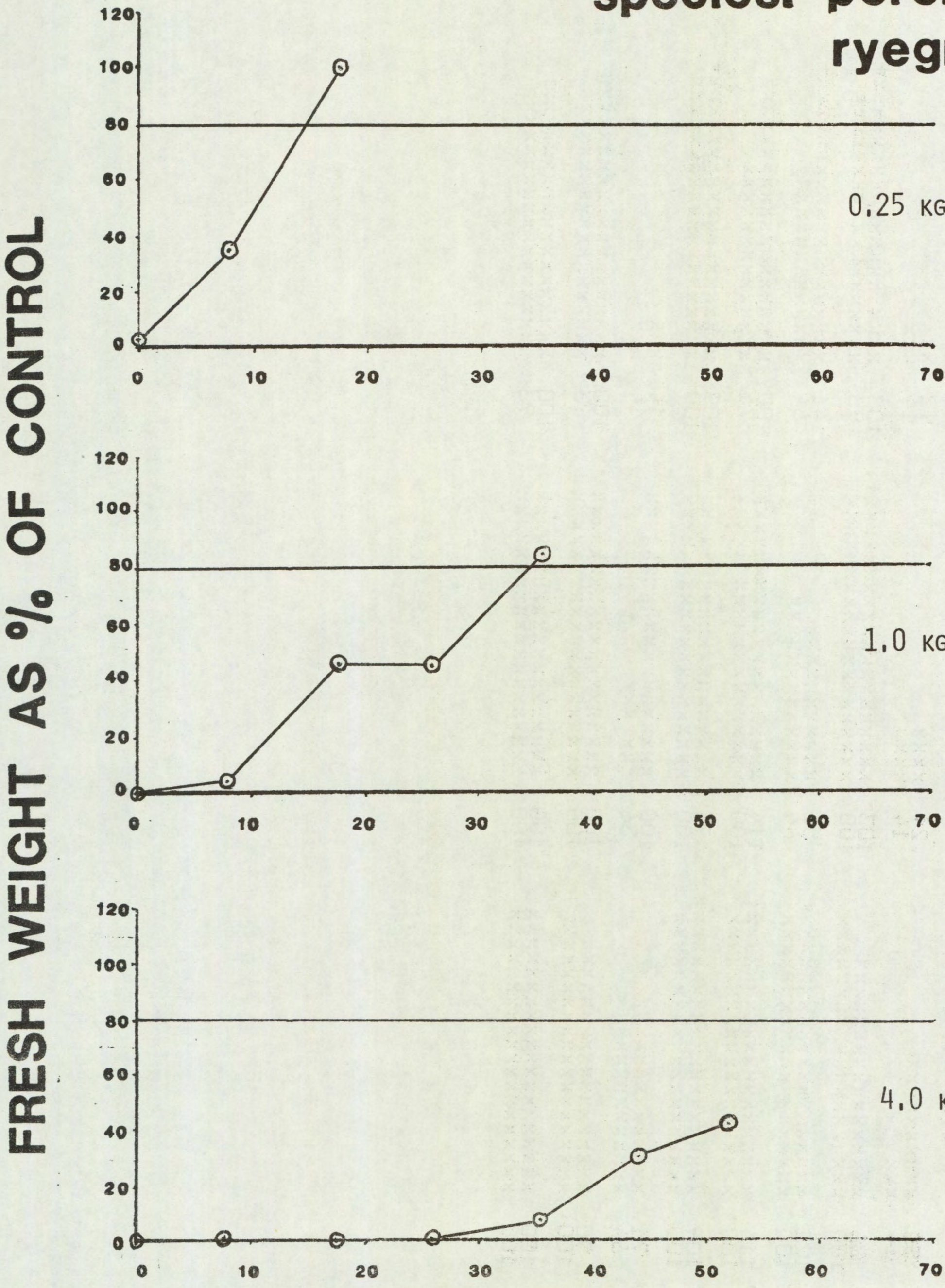
TRIAL NUMBER 533

BUTAMIFOS

SPECIES	0.25 kg/ha		1.00 kg/ha		4.00 kg/ha	
RUM OBTU	50	xxxxxxxxxx	21	xxxx	12	xx
(44)	14	xxx	14	xxx	14	xxx
EL REPEN	86	xxxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxxxx+	103	xxxxxxxxxxxxxxxxxxxx+
(47)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
ALL VIN	122	xxxxxxxxxxxxxxxxxxx+	56	xxxxxxxxxxx	141	xxxxxxxxxxxxxxxxxxx+
(49)	100	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	64	xxxxxxxxxxxx
CIRS ARV	114	xxxxxxxxxxxxxxxxxx+	114	xxxxxxxxxxxxxxxxxx+	100	xxxxxxxxxxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
TUS FARF	109	xxxxxxxxxxxxxxxxxx+	95	xxxxxxxxxxxxxxxxxx	109	xxxxxxxxxxxxxxxxxx+
(51)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
CONV ARV	71	xxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	14	xxx
(52)	64	xxxxxxxxxxxxx	36	xxxxxxx	14	xxx
MAIZE+S	90	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
(56)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
(57)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx

