Click here for previous

SPECIES		ORYZALIN 0.25 KG/HA		ORYZALIN 1.00 KG/HA		ORYZALIN 4.00 KG/HA
CARROT	112	xxxxxxxxxxxxxxxxxxxx +	87	xxxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxx
(18)	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx
LETTUCE	97	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxxx
(20)	57	xxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
SUG BEET	80	xxxxxxxxxxxxxxxx	76	xxxxxxxxxxxxxxx	8	xx
(21)	43	xxxxxxxxx	29	xxxxxx	14	xxx
AVE FATU	95	xxxxxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxxx
(26)	57	xxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
ALO MYOS	84	xxxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxxx	54	xxxxxxxxxxx
(27)	57	xxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
POA ANN	138	xxxxxxxxxxxxxxxxxxx +	56	xxxxxxxxxxx	0	
(28)	57	xxxxxxxxxxx	36	xxxxxxx	0	
SIN ARV	102	xxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxx +
(30)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	36	xxxxxxx
RAPH RAP	86	xxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx +	107	xxxxxxxxxxxxxxxxxxx +
(31)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
CHRY SEG	73	xxxxxxxxxxxxxxx	63	xxxxxxxxxxxxx	29	xxxxxx
(32)	64	xxxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx
TRIP MAR	101	xxxxxxxxxxxxxxxxxx +	87	xxxxxxxxxxxxxxxx	49	xxxxxxxxxx
(33)	86	xxxxxxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
POL LAPA	82	xxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx	112	xxxxxxxxxxxxxxxxxxx +
(35)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
GAL APAR	121	xxxxxxxxxxxxxxxxxx +	93	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
(38)	64	xxxxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	ORYZALIN 0.25 KG/HA		ORYZALIN 1.00 KG/HA		ORYZALIN 4.00 KG/HA	
CHEN ALB	56	xxxxxxxxxxx	6	x	0	
(39)	43	xxxxxxxxx	14	xxx	0	
STEL MED	68	xxxxxxxxxxxxx	72	xxxxxxxxxxxxx	8	xx
(40)	36	xxxxxxx	29	xxxxxx	7	x
AG REPEN	103	xxxxxxxxxxxxxxxxxxxxx +	94	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
(47)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
ALL VIN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	92	xxxxxxxxxxxxxxxxx
(49)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxxx
CIRS ARV	55	xxxxxxxxxxx	136	xxxxxxxxxxxxxxxxxxxx +	55	xxxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	29	xxxxxx
TUS FARF	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(51)	93	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	57	xxxxxxxxxxx
CONV ARV	39	xxxxxxxx	13	xxx	0	
(52)	100	xxxxxxxxxxxxxxxxxxxx	14	xxx	0	
MAIZE	112	xxxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxxx +	94	xxxxxxxxxxxxxxxxxx
(58)	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
SORGHUM	91	xxxxxxxxxxxxxxxxx	63	xxxxxxxxxxxxx	35	xxxxxxx
(59)	57	xxxxxxxxxx	36	xxxxxxx	14	xxx
RICE	88	xxxxxxxxxxxxxxxxx	76	xxxxxxxxxxxxxxx	41	xxxxxxxx
(60)	57	xxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
GRNDNUT	112	xxxxxxxxxxxxxxxxxxxx +	150	xxxxxxxxxxxxxxxxxxxx +	131	xxxxxxxxxxxxxxxxxxxx +
(64)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
SOYABEAN	97	xxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxxx
(65)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

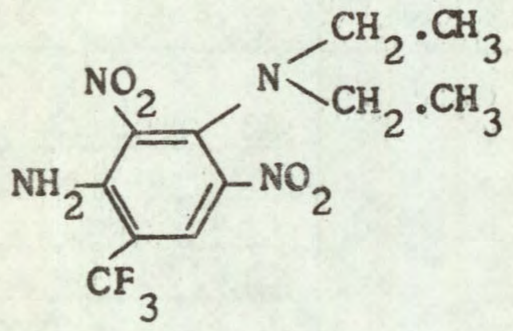
SPECIES		ORYZALIN 0.25 KG/HA		ORYZALIN 1.00 KG/HA		ORYZALIN 4.00 KG/HA
COTTON	90	xxxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxx
(66)	86	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx
JUTE	111	xxxxxxxxxxxxxxxxxxxxx +	96	xxxxxxxxxxxxxxxxxxx	15	xxx
(67)	57	xxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
KENAF	93	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxxx +
(68)	79	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	50	xxxxxxxxxx
SESAMUM	125	xxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxx +	0	
(70)	57	xxxxxxxxxxx	43	xxxxxxxxx	0	
ELEU IND	81	xxxxxxxxxxxxxxxx	7	x	0	
(74)	50	xxxxxxxxxx	43	xxxxxxxxx	0	
ECH CRUS	99	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	9	xx
(75)	29	xxxxxx	14	xxx	7	x
ROT EXAL	82	xxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx +	69	xxxxxxxxxxxxxx
(76)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	50	xxxxxxxxxx
DIG SANG	82	xxxxxxxxxxxxxxxx	22	xxxx	4	x
(77)	43	xxxxxxxxx	43	xxxxxxxxx	14	xxx
AMAR RET	98	xxxxxxxxxxxxxxxxxxx	65	xxxxxxxxxxxxx	39	xxxxxxxx
(78)	43	xxxxxxxxx	36	xxxxxxx	7	x
CYP ESCU	120	xxxxxxxxxxxxxxxxxxx +	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx
(85)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
CYP ROTU	114	xxxxxxxxxxxxxxxxxxx +	89	xxxxxxxxxxxxxxxxx	114	xxxxxxxxxxxxxxxxxxx +
(86)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
OXAL LAT	73	xxxxxxxxxxxxxxx	7	x	0	
(87)	57	xxxxxxxxxxx	21	xxxx	0	

DINITRAMINE

Code number USB 3584 **Trade name** Cobex

Chemical name N',N'-diethyl-2,6-dinitro-4-trifluoromethyl-m-phenylenediamine

Structure



Source

Borax Consolidated Ltd
Borax House
Carlisle Place
London SW1

Information available and suggested uses

Manufacturer's information received in 1973 reports selective control of annual grass and broad-leaved weeds in cotton, soyabeans, groundnut, beans and several other crops. Pre-planting incorporation to 2-4 cm should be carried out within 24 hours of application. Recommended rates are 0.4-0.8 kg/ha depending on soil type.

