WEED RESEARCH ORGANIZATION

TECHNICAL REPORT No. 67

THE ACTIVITY AND POST-EMERGENCE SELECTIVITY OF SOME RECENTLY DEVELOPED HERBICIDES: TRIFOPSIME, GLUFOSINATE, RH 8817, MBR 18337 AND NC 20484

RH 8817 is acifluorfen-ethyl, MBR 18337 is benzofluor, NC 20484 is benfuresate

W G Richardson, T M West and C Parker

December 1982

Price - £3.25

Agricultural Research Council Weed Research Organization, Begbroke Hill, Yarnton, Oxford, OX5 1PF

ISSN 0511 4135
ISBN 0 7084 0259 3

CONTENTS

	Page
SUMMARY	1
INTRODUCTION	1
METHODS AND MATERIALS	2
RESULTS	
Trifopsime	5
D-4-[4-(α,α,α,-trifluoromethyl)phenoxy]-phenoxypropion-2-yloxime	
Glufosinate	15
Ammonium(3-amino-3-carboxypropyl)-methylphosphinate	
RH 8817	25
ethyl-5-[2-chloro-4-trifluoromethylphenoxy]-2 nitrobenzoate	
MBR 18337	34
N[4-(ethylthio)-2-(trifluoromethyl)phenyl]methane sulphonamide	
NC 20484	42
2,3-dihydro-3,3-dimethyl-5-benzofuranyl ethanesulphonate	
ACKNOWLEDGEMENTS	50
REFERENCES	50
APPENDIX	51

NOTE

RICHARDSON, W.G., WEST, T.M. and PARKER, C. The activity and post-emergence selectivity of some recently developed herbicides: trifopsime, glufosinate, RH 8817, MBR 18337 and NC 20484. Technical Report Agricultural Research Council Weed Research Organization, 1982, 67, pp 55.

THE ACTIVITY AND POST-EMERGENCE SELECTIVITY OF SOME RECENTLY DEVELOPED HERBICIDES: TRIFOPSIME, GLUFOSINATE, RH 8817, MBR 18337 AND NC 20484

W.G. Richardson*, T.M. West* and C. Parker**

Agricultural Research Council Weed Research Organization
Begbroke Hill, Yarnton, Oxford, OX5 1PF, UK

SUMMARY

Five herbicides were examined for their post-emergence selectivity on 37 temperate and 28 tropical crop and weed species. The route of action of three of these herbicides was determined on six selected species in a separate test.

Trifopsime, though now withdrawn by the manufacturers for toxicological reasons, was active pre- and post-emergence. Most annual and perennial temperate and tropical grass weeds were controlled post-emergence and there was some effect on Poa annua, a weed which is usually resistant to the aryloxy-phenoxy group of herbicides. Volunteer cereals were also very susceptible but all broad-leaved weeds were resistant. Onion and all broad-leaved crops tested showed a high degree of tolerance.

Glufosinate was highly active as a foliar spray with very little or no activity through the soil. It was mainly non-selective, damaging most crops as well as controlling most annual and perennial broad-leaved and grass weeds. Some degree of tolerance was shown by perennial ryegrass, onion, radish and oat.

RH 8817, active pre- and post-emergence, controlled several annual broad-leaved weeds post-emergence, including Galium aparine, Veronica persica and Solanum nigrum but grasses were much more resistant. Barley and soyabean showed some tolerance, while NA reduced toxicity marginally on maize and rice.

MBR 18337 controlled only a few annual grass weeds in chickpea and three of the brassica crops, post-emergence. Severe suppression of growth occurred with most species.

NC 20484 controlled several annual grass and broad-leaved weeds, post-emergence. Parsnip showed outstanding tolerance but perennial ryegrass was the only other temperate crop to show any degree of tolerance. Maize and more notably rice showed significant safening effects with NA .

INTRODUCTION

The pre- and post-emergence selectivities and effects of new herbicides are investigated at WRO on a large number of pot-grown crop and weed species. The limitations of these investigations are that only one crop variety or source of weed species is used and growth is 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.

This report gives indications of the post-emergence selectivity of five new herbicides. Results of an activity experiment are also included to provide information on levels of phytotoxicity, type and route of action for trifopsime, glufosinate and RH 8817.

