WEED RESEARCH ORGANIZATION

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THE ACTIVITY AND PRE-EMERGENCE SELECTIVITY OF SOME RECENTLY DEVELOPED HERBICIDES: K 1441, MEFLUIDIDE, WL 29226, EPRONAZ, DOWCO 290 AND TRICLOPYR

Dowco 290 is clopyralid, HOE 22870, K1441 is methyldymron, WL29226 is benzglycereth

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RICHARDSON, W.G. and PARKER, C. The activity and pre-emergence selectivity of some recently developed herbicides: K 1441, mefluidide, WL 29226, epronaz, Dowco 290 and triclopyr. Technical Report Agricultural Research Council Weed Research Organization, 1976, 41, pp 65.

THE ACTIVITY AND PRE-EMERGENCE SELECTIVITY OF SOME RECENTLY DEVELOPED HERBICIDES: K 1441, MEFLUIDIDE, WL 29226, EPRONAZ, DOWCO 290 AND TRICLOPYR

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SUMMARY

Six new herbicides were tested for pre-emergence selectivities as surface sprays on 35 temperate and 24 tropical crop and weed species. The persistence of each herbicide in the soil was also determined in conjunction with this test. Each herbicide was examined for foliar and soil activity on six selected species in a separate test.

K 1441 exhibited symptoms more typical of a carbamate rather than a urea herbicide. A wide spectrum of weeds was controlled, including perennials such as Cyperus species, as well as many annual weeds. Potential selectivities were found in large seeded leguminous crops, notably groundnut.

Mefluidide gave some potential pre-emergence control of certain annual weeds, mainly grasses in some large seeded legume crops, but dosage for control of a sufficient number of weeds is probably greater than that needed for its use as a post-emergence growth retardant.

WL 29226 controlled most small seeded annual grasses, including Alopecurus myosuroides, while temperate cereals, notably wheat, showed tolerance. Among the tropical species certain important grass weeds, notably Echinochloa crus-galli were controlled at a dose well tolerated by rice.

The spectrum of weed control of epronaz was impressive, but selectivity at the higher doses was found only with certain of the large seeded tropical legume crops. At the lowest dose, however, the smaller seeded temperate grasses, including A. myosuroides were controlled while all three cereal species were tolerant.

Dowco 290 showed a high specificity for certain families such as Polygonaceae and Compositae, including perennials as well as annuals. All leguminous crops were also highly sensitive. Crop tolerance was also confined to two families; the cereals, notably oat, and the brassicae.

Although only a small number of weeds were controlled by triclopyr at doses tolerated by a limited number of crops, such as cereals (notably wheat), the sensitivity of the Compositae, Tripleurospermum maritimum and Cirsium arvense is of interest.

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* Herbicide Group
** ODM Tropical Weeds Group

Mefluidide and epronaz persisted in the soil for only a short period. All other herbicides showed moderate periods of persistence. However, some breakdown was occurring with Dowco 290 and triclopyr, more than would have been expected for picloram, a related chemical.

INTRODUCTION

The pre- and post-emergence selectivities of new herbicides are investigated on a large number of pot-grown crop and weed species at WRO. The objectives are to discover selectivities, crop and weed susceptibilities and to obtain experience of the type of effects produced by each compound. Soil persistence is also measured and these data, in conjunction with crop susceptibilities, are useful in planning subsequent cropping of treated land. Attention is drawn to the limitations of these investigations; ie use of only one crop variety or source of weed species and growth in one particular soil type at only one depth of sowing without intraspecific competition. Consequently the results should only be used as a guide for further work, as plant responses in pot experiments can be very different to those in the field.

The present report gives pre-emergence selectivity and persistence data on six new herbicides. Results of activity experiments are included to provide information on levels of phytotoxicity, type and route of action.

METHOD AND MATERIALS

The activity experiment was carried out 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) post-emergence to the foliage only, avoiding contact with the soil,

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

(iii) pre-emergence to the soil surface,

(iv) pre-emergence with thorough incorporation before planting. Species data are summarised in Table 1 and soil and environmental conditions in Table 2.

Table 1. Plant data for activity experiments

Species	Cultivar/ source	No. per pot at spraying		Depth of planting (cm)	Post-emergence stage of growth at spraying	Stage of growth at assessment	
		pre-	post-			pre-	post-
Dwarf bean (*Phaseolus vulgaris*)	The Prince	3	1-2	1.8	2 unifoliate leaves	1-1½ trifoliate leaves	1½-2 trifoliate leaves
Kale (*Brassica oleracea acephala*)	Marrow-stem	12-15	5	0.6	1½-2 leaves	2½-4½ leaves	3½-4½ leaves

Species	Cultivar/ source	No. per pot at spraying		Depth of planting (cm)	Post-emergence stage of growth at spraying	Stage of growth at assessment	
		pre-	post-			pre-	post-
Polygonum amphibium	WRO Clone 1	6	4-6	1.2	$2\frac{1}{2}$-6 leaves	$3\frac{1}{2}$-6 leaves	$6\frac{1}{2}$-9 leaves
Perennial ryegrass (Lolium perenne)	S 23	15-20	10	0.6	$2\frac{1}{2}$-3 leaves	6 leaves, tillering	8-10 leaves, tillering
Avena fatua	Band S Supplies 1972 Farthinghoe 1972	12	4-5	1.2	$2\frac{1}{2}$-3 leaves	4-6 leaves, tillering	$5\frac{1}{2}$-10 leaves, tillering
Agropyron repens	WRO Clone 31	6	5	1.2	2-$3\frac{1}{2}$ leaves	4-6 leaves, tillering	6-7 leaves, tillering

Techniques for the selectivity experiment differed from previous practice in that all herbicides were applied to the soil surface following planting, instead of being mixed into the soil before planting. Species were sown as detailed in Appendix 1, each being replicated twice for every treatment. Herbicides were applied to the soil surface using a laboratory sprayer operating at a pressure of 2.11 bars (30 lb/in^2) and moving at constant speed, 30 cm above the soil. Subsequent watering was from overhead. Soil and environmental conditions are summarised in Table 2. During the experiment, normal daylight was supplemented with warm white fluorescent tubes to give a 14 hour photoperiod.

Table 2. Soil and environmental conditions

Experiment number, type and herbicide(s) included	ACTIVITY EXPERIMENT 1 WL 29226 Epronaz	ACTIVITY EXPERIMENT 2 K 1441 Mefluidide Dowco 290 Triclopyr	Pre-emergence Selectivity test K 1441 Epronaz Mefluidide Dowco 290 WL 29226 Triclopyr
Date of spraying	7.5.75	30.9.75	11.11.75
Main assessment completed	6.6.75	4.11.75	7.1.76

Experiment number, type and herbicide(s) included	ACTIVITY EXPERIMENT 1 WL 29226 Epronaz	2 K 1441 Mefluidide Dowco 290 Triclopyr	Pre-emergence Selectivity test K 1441 Epronaz Mefluidide Dowco 290 WL 29226 Triclopyr	
Organic matter (%)	4.2	4.2	4.2	
Clay content (%)	13	13	13	
pH	7.0	7.0	7.0	
John Innes base fertilizer (g/kg)	5.0	5.0	2.5	
DDT (5% dust) (g/kg)	0.5	0.5	0.5	
Fritted trace elements (g/kg)	0.25	0.25	-	
Magnesium sulphate (g/kg)	-	1.0	1.0	
Temperature (°C)			Temperate	Tropical
Mean	19	18	17	22
Maximum	30	25	23	28
Minimum	14	12	10	16
Relative humidity (%)				
Mean	60	55	55	55
Maximum	90	80	76	70
Minimum	26	30	34	39

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 0.1 M potassium nitrate for 48 hours in the light; seeds of Polygonum aviculare were stored moist at 2°C for six months; tubers of Cyperus esculentus were stored moist at 2°C for one month to break dormancy. To protect from soil-borne pathogens all seeds except Chenopodium album. Polygonum aviculare and the temperate cereals were pretreated with one of the following: thiram, benomyl (for onion), Harvesan organomercury (for Avena fatua) or ethylmercuric phosphate + dieldrin (for sugar beet). Temperate cereal seeds were purchased already treated with a mercurial seed dressing.