Formulation used 24% w/v a.i. emulsifiable concentrate

Spray volume for activity experiment 388 l/ha (34.5 gal/ac)
for selectivity experiment 352 l/ha (31.3 gal/ac)

RESULTS

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

RATE (kg ai/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	carrot	Avena fatua Convolvulus arvensis Echinochloa crus-galli Amaranthus retroflexus Oxalis latifolia + species below

(Table continued overleaf)

RATE (kg ai/ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
0.25	species above + dwarf bean field bean pea kale swede lettuce radish groundnut soyabean cotton kenaf	Alopecurus myosuroides Poa annua Chenopodium album Stellaria media Eleusine indica Digitaria sanguinalis

Comments on results

General

The activity experiment results showed the route of action of dinitramine to be similar to the other dinitro-aniline herbicides tested. The foliar spray caused notably less effect than soil treatments and post-emergence soil drenches were less damaging than pre-emergence applications. Incorporation was more effective than surface application, particularly on Avena fatua and Agropyron repens.

The range of grass and broad-leaved weeds controlled was very similar to the other related dinitro-aniline herbicides tested. Carrot was particularly tolerant but all other crops tested were susceptible at 1.00 kg/ha.

Symptoms

Symptoms on susceptible species were almost identical to those caused by trifluralin.

Temperate weeds and crops

Annual grass weed control at both 0.25 and 1.00 kg/ha was similar to that of trifluralin. Chenopodium album and Stellaria media were more sensitive to dinitramine, being controlled by 0.25 kg/ha. Certain other broad-leaved weeds were also more sensitive to dinitramine (i.e. Sinapis arvensis, Chrysanthemum segetum, Polygonum lapathifolium, Cirsium arvense and Raphanus raphanistrum) but trifluralin was more active against Convolvulus arvensis. The response of Agropyron repens was similar with both compounds. Rhizome fragments failed to develop after treatment with 4.00 kg/ha of dinitramine, even when replanted in untreated soil.

Carrot was reduced by only 30% at 4.00 kg/ha and was tolerant at 1.00 kg/ha. Pea and radish were also marginally resistant at 1.00 kg/ha. The large seeded legumes, brassica crops and lettuce were tolerant at only 0.25 kg/ha. Crops were generally more sensitive to dinitramine than to trifluralin.

Potential selective control of several grass and broad-leaved weeds was achieved in carrot, the large seeded legumes, brassica crops and lettuce.

Tropical weeds and crops

The annual grass weeds were considerably more sensitive to dinitramine than to the other dinitro-anilines tested. Eleusine indica did not emerge at 0.25 kg/ha. Digitaria sanguinalis was well controlled at this dose and did not emerge at higher rates. Echinochloa crus-galli was severely reduced at 0.25 kg/ha and failed to emerge at higher doses. Rottboellia exaltata was just controlled at 4.00 kg/ha and appeared unlikely to recover. It was also severely affected at 1.00 kg/ha. Amaranthus retroflexus was severely reduced at 0.25 kg/ha and killed at 1.00 kg/ha. Oxalis latifolia was severely reduced at 0.25 kg/ha and had not emerged at higher rates. Five weeks later stunted leaves were developing at 1.00 kg/ha and at 4.00 kg/ha leaves were developing slowly on retrieved bulbils, although none had emerged through the soil. Cyperus rotundus showed some minor symptoms at 4.00 kg/ha but plants had recovered after nine weeks. Cyperus esculentus did not emerge at this dose and the tubers were rotting while plants treated at lower rates had recovered.

Both cotton and kenaf showed marginal resistance at 1.00 kg/ha and were fully tolerant at 0.25 kg/ha, as were groundnut and soyabean. Maize also showed some degree of resistance at this latter dose.

Eleusine indica and Digitaria sanguinalis were selectively controlled at doses tolerated by the above five crops.

Soil persistence

Using perennial ryegrass as the test species, 0.25 and 1.00 kg/ha of dinitramine were not detected after 12 and 31 weeks respectively. Plants still showed symptoms and a 43% reduction in fresh weight 54 weeks after application of 4.00 kg/ha.

Possible uses and further testing

This herbicide has great potential for selective pre-emergence weed control in several broad-leaved crops, particularly carrot which may well tolerate more than 1.00 kg/ha. Most crops did not tolerate such high doses as with trifluralin, but weed control using dinitramine (with the exception of Convolvulus arvensis) appears to be somewhat better.

Incorporation of dinitramine, which increased the susceptibility of most species in the activity experiment, should be carried out within 24 hours of application according to the manufacturer's information. This time-period provides greater flexibility which could be an advantage under certain circumstances compared with the more immediate incorporation required following trifluralin application.

Another potential advantage would appear to be the shorter persistence of dinitramine, resulting in less risk to following crops, a hazard which can exist with trifluralin.

No outstanding advantages were found for dinitramine in the tropical situation, but selectivities in several crops were comparable with those of trifluralin and somewhat lower doses could be used to achieve a similar degree of weed control.