---

* Herbicide Group ** Tropical Weeds Group

METHODS AND MATERIALS

(a) Activity experiment (AE 1)

These were carried out on six selected species as described previously (Richardson and Dean, 1974). Four annual species were raised from seeds and two perennials from rhizome fragments. There were two replicates for each treatment. 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.

Experimental details are summarised in Tables 1 and 2.

(b) Post-emergence selectivity experiment

The technique for this experiment was as before (Richardson and Parker, 1977). Plants were raised in 9 or 10 cm diameter plastic pots in soil taken from a field near Begbroke Hill, Yarnton. Planting dates were staggered so that the majority of species had reached the 2-4 leaf stage by the time of spraying. However, it can be seen in the Appendix that several species were at a more advanced stage of growth. Temperate species were raised in the open and tropical species in the glasshouse.

Table 1. Plant data for activity experiment (AE 1)

Species	Cultivar/ source	No. per pot at spraying		Depth of planting (cm)	Stage of growth		
					Spraying	Assessment	
		pre-	post		post-em	pre-em	post-em
Dwarf bean (Phaseolus vulgaris)	The Prince	3	2	1.5	2 unifoliate leaves	2 trifoliate leaves	4 trifoliate leaves
Kale (Brassica oleracea acephala)	Marrowstem	10	5	0.5	2-2½ leaves	3½ leaves	4 leaves
Polygonum amphibium	WRO Clone 1	6	4	1.0	4-5 leaves	14 leaves	10 leaves
Perennial ryegrass (Lolium perenne)	S 23	12	5	0.5	4-5 leaves	8 tillers	8 tillers
Avena fatua	WRO 1978	10	5	1.0	2½-3 leaves	9½-11½ leaves, 1-2 tillers	9-12 leaves, 2 tillers
Agropyron repens	WRO Clone 31	6	5	1.0	3-3½ leaves	11 leaves, 1-3 tillers	2 tillers

Table 2. Soil and environmental conditions

Experiment number type and herbicide(s) included	AE 1 trifopsime glufosinate RH 8817	Post-emergence selectivity test trifopsime MBR 18337 glufosinate NC 20484 RH 8817	
Date of spraying	19.5.81	3 and 6.6.81	
Main assessment completed	30.6.81	30.6.81	
Organic matter (%)	4.1	4.1	
Clay content (%)	15.0	15.0	
pH (in water; 1:2 soil:water ratio)	7.0	7.0	
Ammonium sulphate	-	1.0	
Superphosphate (g/kg)	-	3.0	
Potassium sulphate (g/kg)	-	1.0	
Vitax QS 3 fertilizer (g/kg)	2.5	-	
DDT (5% dust) (g/kg)	0.4	0.4	
Hydrated Mg SO4 (g/kg)	1.0	1.0	
Temperature (°C)		Temperate	Tropical
Mean	18	15	21
Maximum	32	25	31
Minimum	8	8	15
Relative humidity (%)			
Mean	65	70	72
Maximum	91	95	96
Minimum	25	28	38

Before spraying, each species was thinned to constant number per pot. Certain plant material was pre-treated to improve establishment:- seeds of Chenopodium album, Polygonum lapathifolium, Portulaca oleracea, Amaranthus retroflexus and Digitaria sanguinalis were soaked in 0.1 M potassium nitrate solution and then kept in the light for two days prior to planting; Veronica persica, Agrostis stolonifera and tobacco seeds were sown in a tray of peat compost and seedlings (1-2 true leaves) transplanted into the potting medium; tubers of Oxalis latifolia and Cyperus esculentus were stored moist at 2°C for two and five to six weeks respectively prior to planting, to break dormancy. Several species germinated inadequately:- lettuce, fenugreek, Senecio vulgaris, Polgonum aviculare and Chenopodium album.

To protect from soil-borne pathogens all seeds except wheat, barley, oat sorghum, sesamum, Polygonum aviculare and those given the nitrate soak treatment were pretreated with one of the following: thiram, Harvesan organomercury (Avena fatua), ethylmercuric phosphate + dieldrin (sugar beet), Milcol 30 (peas), benomyl T (onion). Root fragments of Cirsium arvense were washed in a colloidal copper solution (2 ml litre $^{-1}$) prior to planting. For dwarf bean, field bean and certain brassicas (kale, rape, cabbage, radish) 6% gum arabic solution was included with the thiram fungicide seed dressing to improve adhesion, as most of these species are susceptible to "damping off" diseases.