Results were processed as before (Richardson and Dean, 1973). Survivors were counted and scored on a 0-7 scale as previously, where 0 = dead and 7 = indistinguishable from control. It was not possible to computerise the data for Convolvulus arvensis owing to premature die-back. However, observations of herbicidal effects were possible with some treatments and are referred to in the text where appropriate. Solanum nigrum and Oxalis latifolia, normally included in these experiments, showed delayed and variable emergence, making results inconclusive. Dwarf bean was raised under tropical conditions to improve growth.

Pairs of histograms are presented for each treatment, the upper representing mean plant survival and the lower, mean vigour score, both based on the results expressed as percentages of untreated controls. Each 'x' represents a 5% increment but in the activity experiment histogram, each 'x' represents a 7% increment. A '+' indicates a value in excess of 100%. The percentage figures for each treatment are also inserted to the left of each histogram. '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 compound along with comments to highlight salient points.

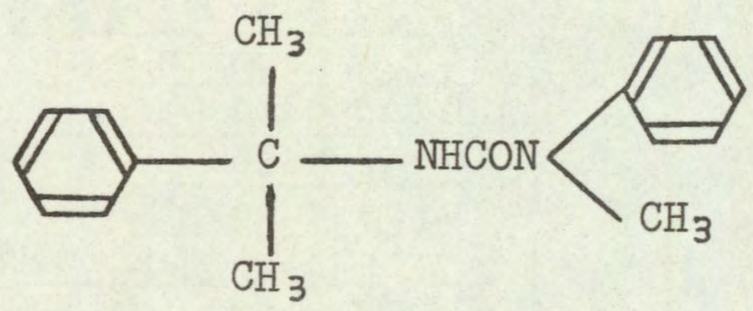
Soil persistence was monitored, in conjunction with the pre-emergence selectivity experiment, both as a surface spray and as an incorporated treatment. Two sets of tins containing soil were sprayed with the herbicides. One set was transferred to the temperate glasshouse and watered normally. Susceptible species were periodically sown shallowly, disturbing the soil as little as possible. The second set of tins were emptied immediately after spraying and the soil was thoroughly mixed to incorporate the herbicide. This soil was then stored in glass jars which were kept in the dark at 23°C until samples of soil were removed for pot bioassays in the same glasshouse as for the surface treatments. Plants were harvested 3 to 4 weeks after sowing. Periodical bioassays were carried out for up to a year unless the herbicide disappeared before then.

K 1441

Code number K 1441

Chemical name N-(α,α-dimethylbenzyl)-N'-methyl-N'-phenylurea

Structure



Source

Showa Denko K. K.
13-9 Shiba Daimon 1 Chome
Minato-Ku
Tokyo 105
JAPAN

Information available and suggested uses

Pre-emergence or incorporated for control of grasses (eg Echinochloa crus-galli and Poa annua) and Cyperaceae. Crops with a high tolerance are: beans, maize, cotton, groundnut, potato, rice, strawberry, sugar cane, sunflower, tomato and turf (lawn). Application rates are 7 to 10 kg/ha for Cyperaceae and 3 to 5 kg/ha for other weeds.

Formulation used 50% w/v a.i. wettable powder

Spray volume for activity experiment 305 l/ha
for selectivity experiment 417 l/ha

RESULTS

Full histogram results are given on pages 10-15 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
8.0	groundnut	Avena fatua Polygonum lapathifolium Stellaria media Allium vineale Tussilago farfara + species below

(Table continued overleaf)

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
2.0	species above + dwarf bean pigeon pea sesamum tomato	Sinapis arvensis Tripleurospermum maritimum Polygonum aviculare Galium aparine Chenopodium album Agropyron repens Oryza punctata Rottboellia exaltata Cyperus esculentus Cyperus rotundus + species below
0.5	species above + wheat oat field bean carrot lettuce sugar beet maize sorghum rice cowpea soyabean cotton kenaf pea	Alopecurus myosuroides Poa annua Poa trivialis Senecio vulgaris Veronica persica Rumex obtusifolius Holcus lanatus Cirsium arvense Eleusine indica Echinochloa crus-galli Digitaria sanguinalis Snowdenia polystachya

Comments on results

Activity experiments (see page 10)

The foliar spray caused minor, non-lethal symptoms on kale and Polygonum. Soil drenches showed greater activity than the foliar spray on five of the species, but dwarf bean was completely tolerant. Pre-emergence treatments generally caused greater phytotoxicity, on the grasses and Polygonum. Dwarf bean again showed considerable resistance. The surface pre-emergence application was markedly more effective than pre-planting incorporation for perennial ryegrass and Polygonum but the other species showed little difference between these two types of applications.

Symptoms

The foliar spray caused marginal leaf necrosis on kale. Newly developing leaves were abnormal, their blades being rather narrow and crinkled, effects which were also observed on the trifoliate leaves of dwarf bean, although unifoliate leaves were unaffected.

Soil drenches resulted in similar symptoms to the foliar spray on kale. Polygonum and the grasses showed a severe retardation of growth, chlorosis and later, necrosis of the leaves. Some stimulation of tillers was noted with Avena and Agropyron, which were also inhibited at the higher doses, but led to some recovery of plants at lower doses.

In the pre-emergence treatments grasses were severely inhibited, leaves varying in colour from dark to pale green (chlorotic). The higher doses resulted in die-back soon after emergence, while some species failed to emerge. The main bud of broad-leaved species was usually severely inhibited at high doses, but at lower doses where leaves did develop, they were often deformed and dark green in colour.

Apart from chlorosis, symptoms were not at all characteristic of herbicides of the urea group. In particular, K 1441 caused a powerful inhibition of shoots and buds, unlike ureas. In fact the symptoms described are more typical of an amide or carbamate than a urea.

Soil persistence

Perennial ryegrass was used as the test species to monitor persistence. Surface or incorporated treatments were undectable 19 weeks after treatment at 0.5 kg/ha and 35 weeks after treatment at 2.0 kg/ha. At this time both types of application at 8.0 kg/ha were still causing approximately 80% shoot fresh weight reductions.

Pre-emergence selectivity among temperate species

A broad weed control spectrum was found. The small seeded grasses A. myosuroides, H. lanatus and the Poa species were all controlled at 0.5 kg/ha. A. repens and A. fatua required higher doses for control however, ie 2.0 and 8.0 kg/ha respectively. Several important annual broad-leaved weeds were susceptible at the lower doses including Galium aparine and Polygonum aviculare but Stellaria media required 8.0 kg/ha for adequate control. The weed spectrum was not restricted to annual species however, Cirsium arvense being controlled at 0.5 kg/ha and Tussilago farfara and Allium vineale at 8.0 kg/ha.