ACTIVITY EXPERIMENT

DINITRAMINE

		0.23 kg/ha (S 0.20 kg/ha)	0.90 kg/ha (S 0.80 kg/ha)	3.61 kg/ha (S 3.20 kg/ha)
DWARF BEAN	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible]	[illegible]	[illegible]
	I	[illegible]	[illegible]	[illegible]
KALE	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible] +	[illegible]	[illegible]
	I	[illegible]	[illegible]	[illegible]
POLYGONUM AMPHIBIUM	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible]	[illegible]	[illegible]
	I	[illegible]	[illegible]	[illegible]
PERENNIAL RYEGRASS	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible]	[illegible]	0
	I	[illegible]	[illegible]	0
AVENA FATUA	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible]	[illegible] +	[illegible]
	I	[illegible]	[illegible]	0
AGROPYRON REPENS	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible] +	[illegible] +	[illegible]
	I	[illegible]	[illegible]	[illegible]

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

PRE-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	DINITRAMINE 0.25 KG/HA		DINITRAMINE 1.00 KG/HA		DINITRAMINE 4.00 KG/HA	
WHEAT	85	xxxxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxxxx	13	xxx
(1)	79	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
BARLEY	96	xxxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxxxx +	70	xxxxxxxxxxxxxx
(2)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	57	xxxxxxxxxxx
OAT	95	xxxxxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxx	15	xxx
(3)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
PER RYGR	7	x	0		0	
(4)	29	xxxxxx	0		0	
ONION	60	xxxxxxxxxxxx	17	xxx	0	
(8)	64	xxxxxxxxxxxxx	14	xxx	0	
DWF BEAN	100	xxxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	33	xxxxxxx
(9)	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
FLD BEAN	75	xxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx
(10)	93	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
PEA	120	xxxxxxxxxxxxxxxxxxx +	120	xxxxxxxxxxxxxxxxxxx +	75	xxxxxxxxxxxxxx
(11)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	50	xxxxxxxxxx
W CLOVER	95	xxxxxxxxxxxxxxxxxxx	12	xx	0	
(12)	71	xxxxxxxxxxxxxx	29	xxxxxx	0	
TOMATO	92	xxxxxxxxxxxxxxxxx	92	xxxxxxxxxxxxxxxxx	52	xxxxxxxxxx
(14)	64	xxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
KALE	100	xxxxxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxxx	36	xxxxxxx
(15)	93	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
SWEDE	122	xxxxxxxxxxxxxxxxxxx +	103	xxxxxxxxxxxxxxxxxxx +	66	xxxxxxxxxxxx
(17)	93	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	36	xxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	DINITRAMINE 0.25 KG/HA		DINITRAMINE 1.00 KG/HA		DINITRAMINE 4.00 KG/HA	
CARROT	100	xxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	112	xxxxxxxxxxxxxxxxxxxx +
(18)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
LETTUCE	82	xxxxxxxxxxxxxxxx	67	xxxxxxxxxxxxx	22	xxxx
(20)	100	xxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
SUG BEET	52	xxxxxxxxxx	40	xxxxxxxx	8	xx
(21)	29	xxxxxx	29	xxxxxx	14	xxx
AVE FATU	89	xxxxxxxxxxxxxxxxxx	27	xxxxx	0	
(26)	57	xxxxxxxxxxx	29	xxxxxx	0	
ALO MYOS	72	xxxxxxxxxxxxxx	0		0	
(27)	29	xxxxxx	0		0	
POA ANN	0		0		0	
(28)	0		0		0	
SIN ARV	60	xxxxxxxxxxxx	66	xxxxxxxxxxxxx	24	xxxxx
(30)	100	xxxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
RAPH RAP	91	xxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	36	xxxxxxx
CHRY SEG	73	xxxxxxxxxxxxxxx	68	xxxxxxxxxxxxxx	34	xxxxxxx
(32)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
TRIP MAR	101	xxxxxxxxxxxxxxxxxxxx +	78	xxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxx
(33)	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	36	xxxxxxx
POL LAPA	76	xxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxxx	35	xxxxxxx
(35)	71	xxxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
GAL APAR	136	xxxxxxxxxxxxxxxxxxxx +	129	xxxxxxxxxxxxxxxxxxx +	14	xxx
(38)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx

SPECIES		DINITRAMINE 0.25 KG/HA		DINITRAMINE 1.00 KG/HA		DINITRAMINE 4.00 KG/HA
CHEN ALB	28	xxxxxx	0		0	
(39)	29	xxxxxx	0		0	
STEL MED	34	xxxxxxx	0		0	
(40)	21	xxxx	0		0	
AG REPEN	103	xxxxxxxxxxxxxxxxxxxx +	86	xxxxxxxxxxxxxxxxxx	34	xxxxxxx
(47)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
ALL VIN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(49)	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxx
CIRS ARV	55	xxxxxxxxxx	82	xxxxxxxxxxxxxx	0	
(50)	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
TUS FARF	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(51)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
CONV ARV	39	xxxxxxxx	0		0	
(52)	100	xxxxxxxxxxxxxxxxxxx	0		0	
MAIZE	94	xxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx	28	xxxxxx
(58)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxxx
SORGHUM	56	xxxxxxxxxx	0		0	
(59)	50	xxxxxxxxxx	0		0	
RICE	82	xxxxxxxxxxxxxxx	59	xxxxxxxxxx	12	xx
(60)	43	xxxxxxxxx	43	xxxxxxxxx	14	xxx
GRNDNUT	112	xxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxx +	94	xxxxxxxxxxxxxxxxx
(64)	93	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	57	xxxxxxxxxx
SOYABEAN	97	xxxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxx +	79	xxxxxxxxxxxxxx
(65)	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