PERSISTENCE OF BUTAMIFOS

species: perennial ryegrass

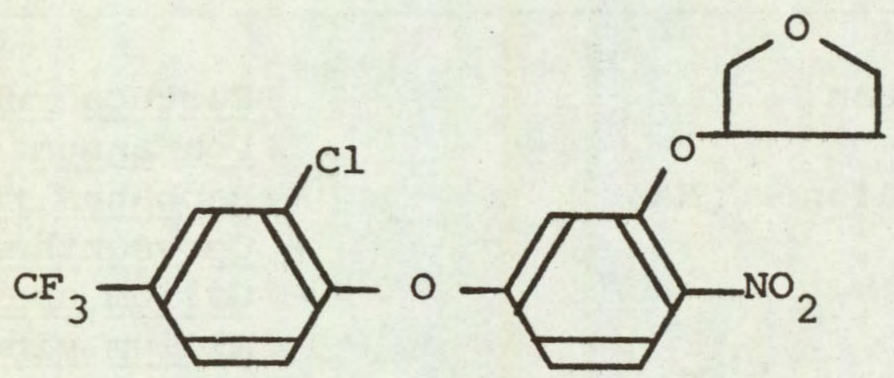


MT-124

Code number MT-124

Chemical name 3-[2-nitro-5-(2-chloro-4-trifluoromethyl phenoxy)phenoxy] tetrahydrofuran

Structure



Source Mitsui Toatsu Chemicals, Inc.
2-5 Kasumigaseki 3-chome
Chiyoda-ku
Tokyo 100
Japan

Information available and suggested uses

Control of *Echinochloa crus-galli* and other annual weeds and perennials such as *Cyperus serotinus* in rice. Peanut and soyabean are tolerant pre- and post-emergence and broad-leaved weeds such as *Chenopodium album*, *Stellaria media*, *Amaranthus retroflexus*, *Abutilon theophrasti* are controlled. Application rates vary from 0.1 to 1.0 kg a.i./ha depending on weed species and size (Yoshimoto *et al*., 1982).

Formulation used 30% a.i. emulsifiable concentrate

Spray volume 373 l/ha

RESULTS

Full results are given in the histograms on pages 28-31 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
3.00	None	None listed as no crops tolerant
1.00	dwarf bean pea maize±safener (NA)	Festuca rubra Poa annua Raphanus raphanistrum Chrysanthemum segetum Galium aparine Allium vineale Convolvulus arvensis + species below
0.33	species above + wheat±safener (NA) barley±safener (NA) oat field bean	Beta vulgaris Poa trivialis Sinapis arvensis Matricaria perforata Senecio vulgaris Polygonum lapathifolium Chenopodium album Stellaria media Veronica persica Viola arvensis Rumex obtusifolius

Comments on results

Activity test data, symptoms and post-emergence selectivity were reported previously (Richardson and West, 1984). These were generally similar to other diphenyl-ether herbicides.

Persistence in the soil

Persistence in the soil is considerable. Shoot fresh weights of perennial ryegrass were reduced by 64 and 96% at 1.0 and 3.0 kg/ha respectively, 52 weeks after treatment, although the earlier bioassay had indicated lower residual activity.

Pre-emergence selectivity

Pre-emergence control of mainly annual broad-leaved weeds and some grasses was found. Of the ten annual broad-leaved weeds controlled at the lowest dose of 0.33 kg/ha, Veronica persica and Viola arvensis are perhaps of most interest. However the control of Stellaria media is also of considerable interest as this species is usually resistant to diphenyl-ether herbicides. Other interesting features of the weed spectrum, comparable with many other diphenyl-ethers, are the control of polygonaceous weeds (Rumex obtusifolius, Polygonum lapathifolium). composites (Matricaria perforata, Senecio vulgaris, Chrysanthemum segetum), crucifers (Sinapis arvensis, Raphanus raphanistrum) and also Convolvulus arvensis and Allium vineale. Grass weed control was much less impressive, with control of only the Poa species and Festuca rubra.