A series of treatments were included to investigate possible uses for safeners. Maize, wheat and barley were treated with NA (1,8-naphthalic anhydride) at 0.5% w/w of seeds. Sorghum seeds were acquired from Ciba-Geigy already dressed with cyometrinil, α-(cyanomethoximino benzacetonitrile.

Herbicides were applied using a laboratory sprayer operating at a pressure of 207 kPa (30 lb/in^2) with an 8002 Tee Jet band spray nozzle moving at 0.5 m sec $^{-1}$, 45 cm above the stationary plants. There were two replicates for each treatment. Stages of growth at spraying and assessment are summarised in Appendix 1. After spraying, the plants were protected from rainfall for 24 hours and then given an overhead watering, by means of a rose at the end of a trigger hose attached to the mains water supply, to wash any residues off the foliage. The pots were then returned to their original position in the glass-house or the open. Watering throughout the experiment was done from overhead. Additional fertilizer in solution was applied to all species at one week intervals after spraying (5 ml litre $^{-1}$ Vitafeed 301). Insecticide and fungicide solutions were applied to individual species as required.

(c) Assessment and processing of results

Results were assessed and processed as before (Richardson and Dean, 1974). Survivors were counted and scored for vigour on a 0-7 scale as previously, where 0 = dead and 7 = untreated control.

Histograms are presented for the results of each treatment, the upper of each pair represents mean plant survival and the lower, mean vigour score, both calculated as percentages of untreated controls. Actual percentage figures are displayed to the left of each row of x's (in selectivity test only). The same information is displayed in the histograms, each 'x' representing a 5% increment, but in the activity experiment each 'x' represents a 7% increment. A '+' indicates a value in excess of 100%. A value of 100 = as untreated control and 0 = a complete kill. 'R' indicates results based on one replicate only.

A table of observed selectivities, using the criteria specified, is presented below for each compound along with comments to highlight salient points. Radish (Raphanus raphistrum) was included for ease of propagation and may be regarded as a crop or weed.

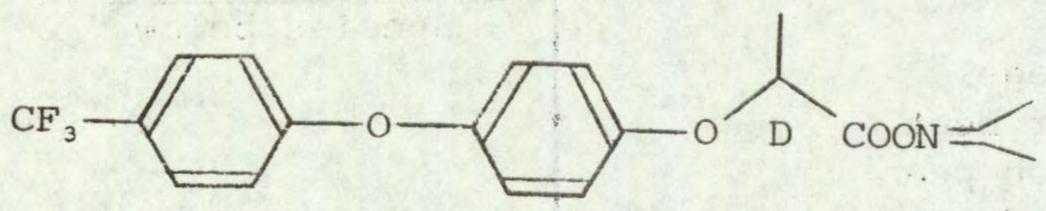
Several species, notably the perennials, were kept for extra periods to observe later effects or the degree of recovery from injury and these final observations are referred to in the text.

TRIFOPSIME

Code number RO 13-8895

Chemical name D-4-[4-(α,α,α,-trifluoromethyl)phenoxy]-phenoxypropion-2-yloxime

Structure



Source

Dr R Maag Ltd
CH-8157 Dielsdorf
Switzerland

Cyanamid of Great Britain Ltd
Agricultural Chemicals Division
Fareham Road
Gosport
P O Box 7
Hants PO13 0AS

Information available and suggested uses

Earlier suggested for control of annual grasses (at 0.125 to 0.75 kg a.i./ha) and perennial grasses (at 0.5 to 2.0 kg/ha) in all non-graminaceous crops.

This herbicide has now been withdrawn by the manufacturers.

Formulation used 36% a.i. emulsifiable concentrate + Agral surfactant at 0.15% v/v final concentration

Spray volume for activity experiment 386 l/ha
for post-emergence selectivity experiment 371 l/ha

RESULTS

Full results are given in the histograms on pages 8-14 and potential selectivities are summarised in the following table.