Dwarf bean was the most tolerant crop, 2.0 kg/ha in this test and the activity experiment being without effect while at 8.0 kg/ha there were only 20 to 30% reductions in vigour. Several crops tolerated 0.5 kg/ha including the cereals, wheat and oat, in addition to field bean, carrot, lettuce, pea and sugar beet. Perennial ryegrass was very sensitive.

Selective weed control may be expected in dwarf bean, including some important problem species in this crop such as P. aviculare and G. aparine. The control of certain grass weeds, notably A. myosuroides in wheat is noteworthy and justifies comparison with other urea herbicides used for this purpose, such as chlortoluron and isoproturon. Indeed the weed spectrum of all three is apparently very similar but K 1441 would appear to be more effective on G. aparine than is isoproturon, although the higher resistance of S. media is unfortunate. A possible advantage over isoproturon and chlortoluron could be that the weeds are killed at an earlier growth stage by K 1441 because of its carbamate type activity, thus preventing any suppression of the crop due to competition. The two contrasting types of activity suggests that mixtures of these herbicides may be worth further investigation. The control of Veronica persica (as well as other weeds) in sugar beet is also noteworthy, thus giving a clear advantage over lenacil and this could also give K 1441 more potential than lenacil in strawberries if these prove to be tolerant, as the manufacturers claim.

Pre-emergence selectivity among tropical species

Control of several annual grasses was excellent at the lowest dose of 0.5 kg/ha and Rottboellia and both Cyperus spp. were additionally controlled at 2 kg/ha. Amaranthus was not controlled. The tolerance of groundnut was outstanding and selectivity against a wide range of grass and sedge weeds should be possible in that crop. Selectivity against annual grasses should be good in many other crops of which sorghum, rice, sesamum, cowpea, kenaf, pigeon pea and cotton are perhaps of greatest interest. Selectivity against Cyperus spp. is also indicated in several of these crops. The fact that this herbicide can perform well as a surface-applied pre-emergence treatment is encouraging but it is possible that under field conditions, control of perennial Cyperus spp. growing from deeper tubers would not be so satisfactory. Further work is, therefore, needed to compare different types of application for Cyperus control.

ACTIVITY EXPERIMENT

K 1441

		0.5 kg/ha	2.0 kg/ha	8.0 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx
KALE	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxx xxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxx xxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxx	xxxxxxxxxxxxxx xxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxx +	xxxxxxxxxxxxx xxxxxxxxxx +	xx xxx
	I	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxx xxxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxx xxxxxx
	P	xxxxxxxxx xxxxxxx	o o	o o
	I	xxxxxxxxxxxxxx + xxxxxxxxx	xxxxxxxxx xxxx	o o
AVENA FATUA	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxx
	P	xxxxxxxxxx xxxxxxxxxx	xxxxxxxxx xxxxxxxx	xxxxxxxxx xxxx
	I	xxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxx + xxxxxxxxx	xxxxxxxxxx xxxx
AGROPYRON REPENS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxx xxxxxx
	P	xxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxx xxxxxx	xx xxxx
	I	xxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxx xxxxxxxxx	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 EXPERIMENT

K 1441

SPECIES		0.5 kg/ha		2.0 kg/ha		8.0 kg/ha
WHEAT	85	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx +	59	xxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	29	xxxxxx
BARLEY	104	xxxxxxxxxxxxxxxxxxx +	98	xxxxxxxxxxxxxxxxxxx	46	xxxxxxxxx
(2)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	21	xxxx
OAT	91	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx +	52	xxxxxxxxxx
(3)	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	36	xxxxxxx
PER RYGR	7	x	0		0	
(4)	21	xxxx	0		0	
ONION	77	xxxxxxxxxxxxxx	26	xxxxx	21	xxxx
(8)	64	xxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
DWF BEAN	106	xxxxxxxxxxxxxxxxxxx +	106	xxxxxxxxxxxxxxxxxxx +	106	xxxxxxxxxxxxxxxxxxx +
(9)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
FLD BEAN	111	xxxxxxxxxxxxxxxxxxx +	111	xxxxxxxxxxxxxxxxxxx +	16	xxx
(10)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	7	x
PEA	78	xxxxxxxxxxxxxxxx	65	xxxxxxxxxxxxx	0	
(11)	86	xxxxxxxxxxxxxxxxx	36	xxxxxxx	0	
W CLOVER	69	xxxxxxxxxxxxxx	55	xxxxxxxxxxx	34	xxxxxxx
(12)	43	xxxxxxxxx	29	xxxxxx	14	xxx
RAPE	96	xxxxxxxxxxxxxxxxxx	68	xxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxxx
(14)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
KALE	97	xxxxxxxxxxxxxxxxxx	101	xxxxxxxxxxxxxxxxxxx	76	xxxxxxxxxxxxxx
(15)	79	xxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx

K 1441

SPECIES	0.5 kg/ha		2.0 kg/ha		8.0 kg/ha	
CARROT	98	xxxxxxxxxxxxxxxxxxx	49	xxxxxxxxxx	20	xxxx
(18)	86	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
LETTUCE	100	xxxxxxxxxxxxxxxxxxx	105	xxxxxxxxxxxxxxxxxxx +	77	xxxxxxxxxxxxxx
(20)	86	xxxxxxxxxxxxxxxx	29	xxxxxx	29	xxxxxx
SUG BEET	86	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxx
(21)	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
AVE FATU	91	xxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx	45	xxxxxxxxx
(26)	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	21	xxxx
ALO MYOS	21	xxxx	0		0	
(27)	29	xxxxxx	0		0	
POA ANN	4	x	0		0	
(28)	14	xxx	0		0	
POA TRIV	0		0		0	
(29)	0		0		0	
SIN ARV	101	xxxxxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxxx	12	xx
(30)	57	xxxxxxxxxxx	29	xxxxxx	14	xxx
RAPH RAP	122	xxxxxxxxxxxxxxxxxxx +	117	xxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxx
(31)	79	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	43	xxxxxxxxx
TRIP MAR	71	xxxxxxxxxxxxxx	120	xxxxxxxxxxxxxxxxxxx +	126	xxxxxxxxxxxxxxxxxxx +
(33)	57	xxxxxxxxxxx	29	xxxxxx	29	xxxxxx
SEN VULG	75	xxxxxxxxxxxxxxx	30	xxxxxx	0	
(34)	29	xxxxxx	14	xxx	0	