Tolerance was restricted to only a few crops. These included large-seeded legumes (dwarf bean, pea, field bean) and cereals, especially maize. There were no effects due to NA with any of the three cereals tested.

The pattern of activity, selectivity and weed spectrum is similar to that found post-emergence (Richardson and West, 1984). One exception is the tolerance of leguminous crops found pre- but not post- emergence.

The potential to control V. persica and V. arvensis in temperate cereals is worth further study. As these are resistant to the substituted urea herbicides (chlorotoluron and isoproturon) currently used in cereals, mixture studies of these with MT-124 may be beneficial, the ureas thus improving the grass weed control spectrum. Such mixtures would be of interest in that they have different mechanisms of action.

TRIAL NUMBER 533

MT-124

SPECIES		0.33 kg/ha		1.00 kg/ha		3.00 kg/ha
WHEAT	78	xxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx+	98	xxxxxxxxxxxxxxxxxx
(1)	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	57	xxxxxxxxxx
WHEAT+S	107	xxxxxxxxxxxxxxxxxxx+	107	xxxxxxxxxxxxxxxxxxx+	93	xxxxxxxxxxxxxxxxxx
(2)	93	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	50	xxxxxxxxx
BARLEY	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(3)	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	64	xxxxxxxxxxxx
BARLEY+S	96	xxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxx
(4)	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	57	xxxxxxxxxx
OAT	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(5)	86	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxx
PER RYGR	84	xxxxxxxxxxxxxxxx	28	xxxxxx	0	
(6)	57	xxxxxxxxxx	43	xxxxxxxxx	0	
ONION	0		0		0	
(8)	0		0		0	
DWF BEAN	104	xxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx
FLD BEAN	129	xxxxxxxxxxxxxxxxxx+	150	xxxxxxxxxxxxxxxxxx+	107	xxxxxxxxxxxxxxxxxx+
(10)	86	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxx
PEA	88	xxxxxxxxxxxxxxxxx	53	xxxxxxxxxx	71	xxxxxxxxxxxxx
(11)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
W CLOVER	0		0		0	
(12)	0		0		0	
LUCERNE	6	x	0		0	
(13)	21	xxxx	0		0	

Pre-emergence selectivity test

TRIAL NUMBER 533

MT-124

SPECIES		0.33 kg/ha	1.00 kg/ha		3.00 kg/ha	
RAPE	59	xxxxxxxxxxxx	11	xx	0	
(14)	57	xxxxxxxxxxx	29	xxxxxx	0	
KALE	75	xxxxxxxxxxxxxxx	68	xxxxxxxxxxxxxx	11	xx
(15)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
SWEDE	29	xxxxxx	6	x	0	
(17)	57	xxxxxxxxxxx	14	xxx	0	
CARROT	12	xx	0		0	
(18)	14	xxx	0		0	
LETTUCE	0		0		0	
(20)	0		0		0	
SUG BEET	22	xxxx	0		0	
(22)	36	xxxxxxx	0		0	
BETA VUL	12	xx	6	x	0	
(23)	21	xxxx	14	xxx	0	
BROM STE	83	xxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxx	32	xxxxxx
(24)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
FEST RUB	56	xxxxxxxxxxx	19	xxxx	0	
(25)	64	xxxxxxxxxxxxx	21	xxxx	0	
AVE FATU	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxxx
(26)	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	43	xxxxxxxxx
ALO MYOS	74	xxxxxxxxxxxxxxx	49	xxxxxxxxxx	20	xxxx
(27)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
POA ANN	55	xxxxxxxxxxx	16	xxx	0	
(28)	50	xxxxxxxxxx	21	xxxx	0	

Pre-emergence selectivity test

TRIAL NUMBER 533

MT-124

SPECIES	0.33 kg/ha		1.00 kg/ha		3.00 kg/ha	
POA TRIV	19	xxxx	0		0	
(29)	14	xxx	0		0	
SIN ARV	5	x	0		0	
(30)	21	xxxx	0		0	
RAPH RAP	55	xxxxxxxxxxx	12	xx	0	
(31)	50	xxxxxxxxxx	14	xxx	0	
CHRY SEG	46	xxxxxxxxx	26	xxxxx	0	
(32)	57	xxxxxxxxxxx	29	xxxxxx	0	
MAT PERF	0		0		0	
(33)	0		0		0	
SEN VULG	0		0		0	
(34)	0		0		0	
POL LAPA	7	x	0		0	
(35)	21	xxxx	0		0	
GAL APAR	65	xxxxxxxxxxxxx	13	xxx	0	
(38)	43	xxxxxxxxx	21	xxxx	0	
CHEN ALB	0		0		0	
(39)	0		0		0	
STEL MED	0		0		0	
(40)	0		0		0	
VER PERS	0		0		0	
(42)	0		0		0	
VI ARVE	0		0		0	
(43)	0		0		0	