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
1.60	field bean pea carrot parsnip radish cowpea chickpea tobacco	Poa annua + species below

cont'd overleaf

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
0.4	species above + onion dwarf bean white clover rape kale cabbage sugar beet pigeon pea groundnut soyabean cotton jute kenaf sesamum tomato	Bromus sterilis Poa trivialis Agropyron repens Bromus pectinatus Cynodon dactylon + species below
0.1	species above	Avena fatua Alopecurus myosuroides Holcus lanatus Agrostis stolonifera Eleusine indica Echinochloa crus-galli Rottboellia exaltata Digitaria sanguinalis Snowdenia polystachya Phalaris minor

Comments on results

Activity experiment

Activity was confined to the grass species, broad-leaved species being resistant. The foliar spray was the most effective of the four application methods. Pre-emergence treatments were also very active, there being no marked differences between surface or incorporated treatments.

Symptoms

Inhibition or stunting of growth, followed by necrosis and death were the most common symptoms of grasses treated post-emergence. Similar effects were seen pre-emergence with die-back of shoots before, at or after emergence, depending on dose. Some grass species reached the three leaf stage but leaf blades were often narrow and growth was inhibited. The high dose post-emergence caused slight scorch or localised necrosis on some broad-leaved species, eg kale within 24 hours of treatment. Two other brassicas, cabbage and rape, were severely stunted, the latter continuing growth by development of lateral buds. Many broad-leaved species exhibited a lack of vigour at the higher doses. Sugar beet showed a slight inrolling of leaves from their margins which lasted several weeks until harvested, but fresh weights were not significantly reduced.

Post-emergence selectivity among temperate species

Only graminaceous weeds were controlled, including the perennials, Agrostis stolonifera and Agropyron repens as well as most annuals. Avena fatua and Alopecurus myosuroides were controlled even at the lowest dose. Poa trivialis was killed at 0,4 kg/ha but Poa annua was unaffected, requiring the

high dose of 1.6 kg/ha for control. Festuca rubra was still resistant at this dose. All broad-leaved weeds were resistant.

Onion and most broad-leaved crops were tolerant. However, radish was the only brassica to tolerate the highest dose, rape, kale and cabbage being reduced by about 50% in vigour. Perennial ryegrass and the cereals were sensitive. There were no safening effects on wheat or barley by the NA seed dressing.

Trifopsime offers outstanding potential for control of grass weeds in onion and many broad-leaved crops. Volunteer cereals and ryegrass can also be controlled. In common with other aryloxy-phenoxy herbicides eg fluazifop-butyl, Poa annua shows some resistance, but selective control of this species is at least possible in some broad-leaved crops at a higher dose.