PRE-EMERGENCE SELECTIVITY EXPERIMENT

K 1441

SPECIES	0.5 kg/ha		2.0 kg/ha		8.0 kg/ha	
POL LAPA	120	xxxxxxxxxxxxxxxxxxx +	93	xxxxxxxxxxxxxxxxxx	110	xxxxxxxxxxxxxxxxxxx +
(35)	100	xxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
POL AVIC	98	xxxxxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxxx	55	xxxxxxxxxxx
(36)	79	xxxxxxxxxxxxxxxx	29	xxxxxx	21	xxxx
GAL APAR	93	xxxxxxxxxxxxxxxxxx	28	xxxxxx	3	x
(38)	100	xxxxxxxxxxxxxxxxxxx	36	xxxxxxx	7	x
CHEN ALB	81	xxxxxxxxxxxxxxxx	65	xxxxxxxxxxxxx	35	xxxxxxx
(39)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
STEL MED	150	xxxxxxxxxxxxxxxxxxx +	105	xxxxxxxxxxxxxxxxxxx +	100	xxxxxxxxxxxxxxxxxxx
(40)	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx
VER PERS	100	xxxxxxxxxxxxxxxxxxx	23	xxxxx	0	
(42)	29	xxxxxx	14	xxx	0	
RUM OBTU	84	xxxxxxxxxxxxxxxx	19	xxxx	14	xxx
(44)	29	xxxxxx	7	x	7	x
HOLC LAN	0		0		0	
(45)	0		0		0	
AG REPEN	116	xxxxxxxxxxxxxxxxxxx +	10	xx	0	
(47)	100	xxxxxxxxxxxxxxxxxxx	14	xxx	0	
ALL VIN	97	xxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx	56	xxxxxxxxxxx
(49)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	29	xxxxxx
CIRS ARV	18	xxxx	0		0	
(50)	14	xxx	0		0	

PRE-EMERGENCE SELECTIVITY EXPERIMENT

K 1441

SPECIES		0.5 kg/ha		2.0 kh/ha		8.0 kg/ha
TUS FARF	100	xxxxxxxxxxxxxxxxxxx	114	xxxxxxxxxxxxxxxxxxx +	43	xxxxxxxxx
(51)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	21	xxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
(58)	86	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
SORGHUM	98	xxxxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx +	33	xxxxxxx
(59)	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	21	xxxx
RICE	106	xxxxxxxxxxxxxxxxxxx +	71	xxxxxxxxxxxxxx	0	
(60)	86	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	0	
PIGEON P	66	xxxxxxxxxxxxx	117	xxxxxxxxxxxxxxxxxxx +	7	x
(61)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	29	xxxxxx
COWPEA	50	xxxxxxxxxx	133	xxxxxxxxxxxxxxxxxxx +	67	xxxxxxxxxxxx
(62)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	71	xxxxxxxxxxxxx
CHICKPEA	97	xxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxx	10	xx
(63)	71	xxxxxxxxxxxxx	64	xxxxxxxxxxxx	29	xxxxxx
GRNDNUT	37	xxxxxxx	94	xxxxxxxxxxxxxxxxxx.	112	xxxxxxxxxxxxxxxxxxx +
(64)	57	xxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
SOYABEAN	123	xxxxxxxxxxxxxxxxxxx +	136	xxxxxxxxxxxxxxxxxx +	95	xxxxxxxxxxxxxxxxx
(65)	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	36	xxxxxxx
COTTON	94	xxxxxxxxxxxxxxxxx	84	xxxxxxxxxxxxxxxx	84	xxxxxxxxxxxxxxxx
(66)	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	43	xxxxxxxxx
JUTE	94	xxxxxxxxxxxxxxxxx	35	xxxxxxx	0	
(67)	36	xxxxxxx	21	xxxx	0	

K 1441

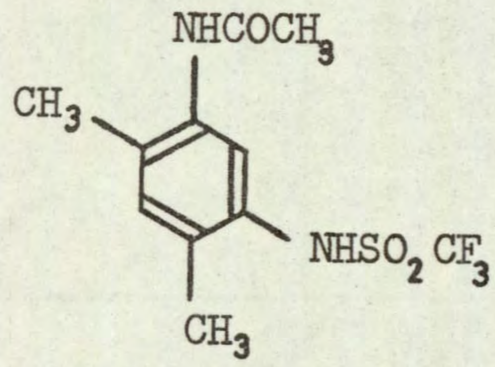
SPECIES	0.5 kg/ha		2.0 kg/ha		8.0 kg/ha	
KENAF	106	xxxxxxxxxxxxxxxxxxx +	103	xxxxxxxxxxxxxxxxxxx +	48	xxxxxxxxxx
(68)	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	14	xxx
SESAMUM	122	xxxxxxxxxxxxxxxxxxx +	122	xxxxxxxxxxxxxxxxxxx +	81	xxxxxxxxxxxxxxx
(70)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	36	xxxxxxx
TOMATO	105	xxxxxxxxxxxxxxxxxxx +	98	xxxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx
(71)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
OR PUNCT	69	xxxxxxxxxxxxxx	4	x	0	
(73)	57	xxxxxxxxxxx	14	xxx	0	
ELEU IND	0		0		0	
(74)	0		0		0	
ECH CRUS	0		0		0	
(75)	0		0		0	
ROTT EXA	98	xxxxxxxxxxxxxxxxxxx	22	xxxx	0	
(76)	57	xxxxxxxxxxx	36	xxxxxxx	0	
DIG SANG	35	xxxxxxx	6	x	0	
(77)	29	xxxxxx	7	x	0	
AMAR RET	103	xxxxxxxxxxxxxxxxxxx +	124	xxxxxxxxxxxxxxxxxxx +	56	xxxxxxxxxxx
(78)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
SNOW POL	10	xx	0		0	
(83)	14	xxx	0		0	
CYP ESCU	90	xxxxxxxxxxxxxxxxxx	0		0	
(85)	57	xxxxxxxxxxx	0		0	
CYP ROTU	75	xxxxxxxxxxxxxx	22	xxxx	0	
(86)	86	xxxxxxxxxxxxxxxx	29	xxxxxx	0	

MEFLUIDIDE

Code number MBR 12325 Trade name Embark

Chemical name N-2,4-dimethyl-5-trifluoromethyl sulphonyl amino phenyl acetamide

Structure



Source

3 M Company
3 M House
Wigmore Street
London, W1A 1ET

Information available and suggested uses

A plant growth regulator for retardation of growth of grasses, seedhead suppression, ripening sugar cane for enhancing sucrose levels and suppression of growth of trees and woody ornamentals. Also as a post-emergence herbicide in soyabean. Other tolerant crops are cotton, flax, grapes, potatoes, safflower, sugar beet, water melon. Controls Sorghum spp., Setaria spp., Digitaria spp., Sesbania exaltata and Oryza sativa. Gives yield increases in wheat and barley. Application rates; 0.3 to 1.1 kg/ha in at least 140 l/ha of water on turf and 0.15 to 0.6 kg/ha in at least 185 l/ha of water on soyabean.

Formulation used 48% w/v a.i. emulsifiable concentrate

Spray volume for activity experiment 305 l/ha
for selectivity experiment 417 l/ha

RESULTS

Full results are given in the histograms on pages 19-24 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	dwarf bean field bean cowpea	Alopecurus myosuroides Poa annua Senecio vulgaris Stellaria media Holcus lanatus Agropyron repens Oryza punctata Eleusine indica Echinochloa crus-galli Amaranthus retroflexus + species below

(Table continued overleaf)

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
0.25	species above + wheat barley oat carrot pigeon pea groundnut soyabean	Poa trivialis Veronica persica

Comments on results

Activity experiment (see page 19)

The foliar spray caused severe growth inhibition of all species, grasses being slightly more susceptible than broad-leaved species. Plants kept for longer term assessments showed that broad-leaved species tended to be more capable of recovery than the grasses. Generally the degree of activity found in post-emergence soil drenches was similar to that found with the foliar spray, grasses again being more susceptible than broad-leaved species. Pre-emergence treatments were also very effective, particularly on perennial ryegrass and Agropyron. The surface application was generally more effective than the incorporated on perennial ryegrass, kale and Agropyron, but the converse was true on Polygonum.