Pre-emergence selectivity test

TRIAL NUMBER 533

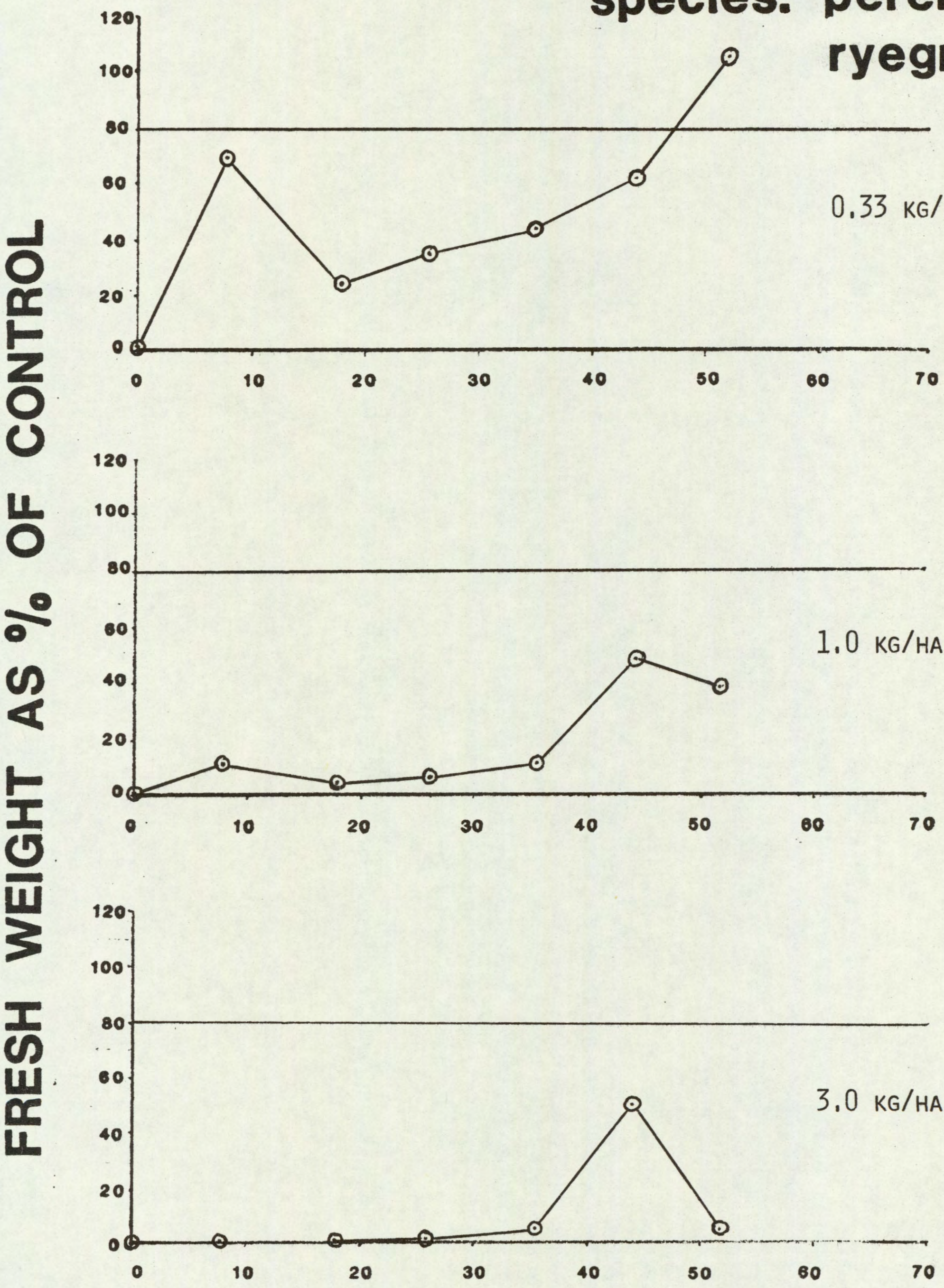
MT-124

SPECIES		0.33 kg/ha	1.00 kg/ha	3.00 kg/ha
RUM OBTU	0		0	0
(44)	0		0	0
EL REPEN	94	xxxxxxxxxxxxxxxxxx	94 xxxxxxxxxxxxxxxxxx	94 xxxxxxxxxxxxxxxxxx
(47)	93	xxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxxx
ALL VIN	84	xxxxxxxxxxxxxxxxx	19 xxxx	28 xxxxxx
(49)	57	xxxxxxxxxxx	21 xxxx	29 xxxxxx
CIRS ARV	86	xxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx
(50)	79	xxxxxxxxxxxxxxx	57 xxxxxxxxxxx	36 xxxxxxx
TUS FARF	82	xxxxxxxxxxxxxxxx	109 xxxxxxxxxxxxxxxxxxx+	109 xxxxxxxxxxxxxxxxxxx+
(51)	100	xxxxxxxxxxxxxxxxxxx	93 xxxxxxxxxxxxxxxxxx	57 xxxxxxxxxx
CONV ARV	57	xxxxxxxxxx	14 xxx	0
(52)	71	xxxxxxxxxxxxx	7 x	0
MAIZE+S	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
(56)	93	xxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxx
(57)	93	xxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx

Pre-emergence selectivity test

PERSISTENCE OF MT-124

species: perennial ryegrass

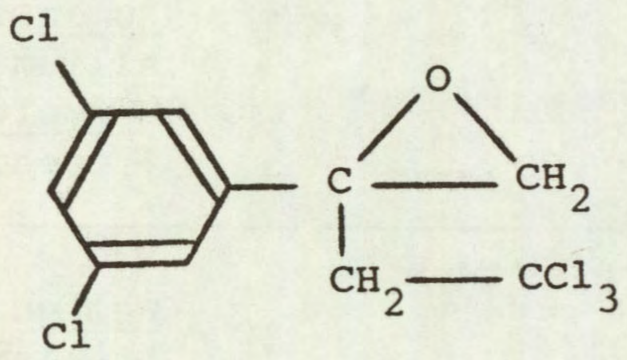


Tridiphane

Code number Dowco 356 Trade name Tandem (+ atrazine)

Chemical name: (±)-2-(3,5-dichlorophenyl)-2-(2,2,2-trichloroethyl) oxirane

Structure



Source

Dow Chemical Co Ltd
Kings Lynn
Norfolk PE30 2JD
UK

Information available and suggested uses

Selective post-emergence herbicide.
Post-crop emergence in maize (+ atrazine and oil)

Formulation used: 50% a.i. emulsifiable concentrate

Spray volume: 373 l/ha

RESULTS

Full results are given in the histograms on pages 36 to 39 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