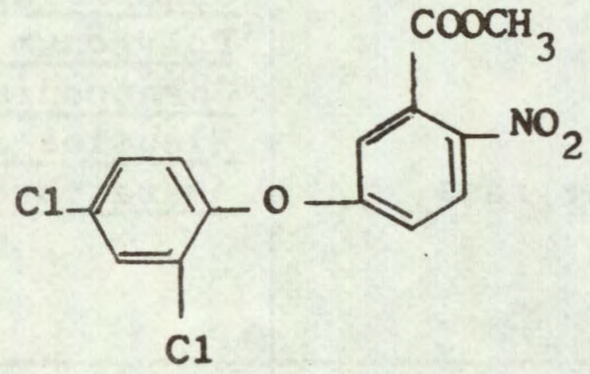
SPECIES		DINITRAMINE 0.25 KG/HA		DINITRAMINE 1.00 KG/HA		DINITRAMINE 4.00 KG/HA
COTTON	90	xxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(66)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
JUTE	89	xxxxxxxxxxxxxxxxxx	4	x	0	
(67)	50	xxxxxxxxxx	7	x	0	
KENAF	87	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx
(68)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
SESAMUM	112	xxxxxxxxxxxxxxxxxxx +	0		0	
(70)	43	xxxxxxxxx	0		0	
ELEU IND	0		0		0	
(74)	0		0		0	
ECH CRUS	56	xxxxxxxxxxx	0		0	
(75)	36	xxxxxxx	0		0	
ROT EXAL	97	xxxxxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxxx	62	xxxxxxxxxxxx
(76)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
DIG SANG	4	x	0		0	
(77)	21	xxxx	0		0	
AMAR RET	104	xxxxxxxxxxxxxxxxxx +	0		0	
(78)	36	xxxxxxx	0		0	
CYP ESCU	90	xxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxx	0	
(85)	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	0	
CYP ROTU	114	xxxxxxxxxxxxxxxxxx +	122	xxxxxxxxxxxxxxxxxx +	49	xxxxxxxxx
(86)	93	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
OXAL LAT	40	xxxxxxxx	0		0	
(87)	57	xxxxxxxxxx	0		0	

BIFENOX
(WSSA approved common name)

Code number MC 4379 **Trade name** Modown

Chemical name methyl 5-(2,4-dichlorophenoxy)-2-nitrobenzoate

Structure



Source

Mobil Chemical Company
Research and Development Laboratories
P O Box 240
Edison
New Jersey 08817
USA

Information available and suggested uses

Manufacturer's information from 1973 reports control of certain broad-leaved weeds and some grasses in soyabeans, maize, rice, sorghum, other small grains, safflower and sunflower. Suggested pre-emergence rates of application range from 1.12-2.24 kg ai/ha and 0.28-2.24 kg ai/ha post-emergence. Directed spraying is necessary in certain crops but applications to rice and small grain crops can be overall. Combination with herbicides which are predominantly grass weed killers has improved the weed control spectrum.

Formulation used 24% w/v a.i. emulsifiable concentrate

Spray volume for selectivity experiment 352 l/ha (31.3 gal/ac)

RESULTS

Full histogram results are given on pages 44-47 and potential selectivities are summarised in the following Table.

RATE (kg ai/ha	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
7.50	pea maize groundnut	Poa annua Chrysanthemum segetum Tripleurospermum maritimum Convolvulus arvensis Cyperus esculentus + species below

(Table continued overleaf)

RATE (kg ai/ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
2.50	species above + wheat barley oat perennial ryegrass field bean kenaf	Sinapis arvensis Polygonum lapathifolium Chenopodium album Eleusine indica Amaranthus retroflexus
0.83	None listed as no weeds controlled	None

Comments on results

General

The activity and post-emergence selectivity data on this herbicide were included in a previous report (Richardson and Dean, 1973b). In the former there was a high level of foliar activity on all broad-leaved species while pre-emergence applications were very active on small seeded species, especially kale. Herbicide incorporation tended to reduce phytotoxicity, compared with surface pre-emergence treatments, particularly on the small seeded species. This should be borne in mind when considering the results of the pre-emergence selectivity experiment where the herbicide was incorporated. The pattern and type of activity found was similar to that of the dinitro-phenyl ether herbicides.

Pre-emergence selective control of certain broad-leaved weeds, two annual grasses and Cyperus esculentus was obtained. Certain temperate and tropical legume and cereal crops were tolerant in addition to perennial ryegrass and kenaf.

Symptoms

Germination and emergence were unaffected except for Convolvulus arvensis, which failed to emerge at the highest dose. High rates inhibited susceptible broad-leaved species at the cotyledon stage and the main bud failed to develop. At lower doses abnormal leaves were produced, often being twisted about the midrib and a streaky veinal necrosis was seen. This latter effect was also found on the grasses together with retardation of growth. Post-emergence symptoms were reported by Richardson and Dean (1973b).

Temperate weeds and crops

Sinapis arvensis, Polygonum lapathifolium and Chenopodium album were controlled at 2.50 kg/ha. The composite weeds, Tripleurospermum maritimum and Chrysanthemum segetum were susceptible at 7.50 kg/ha and Galium aparine was reduced by 64%. Convolvulus arvensis failed to emerge at this rate and all root fragments subsequently rotted, while treatment at 2.50 kg/ha eventually killed 80% of the plants. [In a separate experiment, well established plants recovered from severe initial symptoms due to lack of effect on the

root system]. All other perennial weeds were relatively resistant. The high resistance of Stellaria media was a serious disadvantage while Poa annua was the only grass weed to be controlled.

Pea showed outstanding tolerance at 7.50 kg/ha, and field bean was reduced by only 21% at this dose. Perennial ryegrass and the cereals, were tolerant at 2.50 kg/ha and were reduced in vigour by only 29 to 36% at 7.50 kg/ha.

Several weeds were controlled at doses where pea was resistant, most notably the composites and C. arvensis. The cereals, perennial ryegrass and field bean were all tolerant at 2.50 kg/ha, where S. arvensis, P. lapathifolium and C. album were susceptible.

Tropical weeds and crops

Amaranthus retroflexus was the most susceptible tropical weed although at lower doses plant number was affected more than vigour. Annual grass weeds were resistant, except for Eleusine indica which was controlled at 2.50 kg/ha. The perennials Cyperus rotundus and Oxalis latifolia both recovered from 7.50 kg/ha. Cyperus esculentus was susceptible at this dose and eventually at 2.50 kg/ha, although a certain degree of recovery was apparent at this lower dose.