Symptoms

A powerful inhibition or even cessation of growth was noted on all species from all four methods of application. However, the grasses were more susceptible than broad-leaved species, many of the latter recovering by producing lateral buds. A darker green colour of leaves usually accompanied growth inhibition but chlorosis was seen in some plants. Plants remained in a state of retardation for several weeks before either turning necrotic and dying, or resuming growth. The foliar spray caused minor scorch spots on foliage of broad-leaved species. Trapping of newly developing leaves was seen on most species from all four application methods causing subsequent deformities; where leaves did develop they were often shiny in appearance due to removal of wax from their surfaces. Smaller seeded and perennial grasses failed to emerge with high doses of the pre-emergence treatments.

Soil persistence

Using perennial ryegrass as test species, doses of 0.25 and 1.0 kg/ha either from surface or incorporated treatments, were undetectable 10 to 15 weeks after spraying. With 4.0 kg/ha both types of treatment were still detectable after 19 weeks. After 35 weeks the surface treatment of 4.0 kg/ha had disappeared while the incorporated treatment was causing only a 25% reduction in fresh weight of shoots.

Pre-emergence selectivity among temperate species

All grass weeds, with the exception of Avena fatua, were controlled by 1.0 kg/ha or lower. Agropyron repens, failed to emerge from treatment at 1.0 kg/ha even when remaining rhizome fragments were replanted in untreated soil. Veronica persica at 0.25 kg/ha and Senecio vulgaris and Stellaria media at 1.0 kg/ha, were the only broad-leaved weeds to be controlled below 4 kg/ha.

Crop tolerance was limited to dwarf bean and field bean at 1.0 kg/ha and the three cereals and carrot at 0.25 kg/ha. Although dwarf bean tolerated 1.0 kg/ha in the selectivity test the same dose in the activity experiment caused a 30% reduction in vigour. This suggests that the tolerance level is marginal and can possibly be influenced by different environmental conditions, as the plants in the selectivity test were raised under a higher temperature regime (sub-tropical) as opposed to the cooler temperature conditions of the activity experiment.

Although all grass weeds except A. fatua were selectively controlled in beans (dwarf and field) no obvious advantages over other herbicides currently used in these crops are apparent. Furthermore, higher doses are necessary for pre-emergence control than is recommended for the post-emergence growth retardant effect, making development in the former context unlikely economically.

Pre-emergence selectivity among tropical species

A number of annual grasses and Amaranthus were just controlled by 1 kg/ha but no crops were fully tolerant at this dose, and it seems unlikely that any useful selectivity could be expected from pre-emergence applications of this compound in annual crops. Cyperus rotundus was suppressed at 4 kg/ha and it is just possible that further testing might be worthwhile in sugar cane and other perennial crops.

ACTIVITY EXPERIMENT

MEFLUIDIDE

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

Mefluidide

SPECIES		0.25 kg/ha		1.0 kg/ha		4.0 kg/ha
WHEAT	91	xxxxxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxxx	26	xxxxx
(1)	100	xxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	14	xxx
BARLEY	98	xxxxxxxxxxxxxxxxxxx	65	xxxxxxxxxxxx	7	x
(2)	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxx	7	x
OAT	104	xxxxxxxxxxxxxxxxxxx +	85	xxxxxxxxxxxxxxxx	7	x
(3)	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	7	x
PER RYGR	15	xxx	4	x	0	
(4)	14	xxx	14	xxx	0	
ONION	56	xxxxxxxxxx	0		0	
(8)	71	xxxxxxxxxxxxx	0		0	
DWF BEAN	106	xxxxxxxxxxxxxxxxxxx +	106	xxxxxxxxxxxxxxxxxxx +	106	xxxxxxxxxxxxxxxxxxx +
(9)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
FLD BEAN	79	xxxxxxxxxxxxxxxx	63	xxxxxxxxxxxx	126	xxxxxxxxxxxxxxxxxxx +
(10)	79	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
PEA	104	xxxxxxxxxxxxxxxxxxx +	104	xxxxxxxxxxxxxxxxxxx +	52	xxxxxxxxxx
(11)	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
W CLOVER	14	xxx	3	x	3	x
(12)	43	xxxxxxxxx	7	x	7	x
RAPE	125	xxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxx +	17	xxx
(14)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
KALE	89	xxxxxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxxx	0	
(15)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	0	

PRE-EMERGENCE SELECTIVITY EXPERIMENT

Mefluidide

SPECIES		0.25 kg/ha		1.0 kg/ha		4.0 kg/ha
CARROT	98	xxxxxxxxxxxxxxxxxxxx	54	xxxxxxxxxxx	10	xx
(18)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	21	xxxx
LETTUCE	100	xxxxxxxxxxxxxxxxxxx	14	xxx	0	
(20)	64	xxxxxxxxxxxxx	7	x	0	
SUG BEET	99	xxxxxxxxxxxxxxxxxxx	70	xxxxxxxxxxxxx	21	xxxx
(21)	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
AVE FATU	105	xxxxxxxxxxxxxxxxxxx +	98	xxxxxxxxxxxxxxxxxxx	59	xxxxxxxxxxxx
(26)	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	21	xxxx
ALO MYOS	59	xxxxxxxxxxxx	17	xxx	0	
(27)	57	xxxxxxxxxxx	36	xxxxxxx	0	
POA ANN	62	xxxxxxxxxxxx	2	x	0	
(28)	50	xxxxxxxxxx	14	xxx	0	
POA TRIV	33	xxxxxxx	0		0	
(29)	29	xxxxxx	0		0	
SIN ARV	101	xxxxxxxxxxxxxxxxxxx +	109	xxxxxxxxxxxxxxxxxxx +	8	xx
(30)	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
RAPH RAP	112	xxxxxxxxxxxxxxxxxxx +	86	xxxxxxxxxxxxxxxx	20	xxxx
(31)	64	xxxxxxxxxxxxx	36	xxxxxxx	21	xxxx
TRIP MAR	111	xxxxxxxxxxxxxxxxxxx +	114	xxxxxxxxxxxxxxxxxxx +	23	xxxxx
(33)	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
SEN VULG	90	xxxxxxxxxxxxxxxxx	15	xxx	0	
(34)	50	xxxxxxxxxx	36	xxxxxxx	0	

PRE-EMERGENCE SELECTIVITY EXPERIMENT

Mefluidide

SPECIES		0.25 kg/ha		1.0 kg/ha		4.0 kg/ha
POL LAPA	123	xxxxxxxxxxxxxxxxxxxx +	70	xxxxxxxxxxxxxx	3	x
(35)	100	xxxxxxxxxxxxxxxxxxxx	43	xxxxxxxxxx	7	x
POL AVIC	122	xxxxxxxxxxxxxxxxxxxx +	73	xxxxxxxxxxxxxxx	24	xxxxx
(36)	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
GAL APAR	91	xxxxxxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxxx	43	xxxxxxxxx
CHEN ALB	115	xxxxxxxxxxxxxxxxxxxx +	62	xxxxxxxxxxxx	23	xxxxx
(39)	57	xxxxxxxxxxx	57	xxxxxxxxxxx	14	xxx
STEL MED	80	xxxxxxxxxxxxxxxx	10	xx	0	
(40)	50	xxxxxxxxxx	14	xxx	0	
VER PERS	31	xxxxxx	0		0	
(42)	14	xxx	0		0	
RUM OBTU	75	xxxxxxxxxxxxxxx	61	xxxxxxxxxxxx	5	x
(44)	64	xxxxxxxxxxxxx	43	xxxxxxxxxx	14	xxx
HOLC LAN	44	xxxxxxxxx	9	xx	0	
(45)	43	xxxxxxxxx	21	xxxx	0	
AG REPEN	58	xxxxxxxxxxxx	0		0	
(47)	50	xxxxxxxxxx	0		0	
ALL VIN	105	xxxxxxxxxxxxxxxxxxxx +	75	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxxx
(49)	93	xxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
CIRS ARV	71	xxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	0	
(50)	43	xxxxxxxxx	57	xxxxxxxxxxx	0	