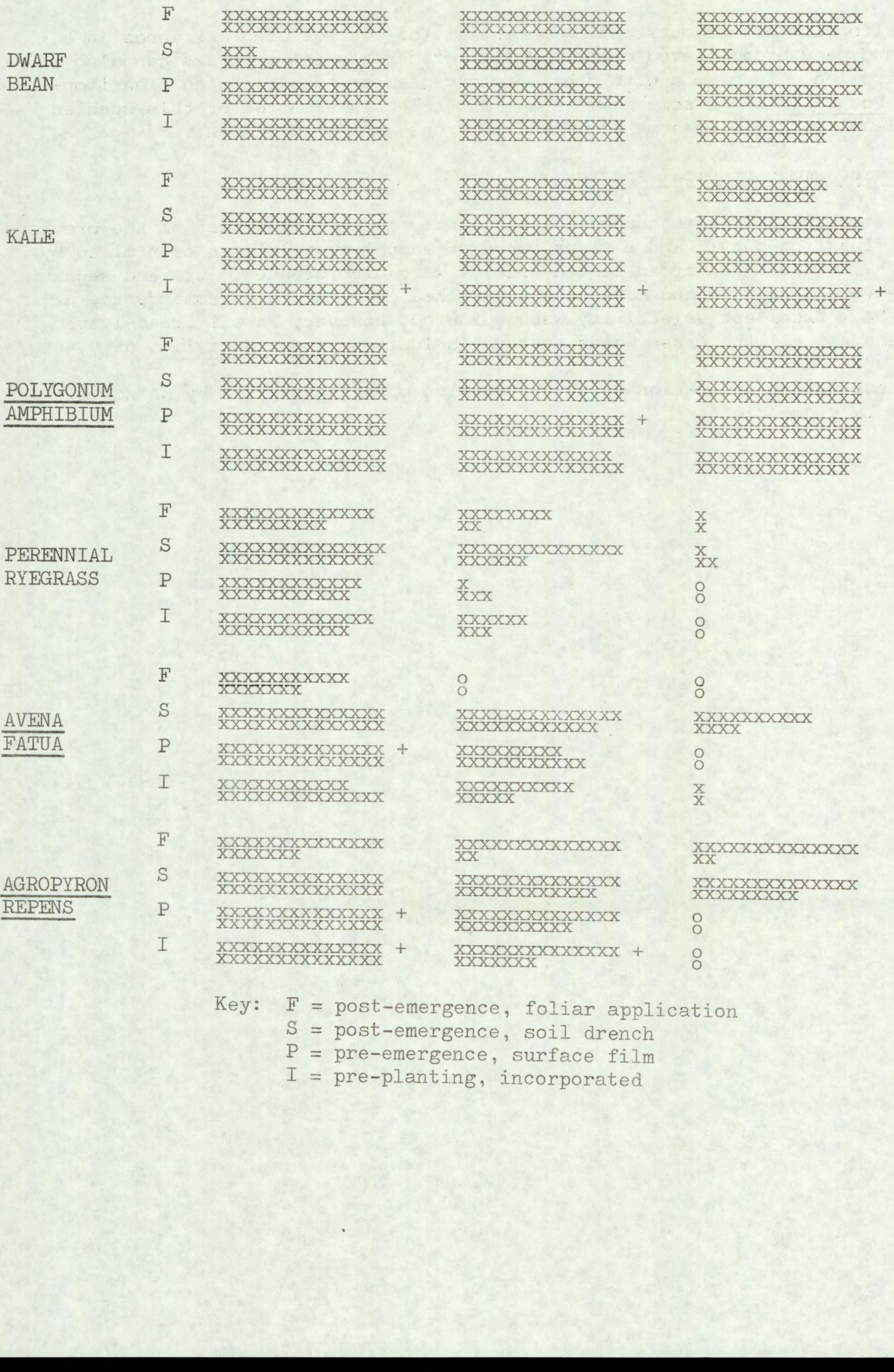
Selectivity among tropical species

The activity of this compound was slightly greater than that of the previously tested fluazifop-butyl, and a wider range of annual grasses were controlled by 0.1 kg/ha. Effects on broad-leaved species were also greater, jute and sesamum being severely damaged and most others scorched or retarded to some degree at 1.6 kg/ha. Excellent selectivity was indicated, however, in all broad-leaved crops against all the grass weeds tested, including Cynodon dactylon, at 0.4 kg/ha.

There was no indication of any protection of maize or rice by NA nor of sorghum by cyometrinil.

ACTIVITY EXPERIMENT

TRIFOPSIME



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

POST-EMERGENCE SELECTIVITY TEST

SPECIES		TRIFOPSIME 0.1 kg/ha		TRIFOPSIME 0.4 kg/ha		TRIFOPSIME 1.6 kg/ha
WHEAT	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx
(1)	29	xxxxxx	14	xxx	14	xxx
WHEAT + S	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(2)	29	xxxxxx	14	xxx	0	
BARLEY	100	xxxxxxxxxxxxxxxxxxx	0		0	
(3)	21	xxxx	0		0	
BARLEY + S	100	xxxxxxxxxxxxxxxxxxx	0		0	
(4)	21	xxxx	0		0	
OAT	40	xxxxxxxx	90	xxxxxxxxxxxxxxxxx	0	
(5)	29	xxxxxx	14	xxx	0	
PER RYGR	94	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	56	xxxxxxxxxx
(6)	43	xxxxxxxxx	29	xxxxxx	14	xxx
ONION	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
(8)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
DWF BEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
FLD BEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(10)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
PEA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(11)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
W CLOVER	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(12)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
RAPE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(14)	86	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx

SPECIES		TRIFOPSIME 0.1 kg/ha		TRIFOPSIME 0.4 kg/ha		TRIFOPSIME 1·6 kg/ha
KALE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
CABBAGE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(16)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx
CARROT	95	xxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx	105	xxxxxxxxxxxxxxxxxxxx +
(18)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
PARSNIP	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(19)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
SUG BEET	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(22)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
BETA VUL	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(23)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
BROM STE	100	xxxxxxxxxxxxxxxxxxxx	20	xxxx	0	
(24)	36	xxxxxxx	7	x	0	
FEST RUB	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxx
(25)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
AVE FATU	60	xxxxxxxxxxxx	0		0	
(26)	14	xxx	0		0	
ALO MYOS	40	xxxxxxxx	0		0	
(27)	14	xxx	0		0	
POA ANN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	69	xxxxxxxxxxxxxx
(28)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	21	xxxx
POA TRIV	56	xxxxxxxxxxx	0		0	
(29)	50	xxxxxxxxxx	0		0	

POST-EMERGENCE SELECTIVITY TEST

SPECIES		TRIFOPSIME 0.1 kg/ha		TRIFOPSIME 0.4 kg/ha		TRIFOPSIME 1.6 kg/ha
SIN ARV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(30)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
RAPH RAP	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
TRIP MAR	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(33)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
POL LAPA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(35)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
GAL APAR	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
STEL MED	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SPER ARV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(41)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
VER PERS	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(42)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
RUM OBTU	100 R	xxxxxxxxxxxxxxxxxxx	100 R	xxxxxxxxxxxxxxxxxxx	100 R	xxxxxxxxxxxxxxxxxxx
(44)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
HOLC LAN	20	xxxx	0		0	
(45)	43	xxxxxxxxx	0		0	
AG REPEN	100	xxxxxxxxxxxxxxxxxxx	14	xxx	0	
(47)	71	xxxxxxxxxxxxxx	7	x	0	
AG STOLO	0		0		0	
(48)	0		0		0	

POST-EMERGENCE SELECTIVITY TEST

SPECIES		TRIFOPSIME 0.1 kg/ha		TRIFOPSIME 0.4 kg/ha		TRIFOPSIME 1.6 kg/ha
CIRS ARV	75	xxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(50)	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
MILLET	0		0		0	
(55)	0		0		0	
MAIZE + S	75	xxxxxxxxxxxxxxx	0		0	
(56)	43	xxxxxxxxx	0		0	
MAIZE	0		0		0	
(57)	0		0		0	
SORG + S	0		0		0	
(58)	0		0		0	
SORGHUM	0		0		0	
(59)	0		0		0	
PIGEON P	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(61)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
COWPEA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(62)	93	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
CHICKPEA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(63)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
GRNDNUT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(64)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx
SOYABEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(65)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
COTTON	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(66)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx

POST-EMERGENCE SELECTIVITY TEST

SPECIES		TRIFOPSIME 0.1 kg/ha		TRIFOPSIME 0.4 kg/ha		TRIFOPSIME 1.6 kg/ha
JUTE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	92	xxxxxxxxxxxxxxxxx
(67)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx
KENAF	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(68)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
TOBACCO	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(69)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
SESAMUM	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	25	xxxxx
(70)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	36	xxxxxxx
TOMATO	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(71)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
RICE	100	xxxxxxxxxxxxxxxxxxx	25	xxxxx	0	
(72)	50	xxxxxxxxxx	14	xxx	0	
RICE + S	87	xxxxxxxxxxxxxxxxx	62	xxxxxxxxxxxx	0	
(73)	57	xxxxxxxxxxx	29	xxxxxx	0	
ELEU IND	0		0		0	
(74)	0		0		0	
ECH CRUS	0		0		0	
(75)	0		0		0	
ROTT EXA	31	xxxxxx	0		0	
(76)	14	xxx	0		0	
DIG SANG	100	xxxxxxxxxxxxxxxxxxx	0		0	
(77)	14	xxx	0		0	
AMAR RET	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(78)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx

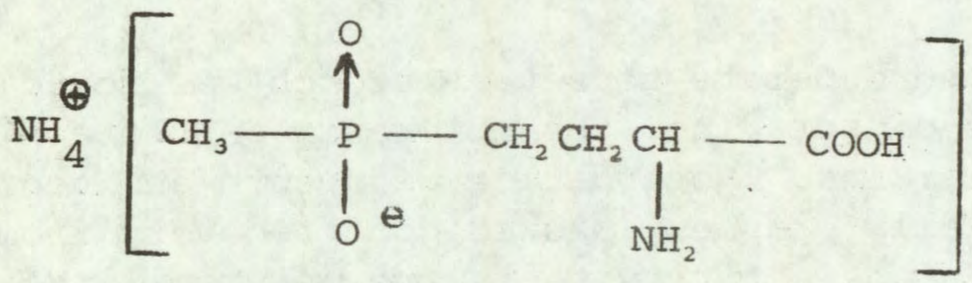
SPECIES		TRIFOPSIME 0.1 kg/ha		TRIFOPSIME 0.4 kg.ha		TRIFOPSIME 1.6 kg/ha
PORT OLE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(79)	93	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
SOL NIG	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(81)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
BROM PEC	100	xxxxxxxxxxxxxxxxxxx	0		0	
(82)	79	xxxxxxxxxxxxxxxx	0		0	
SNO POL	0		0		0	
(83)	0		0		0	
PHAL MIN	50	xxxxxxxxxx	0		0	
(84)	14	xxx	0		0	
CYP ESCU	-		-		-	
(85)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
CYP ROTU	-		-		-	
(86)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
OXAL LAT	-		-		-	
(87)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
CYN DACT	-		-		-	
(88)	36	xxxxxxx	14	xxx	0	

GLUFOSINATE

Code number Hoe 39866

Chemical name Ammonium(3-amino-3-carboxypropyl)-methylphosphinate

Structure



Source

Hoechst UK Ltd
Agriculture Division
East Winch Hall
East Winch
Norfolk PE32 1HN

Information available and suggested uses

Non-selective contact herbicide in orchards, waste ground, minimum tillage, forestry, pre-emergence of potatoes and as a dessicant between 0.5 and 1.5 kg a.i./ha.

Formulation used 20% a.i. w/v aqueous concentrate

Spray volume for activity experiment 386 l/ha
for post-emergence selectivity experiment 371 l/ha

RESULTS

Full results are given in the histograms on pages 18-24 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
1.60	None	None listed as no crops tolerant
0.4	barley + safener (NA) oat perennial ryegrass onion radish	Beta vulgaris Sinapis arvensis Tripleurospermum maritimum Stellaria media Spergula arvensis Veronica persica Rumex obtusifolius Holcus lanatus Agrostis stolonifera Cirsium arvense Echinochloa crus-galli Rottboellia exaltata Amaranthus retroflexus Portulaca oleracea
0.1	None listed as no weeds controlled	None

Comments on results

Activity experiment

Only the foliar spray was active, all three soil applications possessing very little or no activity. All six species were affected, broad-leaved species, notably kale, being more sensitive. Perennial ryegrass showed some degree of tolerance.

Symptoms

A mild chlorosis and moderate to severe scorch was found on broad-leaved species within 24 hours of spraying, the chlorosis on certain legumes being most apparent at leaf margins. Retardation of growth and necrosis followed. Several species, especially grasses, showed good recovery from the initially quite severe scorch. In the activity test, the only soil treatments showing any effects were the surface, pre-emergence treatments at the highest dose. Thus a slight, transient retardation of growth was seen on some species. Dwarf bean was not retarded, however, and although a mild temporary chlorosis and necrosis was seen on leaves, plants podded normally. Also in the activity experiment, Agropyron repens recovered well from foliar sprays at the middle dose after earlier stunting and scorch, but the rhizome system was less vigorous than the control. At the high dose, however, all plant systems were killed.

Post-emergence selectivity among temperate species

At 0.4 kg/ha mainly annual broad-leaved weeds were controlled. Holcus lanatus was the only sensitive annual grass weed. However, two perennials, Agrostis stolonifera and Cirsium arvense were susceptible at this dose. At the highest dose (1.6 kg/ha) all weeds tested were killed or controlled.

Perennial ryegrass was the most tolerant species tested (corresponding to the activity experiment), 1.6 kg/ha failing to kill this species, though it was reduced severely in vigour at this dose. Onion, oat, radish and barley + safener (NA) were the only other crops to tolerate 0.4 kg/ha. A mild safening effect of NA also occurred on wheat at this dose. The tolerance of oat and onion corresponded to the low amount of spray retained on the leaves of these species. Retention on radish and perennial ryegrass was high however,. At 1.6 kg/ha all crops were either killed or severely damaged. Sugar beet and white clover were very sensitive.