Larger seeded crops tended to be more tolerant, with maize and groundnut being particularly resistant at 7.50 kg/ha. Soyabean and cotton were reduced by only 21-29% at both 7.50 and 2.50 kg/ha. At the latter rate rice, sorghum and sesamum showed marginal resistance and kenaf was tolerant.

E. indica, A. retroflexus and C. esculentus were controlled at rates where kenaf, maize and groundnut were tolerant.

Soil persistence

Bifenox showed a moderate period of soil persistence in bioassays using turnip. Applications of 2.50 and 7.50 kg/ha were barely detectable 21 and 36 weeks after treatment. Turnip showed little or no response to 0.83 kg/ha in the initial assay set up at spraying.

Possible uses and further testing

Bifenox has an interesting broad-leaved weed control spectrum, including certain problem weeds of peas and field beans. It is possible that the crops listed as tolerant at 2.50 kg/ha could withstand higher doses, and control of more broad-leaved weeds may then be expected. Furthermore the margin of selectivity in larger seeded crops could possibly be increased by surface pre-emergence application. The resistance of Stellaria media could be a serious disadvantage but this problem may be overcome if, as the manufacturer suggests, the herbicide is compatible with other broad-leaved weed killers. The use of bifenox as a contact pre-emergence spray would seem worth further investigation. An earlier post-emergence selectivity test showed that other weeds, including S. media, can then be controlled. The possible susceptibility of immature C. arvensis and control of composite weeds in pea and field bean crops may be worth some further testing.

Apart from the selective control of C. esculentus in certain crops, little of interest was found for the tropical situation but further testing is required as a surface pre-emergence treatment.

PRE-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	BIFENOX 0.83 KG/HA		BIFENOX 2.50 KG/HA		BIFENOX 7.50 KG/HA	
WHEAT	98	xxxxxxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
BARLEY	83	xxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxxx	77	xxxxxxxxxxxxxxx
(2)	100	xxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
OAT	110	xxxxxxxxxxxxxxxxxxxxx +	95	xxxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx +
(3)	100	xxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
PER RYGR	114	xxxxxxxxxxxxxxxxxxxxx +	93	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(4)	100	xxxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
ONION	129	xxxxxxxxxxxxxxxxxxxxx +	26	xxxxx	0	
(8)	93	xxxxxxxxxxxxxxxxxxx	21	xxxx	0	
DWF BEAN	100	xxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	57	xxxxxxxxxx
FLD BEAN	100	xxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(10)	100	xxxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
PEA	105	xxxxxxxxxxxxxxxxxxxxx +	90	xxxxxxxxxxxxxxxxxx	105	xxxxxxxxxxxxxxxxxxx +
(11)	100	xxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
W CLOVER	111	xxxxxxxxxxxxxxxxxxxxx +	37	xxxxxxx	4	x
(12)	100	xxxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	21	xxxx
TOMATO	98	xxxxxxxxxxxxxxxxxxxxx	46	xxxxxxxxx	12	xx
(14)	100	xxxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	14	xxx
KALE	109	xxxxxxxxxxxxxxxxxxxxx +	73	xxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
SWEDE	131	xxxxxxxxxxxxxxxxxxxxx +	47	xxxxxxxxx	0	
(17)	93	xxxxxxxxxxxxxxxxxxx	21	xxxx	0	

PRE-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES		BIFENOX 0.83 KG/HA		BIFENOX 2.50 KG/HA		BIFENOX 7.50 KG/HA
CARROT	94	xxxxxxxxxxxxxxxxxxx	56	xxxxxxxxxxx	12	xx
(18)	93	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	21	xxxx
LETTUCE	97	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	56	xxxxxxxxxxx
(20)	100	xxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	21	xxxx
SUG BEET	64	xxxxxxxxxxxxx	4	x	0	
(21)	71	xxxxxxxxxxxxxx	14	xxx	0	
AVE FATU	95	xxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxx +
(26)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
ALO MYOS	126	xxxxxxxxxxxxxxxxxxx +	132	xxxxxxxxxxxxxxxxxxx +	108	xxxxxxxxxxxxxxxxxxx +
(27)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
POA ANN	86	xxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx +	30	xxxxxx
(28)	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	50	xxxxxxxxxx
SIN ARV	108	xxxxxxxxxxxxxxxxxx +	0		0	
(30)	79	xxxxxxxxxxxxxxxx	0		0	
RAPH RAP	91	xxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
CHRY SEG	63	xxxxxxxxxxxxx	68	xxxxxxxxxxxxxx	24	xxxxx
(32)	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
TRIP MAR	98	xxxxxxxxxxxxxxxxxx	72	xxxxxxxxxxxxxx	14	xxx
(33)	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	21	xxxx
POL LAPA	82	xxxxxxxxxxxxxxx	29	xxxxxx	0	
(35)	100	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0	
GAL APAR	100	xxxxxxxxxxxxxxxxxx	107	xxxxxxxxxxxxxxxxxx +	71	xxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	36	xxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	BIFENOX 0.83 KG/HA		BIFENOX 2.50 KG/HA		BIFENOX 7.50 KG/HA	
CHEN ALB	67	xxxxxxxxxxxxx	28	xxxxxx	0	
(39)	93	xxxxxxxxxxxxxxxxxxxx	36	xxxxxxx	0	
STEL MED	110	xxxxxxxxxxxxxxxxxxxxx +	91	xxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
AG REPEN	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(47)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
ALL VIN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(49)	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	43	xxxxxxxxx
CIRS ARV	109	xxxxxxxxxxxxxxxxxxxx +	109	xxxxxxxxxxxxxxxxxxxx +	82	xxxxxxxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
TUS FARF	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(51)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	50	xxxxxxxxxx
CONV ARV	91	xxxxxxxxxxxxxxxxxx	52	xxxxxxxxxx	0	
(52)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	0	
MAIZE	94	xxxxxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxxx +
(58)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
SORGHUM	112	xxxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxxx +	105	xxxxxxxxxxxxxxxxxxxx +
(59)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
RICE	106	xxxxxxxxxxxxxxxxxxxx +	94	xxxxxxxxxxxxxxxxxx	76	xxxxxxxxxxxxxx
(60)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	50	xxxxxxxxxx
GRNDNUT	75	xxxxxxxxxxxxxx	131	xxxxxxxxxxxxxxxxxxxx +	131	xxxxxxxxxxxxxxxxxxxx +
(64)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
SOYABEAN	97	xxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx
(65)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	71	xxxxxxxxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