PRE-EMERGENCE SELECTIVITY EXPERIMENT

Mefluidide

SPECIES		0.25 kg/ha		1.0 kg/ha		4.0 kg/ha
TUS FARF	71	xxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
(51)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	60	xxxxxxxxxxx
(58)	79	xxxxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
SORGHUM	87	xxxxxxxxxxxxxxxx	60	xxxxxxxxxxx	16	xxx
(59)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	7	x
RICE	88	xxxxxxxxxxxxxxxx	18	xxxx	0	
(60)	71	xxxxxxxxxxxxxx	29	xxxxxx	0	
PIGEON P	110	xxxxxxxxxxxxxxxxxx +	66	xxxxxxxxxxxx	15	xxx
(61)	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	21	xxxx
COWPEA	83	xxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxx	17	xxx
(62)	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	29	xxxxxx
CHICKPEA	77	xxxxxxxxxxxxxx	19	xxxx	0	
(63)	64	xxxxxxxxxxxxx	29	xxxxxx	0	
GRNDNUT	112	xxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxx +	19	xxxx
(64)	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	21	xxxx
SOYABEAN	82	xxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxx	68	xxxxxxxxxxxxx
(65)	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	36	xxxxxxx
COTTON	75	xxxxxxxxxxxxxx	75	xxxxxxxxxxxxx	28	xxxxxx
(66)	71	xxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	43	xxxxxxxxx
JUTE	6	x	0		0	
(67)	14	xxx	0		0	

PRE-EMERGENCE SELECTIVITY EXPERIMENT

Mefluidide

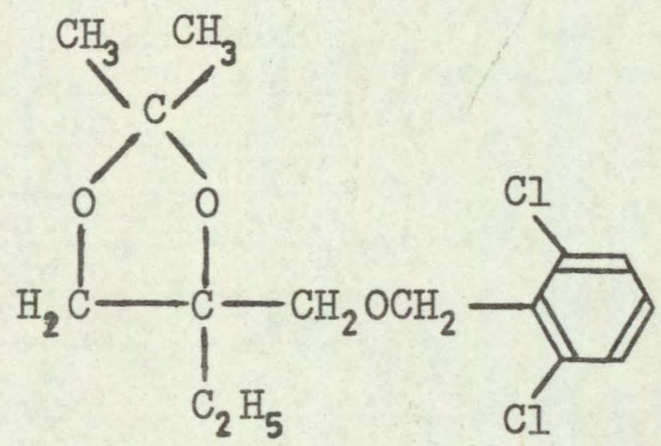
SPECIES	0.25 kg/ha		1.0 kg/ha		4.0 kg/ha	
KENAF	94	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	18	xxxx
(68)	64	xxxxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx
SESAMUM	65	xxxxxxxxxxxxx	24	xxxxx	0	
(70)	64	xxxxxxxxxxxxx	29	xxxxxx	0	
TOMATO	112	xxxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxxx +	28	xxxxxx
(71)	79	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	21	xxxx
OR PUNCT	77	xxxxxxxxxxxxxxx	28	xxxxxx	0	
(73)	64	xxxxxxxxxxxxx	36	xxxxxxx	0	
ELEU IND	50	xxxxxxxxxx	18	xxxx	0	
(74)	57	xxxxxxxxxxx	43	xxxxxxxxx	0	
ECH CRUS	99	xxxxxxxxxxxxxxxxxxxx	22	xxxx	7	x
(75)	79	xxxxxxxxxxxxxxxx	36	xxxxxxx	14	xxx
ROTT EXA	101	xxxxxxxxxxxxxxxxxxxx +	47	xxxxxxxxx	6	x
(76)	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx
DIG SANG	89	xxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxx	19	xxxx
(77)	79	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	29	xxxxxx
AMAR RET	90	xxxxxxxxxxxxxxxxxx	9	xx	0	
(78)	50	xxxxxxxxxx	50	xxxxxxxxxx	0	
SNOW POL	69	xxxxxxxxxxxxxx	39	xxxxxxxx	0	
(83)	64	xxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	0	
CYP ESCU	105	xxxxxxxxxxxxxxxxxxxx +	135	xxxxxxxxxxxxxxxxxxxx +	60	xxxxxxxxxxx
(85)	100	xxxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	50	xxxxxxxxxx
CYP ROTU	112	xxxxxxxxxxxxxxxxxxxx +	165	xxxxxxxxxxxxxxxxxxxx +	15	xxx
(86)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	21	xxxx

WL 29226

Code number — WL 29226

Chemical name — (2',6'-dichlorobenzyl)2,2-dimethyl-4-ethyl-dioxolan-4-yl methylether

Structure



Source

Shell Research Limited
Woodstock Laboratory
Sittingbourne Research Centre
Sittingbourne
Kent, ME 9 8AG

Information available and suggested uses

Kirby and Turner, 1974, reported excellent pre-emergence control of *Alopecurus myosuroides*, other annual grass weeds (*Poa*, *Lolium*, *Phalaris* spp.) and a very high level of control of a range of annual broad-leaved weeds (including *Stellaria*, *Veronica*, *Matricaria* and *Papaver* spp.) in winter wheat at a dose of 1 kg a.i./ha.

Formulation used — 40% w/v a.i. emulsifiable concentrate

Spray volume — for activity experiment 305 l/ha
for selectivity experiment 417 l/ha

RESULTS

Full results are given in the histograms on pages 28-33 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
4.0	none	none listed as no crops tolerant
1.0	wheat field bean radish pigeon pea cowpea chickpea groundnut soyabean cotton tomato	*Chenopodium album* *Veronica persica* *Oryza punctata* + species below

(Table continued overleaf)

RATE (kg a.i./ha)	CROPS: vigour reduced by less than 15%	WEEDS: number or vigour reduced by 70% or more
0.25	species above+ barley oat dwarf bean rape kale carrot rice kenaf sesamum	Alopecurus myosuroides Poa annua Poa trivialis Rumex obtusifolius Holcus lanatus Eleusine indica Echinochloa crus-galli Digitaria sanguinalis Snowdenia polystachya

Comments on results

Activity experiment (see page 28)

In general pre-emergence activity was rather greater than post-emergence. The foliar spray caused only minor non-lethal effects mainly on the broad-leaved species. Soil-drenches were somewhat more damaging on the grasses but had only mild effects on the broad-leaved species. Pre-emergence treatments were more effective on all species with the possible exception of kale. Pre-planting incorporation was distinctly less effective than surface pre-emergence treatment on the very sensitive perennial ryegrass, and on kale, but the converse was true for dwarf bean and the perennials.