2.00	dwarf bean	Sinapis arvensis Matricaria perforata Senecio vulgaris Chenopodium album Rumex obtusifolius Allium vineale Convolvulus arvensis + species below
0.5	species above + pea carrot radish maize±safener (NA)	Festuca rubra Stellaria media Veronica persica + species below
0.125	species above + wheat±safener (NA) barley±safener (NA) oat field bean rape kale lettuce	Alopecurus myosuroides Poa annua Poa trivialis

Comments on results

Activity test data, symptoms and post-emergence selectivities were reported previously (Richardson and West, 1984).

Persistence in the soil

Using perennial ryegrass as the test species, tridiphane was found to have a moderate to short persistence in the soil. The dose of 0.125 kg/ha, initially lethal, was not detected after seven weeks, while the doses of 0.5 and 2.0 kg/ha were not detected after 36 and 44 weeks respectively.

Pre-emergence selectivity

Although the weed spectrum consisted mainly of annual broad-leaved species, only annual grasses were controlled at the lowest dose, these being the two Poa species and more interestingly, Alopecurus myosuroides. Veronica persica was the most important of the three weeds controlled at 0.5 kg/ha. At 2.0 kg/ha a further six broad-leaved species were susceptible. Allium vineale was the only perennial weed controlled.

Tolerance was found with large-seeded legumes, dwarf bean withstanding 2.0 kg/ha while pea and field bean were reduced in vigour by only 29% at this dose. At 0.5 kg/ha, maize, carrot and radish were tolerant. Temperate cereals (wheat, barley, oat), two brassicas (rape and kale), field bean and lettuce were tolerant to 0.125 kg/ha. Perennial ryegrass, onion and white

Click here to continue