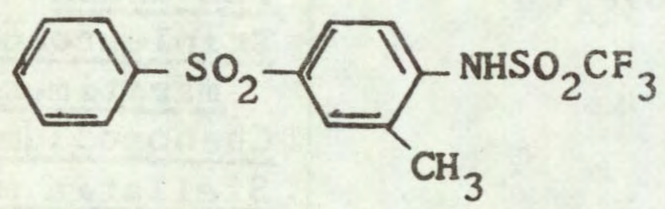
SPECIES		BIFENOX 0.83 KG/HA		BIFENOX 2.50 KG/HA		BIFENOX 7.50 KG/HA
COTTON	100	xxxxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxxx
(66)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxxx
JUTE	26	xxxxx	0		0	
(67)	64	xxxxxxxxxxxxx	0		0	
KENAF	87	xxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	27	xxxxx
(68)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
SESAMUM	75	xxxxxxxxxxxxxxx	150	xxxxxxxxxxxxxxxxxxx +	0	
(70)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	0	
ELEU IND	81	xxxxxxxxxxxxxxxx	26	xxxxx	7	x
(74)	93	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
ECH CRUS	103	xxxxxxxxxxxxxxxxxxxx +	120	xxxxxxxxxxxxxxxxxxxx +	73	xxxxxxxxxxxxxxx
(75)	93	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
ROT EXAL	92	xxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	99	xxxxxxxxxxxxxxxxxxx
(76)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
DIG SANG	120	xxxxxxxxxxxxxxxxxxx +	64	xxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
(77)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
AMAR RET	46	xxxxxxxxx	13	xxx	0	
(78)	93	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	0	
CYP ESCU	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(85)	100	xxxxxxxxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
CYP ROTU	130	xxxxxxxxxxxxxxxxxxx +	114	xxxxxxxxxxxxxxxxxxx +	97	xxxxxxxxxxxxxxxxxx
(86)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx
OXAL LAT	87	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	67	xxxxxxxxxxxx
(87)	93	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx

MBR 8251

Code number MBR 8251 **Trade name** Destun

Chemical name 1,1,1-trifluoro-N-(4-phenylsulphonyl-o-tolyl) methanesulphonamide

Structure



Source

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

Information available and suggested uses

Manufacturer's information received between 1971 and 1974 reports promising selective pre-emergence control of Cyperus rotundus, Cyperus esculentus and many grass and broad-leaved weeds at rates of 1.58 to 4.48 kg/ha, depending on soil type. The range of tolerant crops include alfalfa, cabbage, cotton, cucurbits, flax, peanuts, rape, rice, soyabeans, strawberries, sunflowers and tobacco. Application may be made post-planting, post-transplanting or to established plants. Soil surface applications are reported to produce the best results, but rainfall or irrigation within 7 days is necessary for optimum performance. Mixtures with other herbicides have been tested to improve broad-leaved weed control.

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

Spray volume for activity experiment 352 l/ha (31.3 gal/ac)
for selectivity experiment 352 l/ha (31.3 gal/ac)

RESULTS

Full histogram results are given on pages 52-56 and potential selectivities are summarised in the following Table.

RATE (kg ai/ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
4.50	pea kale	Avena fatua Sinapis arvensis Chrysanthemum segetum Agropyron repens Cirsium arvense Tussilago farfara Convolvulus arvensis Amaranthus retroflexus + species below

(Table continued overleaf)

RATE (kg ai/ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
1.50	species above + dwarf bean field bean radish maize groundnut soyabean	Poa annua Tripleurospermum maritimum Chenopodium album Stellaria media Eleusine indica Echinochloa crus-galli Digitaria sanguinalis Cyperus esculentus Cyperus rotundus
0.50	No crops listed as no weeds controlled	None

Comments on results

General

In the activity experiment there was a high degree of soil activity but little effect due to the foliar spray. Pre-emergence applications were more active than post-emergence soil drenches. With the exception of Agropyron repens and dwarf bean, pre-emergence surface treatments were more phytotoxic than those incorporated. This fact should be borne in mind when considering the results of the pre-emergence selectivity experiment, where the herbicide was fully incorporated.

The high level of activity of MBR 8251 was confirmed in the pre-emergence selectivity experiment where there was good control of a wide range of temperate and tropical weeds including several perennials. The tolerance of legume crops was good and potential selectivities were also found in maize, kale and radish.

Symptoms

Mild necrosis and shiny leaf surfaces were observed on broad-leaved species after foliar treatment. Soil drenches caused a severe inhibition of main shoots and tillering of grasses, where leaves became much darker green before turning necrotic. Pre-emergence applications at higher doses resulted in the death of plants just after emergence with the grasses often failing to emerge from the coleoptile. At lower doses, leaves were inhibited, darker green and tended to stick together causing subsequent leaf trapping. Nearly all susceptible plants had weakened root systems, with stunted and thickened roots.

Temperate weeds and crops

All annual and perennial grass weeds, except Alopecurus myosuroides, were controlled by 4.50 kg/ha. Only 1.50 kg/ha was required to control Poa annua. With the exception of Galium aparine, Raphanus raphanistrum

and Polygonum lapathifolium, all annual and perennial broad-leaved weeds were controlled at 4.50 kg/ha or lower. The susceptibility of the perennial species, particularly Allium vineale, was most impressive. This species was not controlled 5 weeks after treatment but plants gradually became weaker and eventually there was complete kill of shoots and underground bulbils even at 1.50 kg/ha. All perennials were eventually killed at 4.50 kg/ha and some mortality was observed at 1.50 kg/ha. (NB. Oxalis latifolia, which was included in this experiment as a tropical weed but does also occur in temperate regions, was particularly tolerant of MBR 8251).