Symptoms

Minor scorch symptoms were caused by the foliar spray, while some species also showed retardation of growth. A darker green colour of foliage was often seen together with retardation of growth, in the soil drench treatments. Similar symptoms were found in the pre-emergence treatments, but some chlorosis was seen with Agropyron. Perennial ryegrass and other small seeded grasses often failed to emerge either from the soil or from the coleoptile at the higher doses, while leaves were often trapped at lower doses. Kale exhibited growth deformitites of developing leaves, while stems were shorter and thicker.

Soil persistence

Perennial ryegrass was used to monitor persistence. At 0.25 kg/ha the incorporated treatment was undetectable after 10 weeks, although it had caused almost complete kill initially. The surface treatment was still causing a 28% shoot fresh weight reduction after 19 weeks but was undetectable after 35 weeks. At 1.0 kg/ha both types of application were still very active after 19 weeks but were undetectable after 35 weeks. However, 35 weeks after application at 4.0 kg/ha, surface and incorporated treatments were causing 73 and 97% reductions in shoot fresh weight respectively.

Pre-emergence selectivity among temperate species

The smaller seeded annual grasses, ie Poa spp., Holcus lanatus and Alopecurus myosuroides were highly susceptible, all being either killed or controlled at 0.25 kg/ha. Avena fatua was quite resistant however. Only three annual broad-leaved weeds were controlled at the lower doses. All

perennial weeds were resistant with the exception of Cirsium arvense, which was reduced by 43 to 47% at the lower doses and killed by 4.0 kg/ha.

Wheat was the most tolerant of all crops treated, with only a 29% reduction in vigour at 4.0 kg/ha, plants making a good recovery from the initial symptoms. Field bean and radish tolerated 1.0 kg/ha. Six other crops were tolerant at 0.25 kg/ha including the other two cereals, barley and oat, the other two brassicae, rape and kale, and also dwarf bean and carrot. The latter at assessment was reduced in vigour by only 21 and 29% at the higher doses of 1.0 and 4.0 kg/ha but more severe symptoms developed later. Perennials ryegrass was extremely sensitive.

This test suggests that there is a good margin of selectivity between the smaller seeded annual grass weeds (including A. myosuroides) and wheat. WL 29226 deserves comparison with the other black-grass herbicides used in wheat such as chlortoluron, isoproturon and nitrofen. Its quicker action may afford some advantages over the urea herbicides but its broad-leaved weed control spectrum is perhaps not quite as good.

Pre-emergence selectivity among tropical species

Small seeded annual grasses (but not Rottboellia) were well controlled at 0.25 kg/ha and many broad-leaved crops tolerated both that dose and the higher one of 1 kg/ha. The safety of cowpea, pigeon pea, kenaf, cotton and sesamum is of interest, because an annual grass killer not requiring incorporation could be of particular value. Control of Snowdenia and other annual grasses in tropical wheat would also appear feasible.

Further work is justified in comparison with other ether-type compounds to see whether it has adequate reliability under varying soil moisture conditions and whether it controls broad-leaved weeds other than Amaranthus, which proved highly tolerant in this test. Jute on the other hand was highly sensitive and it was later shown that some abnormalities in control plants in this experiment were due to vapour damage by this herbicide.

Perennial Cyperus species were not adequately controlled at 1 kg/ha but there was prolonged stunting of C. esculentus at 4 kg/ha for at least 10 weeks.

ACTIVITY EXPERIMENT

WL 29226

		0.33 kg/ha	1.0 kg/ha	3.0 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx
	I	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxxx xxxxxx
KALE	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx
	P	xxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxx xxxxxxxx
	I	xxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxx
	P	xxxxxxxxxxxxxx + xxxxxxxxxxxx	xxxxxxxxxx xxxxxxxxx	xxxxxx xxxxxx
	I	xxxxxxxxxxxx xxxxxxxx	xxxxxxxxxx xxxxxxx	xxxxxxx xxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxxx xxxxx
	P	x xx	x x	o o
	I	xxxxxxxxxx xxxxxx	xxxx xxxxx	xxxxx xx
AVENA FATUA	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxxxx
	P	xxxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxx xxxxxxx
	I	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxx
AGROPYRON REPENS	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxx	xxxxxxxxxx xxxxxxx

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

WL 29226

SPECIES		0.25 kg/ha		1.0 kg/ha		4.0 kg/ha
WHEAT	91	xxxxxxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
BARLEY	98	xxxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx
(2)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	64	xxxxxxxxxxxx
OAT	104	xxxxxxxxxxxxxxxxxxx +	104	xxxxxxxxxxxxxxxxxxx +	98	xxxxxxxxxxxxxxxxxxx
(3)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	36	xxxxxxx
PER RYGR	4	x	0		0	
(4)	7	x	0		0	
ONION	77	xxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
(8)	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxx	50	xxxxxxxxxx
DWF BEAN	106	xxxxxxxxxxxxxxxxxxx +	106	xxxxxxxxxxxxxxxxxxx +	106	xxxxxxxxxxxxxxxxxxx +
(9)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx
FLD BEAN	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	142	xxxxxxxxxxxxxxxxxxx +
(10)	86	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
PEA	91	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx +	78	xxxxxxxxxxxxxxx
(11)	57	xxxxxxxxxx	36	xxxxxx	21	xxxx
W CLOVER	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxxx +
(12)	71	xxxxxxxxxxxxxx	50	xxxxxxxxx	29	xxxxxx
RAPE	85	xxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxx	113	xxxxxxxxxxxxxxxxxxx +
(14)	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx
KALE	101	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxx
(15)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	43	xxxxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

WL 29226

SPECIES	0.25 kg/ha		1.0 kg/ha		4.0 kg/ha	
CARROT	84	xxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx
(18)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
LETTUCE	105	xxxxxxxxxxxxxxxxxxx +	105	xxxxxxxxxxxxxxxxxxx +	95	xxxxxxxxxxxxxxxxxx
(20)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
SUG BEET	107	xxxxxxxxxxxxxxxxxxx +	74	xxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxxx +
(21)	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx
AVE FATU	105	xxxxxxxxxxxxxxxxxxx +	105	xxxxxxxxxxxxxxxxxxx +	101	xxxxxxxxxxxxxxxxxxx
(26)	100	xxxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	43	xxxxxxxxx
ALO MYOS	3	x	0		0	
(27)	14	xxx	0		0	
POA ANN	4	x	0		0	
(28)	14	xxx	0		0	
POA TRIV	0		0		0	
(29)	0		0		0	
SIN ARV	93	xxxxxxxxxxxxxxxxxx	118	xxxxxxxxxxxxxxxxxxx +	85	xxxxxxxxxxxxxxxxx
(30)	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
RAPH RAP	117	xxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxx +	97	xxxxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx
TRIP MAR	106	xxxxxxxxxxxxxxxxxxx +	106	xxxxxxxxxxxxxxxxxxx +	111	xxxxxxxxxxxxxxxxxxx +
(33)	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
SEN VULG	37	xxxxxxx	52	xxxxxxxxxx	45	xxxxxxxxx
(34)	57	xxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