A high degree of tolerance was shown by the large seeded legumes. Pea was tolerant at 4.50 kg/ha while field bean and dwarf bean were only slightly reduced in vigour. Dwarf bean was completely tolerant to the activity experiment pre-emergence surface spray of 4.50 kg/ha while the same dose incorporated reduced vigour by only 15%. Crop tolerance was also found with radish and kale at 1.50 and 4.50 kg/ha respectively but swede proved very sensitive. It should be emphasised that kale tolerance was only found when the herbicide was incorporated; surface pre-emergence sprays of 4.50 kg/ha in the activity experiment were highly toxic. Onion was particularly sensitive.

Most annual and all perennial broad-leaved and grass weeds were selectively controlled at doses where pea and kale were tolerant. Certain potential selectivities were also found in dwarf bean, field bean and radish. It should be noted that at later assessments a number of perennial weeds were controlled, or severely reduced, at doses where these crops were tolerant.

Tropical weeds and crops

MBR 8251 was outstandingly active on both Cyperus spp. Cyperus esculentus was somewhat more sensitive and no shoots had emerged at 1.50 kg/ha nine weeks after treatment. [This agrees with the results of Gentner (1973) who reported control of C. esculentus for 10 weeks following surface application.] Some eventual recovery was apparent at 0.50 kg/ha. Similar results were found with C. rotundus i.e. no shoot emergence at 4.50 kg/ha, slight emergence but eventual kill at 1.50 kg/ha and recovery at 0.50 kg/ha. Tubers examined from the higher doses were discoloured and presumably not viable. [In a recent report Dean and Parker (1974) found that tubers of C. rotundus planted at 2 or 8 cm were adequately controlled by 2.0 kg/ha following surface application or incorporation to 2 or 8 cm. At 1.0 kg/ha control was more affected by the method of application.] Broad-leaved weeds tended to be more resistant and Oxalis latifolia was particularly tolerant. Annual grass weeds were all controlled at 1.50 kg/ha with the exception of Rottboellia exaltata which exhibited its usual resistance.

Soyabean and cotton were only slightly reduced at 4.50 kg/ha. The legumes, maize and cotton were partially or completely tolerant at 1.50 kg/ha, while kenaf and rice also showed some degree of resistance.

Certain annual grasses, C. rotundus and C. esculentus were selectively controlled at rates where maize, groundnut and soyabean were resistant.

Soil persistence

Using perennial ryegrass as the test species, 0.50 kg/ha could not be detected ten weeks after application. Herbicide loss at 1.50 kg/ha was rapid initially but from 14-54 weeks after treatment the level remained relatively constant causing a 28-48% reduction in shoot fresh weights. At 4.50 kg/ha all plants were killed up to 14 weeks after treatment but subsequent fresh weights were reduced by only 60-70% from 30-54 weeks.

Possible uses and further testing

MBR 8251 is of considerable interest as a pre-emergence herbicide, giving good control of grass and several broad-leaved weeds. Of even greater interest however is the susceptibility of perennial weeds, particularly Allium vineale. Although this weed is more of a local rather than a general problem, it has proved consistently resistant to nearly all selective herbicides. The selectivity between kale and S. arvensis is of interest and deserves further investigation.

The potential selective control of C. rotundus and C. esculentus in maize, groundnut and soyabean was most encouraging and the degree of selectivity was good. Some other crops such as kenaf, rice, cotton and even sorghum may be able to withstand doses of MBR 8251 at which significant reduction of these and certain annual grass weeds may be achieved. It is evident, however, from other results that the actual method of application and depth of crop planting may be altered to increase levels of selectivity (Dean and Parker, 1974). Results have recently been obtained to suggest that the use of an antidote seed dressing may also assist with increasing levels of selectivity. Conditions at, and following application, may be critical and this could well explain the disappointing results obtained by Terry (personal communication) in the field.

ACTIVITY EXPERIMENT

MBR 8251

		0.125 kg/ha	0.75 kg/ha	4.50 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx +
	I	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxxxx
KALE	F	xxxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx	xx xxx
	I	xxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx +	xxxxxxxxxxxxx	o o
	I	xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx +	xxxxxxx xxxxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxxxxxx
	P	xxxxxxxxxxxx xxxxxxxxxxxxx	x xxxx	o o
	I	xxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxx xxxxxxxxx	xxx xxxx
AVENA FATUA	F	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx +	xxxxxxxxx xxxxxxxxxx	x xx
	I	xxxxxxxxxxxxxx +	xxxxxxxxxxxxx xxxxxxxxxxx	xx xxxx
AGROPYRON REPENS	F	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx
	S	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxxx
	P	xxxxxxxxxxxxxx	xxxxxxxxxxxxxx	xxxxxxxx xxxxxxxx
	I	xxxxxxxxxxxxxx	xxxxxxxxxx	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

SPECIES	MBR 8251 0.50 KG/HA		MBR 8251 1.50 KG/HA		MBR 8251 4.50 KG/HA	
WHEAT	98	xxxxxxxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxxxxx +	91	xxxxxxxxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
BARLEY	89	xxxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxxx +
(2)	100	xxxxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxxx	57	xxxxxxxxxxx
OAT	110	xxxxxxxxxxxxxxxxxxxxx +	110	xxxxxxxxxxxxxxxxxxxxx +	88	xxxxxxxxxxxxxxxxxx
(3)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
PER RYGR	93	xxxxxxxxxxxxxxxxxxx	21	xxxx	0	
(4)	57	xxxxxxxxxxx	36	xxxxxxx	0	
ONION	69	xxxxxxxxxxxxxx	0		0	
(8)	50	xxxxxxxxxx	0		0	
DWF BEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
FLD BEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(10)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
PEA	120	xxxxxxxxxxxxxxxxxxxx +	120	xxxxxxxxxxxxxxxxxxxx +	120	xxxxxxxxxxxxxxxxxxxx +
(11)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
W CLOVER	107	xxxxxxxxxxxxxxxxxxxx +	95	xxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx
(12)	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx
TOMATO	98	xxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	0	
(14)	100	xxxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0	
KALE	64	xxxxxxxxxxxxx	118	xxxxxxxxxxxxxxxxxxxx +	109	xxxxxxxxxxxxxxxxxxx +
(15)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
SWEDE	84	xxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(17)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	MBR 8251 0.50 KG/HA		MBR 8251 1.50 KG/HA		MBR 8251 4.50 KG/HA	
CARROT	81	xxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxxx	6	x
(18)	79	xxxxxxxxxxxxxxxxx	43	xxxxxxxxxx	14	xxx
LETTUCE	112	xxxxxxxxxxxxxxxxxxxxx +	97	xxxxxxxxxxxxxxxxxxxx	52	xxxxxxxxxx
(20)	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxxx	21	xxxx
SUG BEET	84	xxxxxxxxxxxxxxxxx	68	xxxxxxxxxxxxxx	52	xxxxxxxxxx
(21)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
AVE FATU	95	xxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	68	xxxxxxxxxxxxxx
(26)	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
ALO MYOS	138	xxxxxxxxxxxxxxxxxxxx +	180	xxxxxxxxxxxxxxxxxxxx +	60	xxxxxxxxxxx
(27)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	50	xxxxxxxxxx
POA ANN	82	xxxxxxxxxxxxxxxx	13	xxx	0	
(28)	57	xxxxxxxxxxx	14	xxx	0	
SIN ARV	60	xxxxxxxxxxxx	78	xxxxxxxxxxxxxxxx	30	xxxxxx
(30)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
RAPH RAP	91	xxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	59	xxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
CHRY SEG	92	xxxxxxxxxxxxxxxxx	44	xxxxxxxxx	0	
(32)	100	xxxxxxxxxxxxxxxxxxx	36	xxxxxxx	0	
TRIP MAR	110	xxxxxxxxxxxxxxxxxxx +	26	xxxxx	0	
(33)	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0	
POL LAPA	88	xxxxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxx	118	xxxxxxxxxxxxxxxxxxx +
(35)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxx
GAL APAR	93	xxxxxxxxxxxxxxxxxx	107	xxxxxxxxxxxxxxxxxxx +	79	xxxxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	43	xxxxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	MBR 8251 0.50 KG/HA		MBR 8251 1.50 KG/HA		MBR 8251 4.50 KG/HA	
CHEN ALB	44	xxxxxxxxx	6	x	0	
(39)	86	xxxxxxxxxxxxxxxxx	29	xxxxxx	0	
STEL MED	46	xxxxxxxxx	0		0	
(40)	64	xxxxxxxxxxxxx	0		0	
AG REPEN	94	xxxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxxxx	0	
(47)	79	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0	
ALL VIN	92	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	92	xxxxxxxxxxxxxxxxxx
(49)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	43	xxxxxxxxx
CIRS ARV	136	xxxxxxxxxxxxxxxxxxxx +	55	xxxxxxxxxxx	27	xxxxx
(50)	100	xxxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
TUS FARF	100	xxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	62	xxxxxxxxxxxx
(51)	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
CONV ARV	91	xxxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxxxx	13	xxx
(52)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
MAIZE	103	xxxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxxx +	103	xxxxxxxxxxxxxxxxxxxx +
(58)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
SORGHUM	91	xxxxxxxxxxxxxxxxx	105	xxxxxxxxxxxxxxxxxxxx +	84	xxxxxxxxxxxxxxxxx
(59)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	43	xxxxxxxxx
RICE	94	xxxxxxxxxxxxxxxxxx	112	xxxxxxxxxxxxxxxxxxxx +	65	xxxxxxxxxxxxx
(60)	79	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
GRNDNUT	131	xxxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxxx +	131	xxxxxxxxxxxxxxxxxxxx +
(64)	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
SOYABEAN	106	xxxxxxxxxxxxxxxxxxxx +	97	xxxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxxxx +
(65)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx

PRE-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	MBR 8251 0.50 KG/HA		MBR 8251 1.50 KG/HA		MBR 8251 4.50 KG/HA	
COTTON	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(66)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
JUTE	63	xxxxxxxxxxxxx	4	x	0	
(67)	79	xxxxxxxxxxxxxxxxx	14	xxx	0	
KENAF	98	xxxxxxxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx
(68)	93	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxxx	43	xxxxxxxxx
SESAMUM	137	xxxxxxxxxxxxxxxxxxxx +	25	xxxxx	0	
(70)	57	xxxxxxxxxxx	21	xxxx	0	
ELEU IND	74	xxxxxxxxxxxxxxx	30	xxxxxx	0	
(74)	86	xxxxxxxxxxxxxxxxx	21	xxxx	0	
ECH CRUS	94	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	13	xxx
(75)	93	xxxxxxxxxxxxxxxxxxx	29	xxxxxx	7	x
ROT EXAL	94	xxxxxxxxxxxxxxxxxxx	114	xxxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxxx +
(76)	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
DIG SANG	79	xxxxxxxxxxxxxxxx	11	xx	15	xxx
(77)	86	xxxxxxxxxxxxxxxxx	36	xxxxxxx	7	x
AMAR RET	111	xxxxxxxxxxxxxxxxxx +	59	xxxxxxxxxxxx	20	xxxx
(78)	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
CYP ESCU	130	xxxxxxxxxxxxxxxxxx +	0		0	
(85)	57	xxxxxxxxxxx	0		0	
CYP ROTU	138	xxxxxxxxxxxxxxxxxx +	41	xxxxxxxx	0	
(86)	93	xxxxxxxxxxxxxxxxxx	21	xxxx	0	
OXAL LAT	120	xxxxxxxxxxxxxxxxxx +	47	xxxxxxxxx	40	xxxxxxxx
(87)	93	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx

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