WL 29226

SPECIES		0.25 kg/ha		1.0 kg/ha		4.0 kg/ha
POL LAPA	100	xxxxxxxxxxxxxxxxxxxx	137	xxxxxxxxxxxxxxxxxxxx +	93	xxxxxxxxxxxxxxxxxx
(35)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
POL AVIC	104	xxxxxxxxxxxxxxxxxxxx +	116	xxxxxxxxxxxxxxxxxxxx +	80	xxxxxxxxxxxxxxxx
(36)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
GAL APAR	116	xxxxxxxxxxxxxxxxxxxx +	74	xxxxxxxxxxxxxxxx	68	xxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	36	xxxxxxx
CHEN ALB	88	xxxxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxxx
(39)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
STEL MED	160	xxxxxxxxxxxxxxxxxxxx +	140	xxxxxxxxxxxxxxxxxxxx +	110	xxxxxxxxxxxxxxxxxxxx +
(40)	86	xxxxxxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
VER PERS	77	xxxxxxxxxxxxxxxx	46	xxxxxxxxx	46	xxxxxxxxx
(42)	43	xxxxxxxxx	21	xxxx	14	xxx
RUM OBTU	42	xxxxxxxx	108	xxxxxxxxxxxxxxxxxxxx +	28	xxxxxx
(44)	29	xxxxxx	29	xxxxxx	14	xxx
HOLC LAN	0		0		0	
(45)	0		0		0	
AG REPEN	106	xxxxxxxxxxxxxxxxxxxx +	87	xxxxxxxxxxxxxxxxx	116	xxxxxxxxxxxxxxxxxxxx +
(47)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
ALL VIN	97	xxxxxxxxxxxxxxxxxxx	120	xxxxxxxxxxxxxxxxxxxx +	101	xxxxxxxxxxxxxxxxxxxx +
(49)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
CIRS ARV	53	xxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxxxx +	0	
(50)	57	xxxxxxxxxxx	50	xxxxxxxxxx	0	

PRE-EMERGENCE SELECTIVITY EXPERIMENT

WL 29226

SPECIES	0.25 kg/ha		1.0 kg/ha		4.0 kg/ha	
TUS FARF	114	xxxxxxxxxxxxxxxxxxxx +	114	xxxxxxxxxxxxxxxxxxxx +	100	xxxxxxxxxxxxxxxxxxxx
(51)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx	10	xx
(58)	71	xxxxxxxxxxxxxx	36	xxxxxxx	7	x
SORGHUM	98	xxxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
(59)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxxx
RICE	97	xxxxxxxxxxxxxxxxxx	62	xxxxxxxxxxx	9	xx
(60)	86	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	43	xxxxxxxxx
PIGEON P	80	xxxxxxxxxxxxxxx	110	xxxxxxxxxxxxxxxxxx +	37	xxxxxxx
(61)	86	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx
COWPEA	100	xxxxxxxxxxxxxxxxxxx	67	xxxxxxxxxxxx	83	xxxxxxxxxxxxxxxx
(62)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
CHICKPEA	116	xxxxxxxxxxxxxxxxxxx +	106	xxxxxxxxxxxxxxxxxxx +	39	xxxxxxxx
(63)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	36	xxxxxxx
GRNDNUT	112	xxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxx +
(64)	64	xxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
SOYABEAN	123	xxxxxxxxxxxxxxxxxxx +	95	xxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxx
(65)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
COTTON	112	xxxxxxxxxxxxxxxxxxx +	103	xxxxxxxxxxxxxxxxxxx +	75	xxxxxxxxxxxxxx
(66)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
JUTE	65	xxxxxxxxxxxx	29	xxxxxx	29	xxxxxx
(67)	57	xxxxxxxxxx	36	xxxxxxx	14	xxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

WL 29226

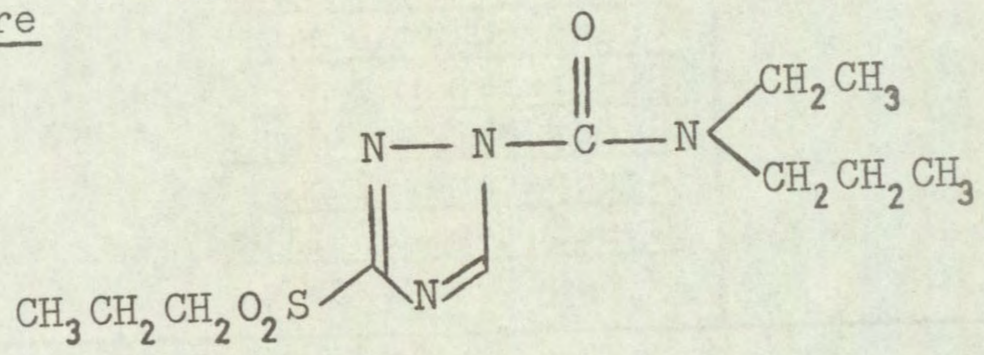
SPECIES	0.25 kg/ha		1.0 kg/ha		4.0 kg/ha	
KENAF	100	xxxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxxx
(68)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
SESAMUM	138	xxxxxxxxxxxxxxxxxxx +	105	xxxxxxxxxxxxxxxxxxx +	49	xxxxxxxxxx
(70)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	29	xxxxxx
TOMATO	98	xxxxxxxxxxxxxxxxxxx	105	xxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxx +
(71)	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
OR PUNCT	85	xxxxxxxxxxxxxxxx	0		0	
(73)	50	xxxxxxxxxx	0		0	
ELEU IND	0		0		0	
(74)	0		0		0	
ECH CRUS	7	x	0		0	
(75)	7	x	0		0	
ROTT EXA	101	xxxxxxxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxx	41	xxxxxxxx
(76)	64	xxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
DIG SANG	57	xxxxxxxxxxx	26	xxxxx	0	
(77)	29	xxxxxx	14	xxx	0	
AMAR RET	69	xxxxxxxxxxxxxx	116	xxxxxxxxxxxxxxxxxxx +	81	xxxxxxxxxxxxxxxx
(78)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
SNOW POL	25	xxxxx	0		0	
(83)	21	xxxx	0		0	
CYP ESCU	120	xxxxxxxxxxxxxxxxxxx +	210	xxxxxxxxxxxxxxxxxxx +	45	xxxxxxxxx
(85)	57	xxxxxxxxxxx	50	xxxxxxxxxx	36	xxxxxxx
CYP ROTU	97	xxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxxx
(86)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	50	xxxxxxxxxx

EPRONAZ

Code number BTS 30843

Chemical name 1-(N-ethyl-N-propyl-carbamoyl)-3-propyl-sulphonyl-(1H)-1,2,4-triazole

Structure



Source

The Boots Company Ltd
Lenton Research Station
Nottingham
NG7 2QD

Information available and suggested uses

Copping and Brooks, 1974, report that field evaluation in Europe, Australasia and the United States has shown promising control of all major annual grass weeds in soyabean, peanut, cotton, maize and small grains at rates of 1-2 kg/ha applied pre- or very early post-emergence.

Formulation used 25% w/v a.i. emulsifiable concentrate

Spray volume for activity experiment 305 l/ha
for selectivity experiment 417 l/ha

RESULTS

Full results are given in the histograms on pages 37-42 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
3.2	chickpea	Avena fatua Raphanus raphanistrum Polygonum lapathifolium Galium aparine Allium vineale Tussilago farfara Cyperus rotundus + species below

(Table continued overleaf)

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