Glufosinate shows high capacity as a non-selective post-emergence foliar spray, in common with glyphosate and paraquat. Symptoms are somewhat slower to develop than with paraquat but more rapid than with glyphosate. These results also suggest that translocation is intermediate, as compared with the two other herbicides, being higher than paraquat but less than glyphosate. Advantages of glufosinate over the two other herbicides are not obvious at present but testing of all three in the many situations where these herbicides are used could prove interesting. One possible advantage could be in spot treatments or selective applications (SELAP) eg weed wiping. A problem in control of annual beet in the beet crop has been the damage caused to the latter, either by "splash" from weed to crop or transfer of herbicide by some other means. Perhaps glufosinate would be less hazardous to use in such a situation, the ability of several plant species to recover from sub-lethal doses being very marked in the current experiment. Some further testing, initially in pots, with the other crops found tolerant here, may also be worthwhile. Already in other work, established ryegrass has proved tolerant while Rumex obtusifolius was susceptible (T.M. West et al, unpublished results). The safening effects of NA on barley and wheat, though mild, need verification.

Selectivity among tropical species

All crops were damaged at 0.4 kg/ha and at this dose only four weed species were controlled so there seems little prospect of selectivity in annual crops with overall application. No appreciable protection was provided by the safeners NA or cyometrinil. For directed spraying or pre-planting application, the spectrum of activity on annual weeds appears likely to be good at doses above 1 kg/ha. Effects on perennials suggested a little translocation, but recovery from initial scorch was rapid. Oxalis latifolia and Cyperus species made complete recovery from the highest dose within 2-3 months. In one replicate Cynodon dactylon was killed at 1.6 kg/ha but this material had not developed a rhizome system prior to spraying, and it appears probable that effects on perennials in the field would be only transitory.

ACTIVITY EXPERIMENT

GLUFOSINATE

		0.1 kg/ha	0.5 kg/ha	2.5 kg/ha
DWARF BEAN	F	xxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxx xxx	xxxxxxxxxxxxxx xx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxx
KALE	F	xxxxxxxxxxxxx xxxxxxxxxx	o o	x x
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxx xxxxxxxxxxxxxx	xx xxxxxxxxxx R
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxx	xxxxxxxxxxxxxx xx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx	xxxxxxx xx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxx xxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxxx
AVENA FATUA	F	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxx xxxxxx	o o
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	I	xxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxx xxxxxxxxxxxxx
AGROPYRON REPENS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxxx xx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx

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

SPECIES		GLUFOSINATE 0.1 kg/ha		GLUFOSINATE 0.4 kg/ha		GLUFOSINATE 1.6 kg/ha
WHEAT	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
(1)	86	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	0	
WHEAT + S	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	0	
(2)	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	0	
BARLEY	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(3)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	0	
BARLEY + S	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	10	xx
(4)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	14	xxx
OAT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(5)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	0	
PER RYGR	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxx
(6)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	36	xxxxxxx
ONION	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	14	xxx
(8)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	14	xxx
DWF BEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(9)	64	xxxxxxxxxxxx	50	xxxxxxxxxx	0	
FLD BEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(10)	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
PEA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(11)	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0	
W CLOVER	100	xxxxxxxxxxxxxxxxxxx	0		0	
(12)	64	xxxxxxxxxxxxx	0		0	
RAPE	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	20	xxxx
(14)	100	xxxxxxxxxxxxxxxxxxx	21	xxxx	14	xxx

POST-EMERGENCE SELECTIVITY TEST

SPECIES		GLUFOSINATE 0.1 kg/ha		GLUFOSINATE 0.4 kg/ha		GLUFOSINATE 1.6 kg/ha
KALE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx
(15)	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx
CABBAGE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	20	xxxx
(16)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	7	x
CARROT	105	xxxxxxxxxxxxxxxxxxx+	105	xxxxxxxxxxxxxxxxxxx+	0	
(18)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	0	
PARSNIP	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	20	xxxx
(19)	93	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	14	xxx
SUG BEET	100	xxxxxxxxxxxxxxxxxxx	10	xx	0	
(22)	64	xxxxxxxxxxxxx	7	x	0	
BETA VUL	100	xxxxxxxxxxxxxxxxxxx	20	xxxx	0	
(23)	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	0	
BROM STE	100	xxxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxx	0	
(24)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0	
FEST RUB	69	xxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	12	xx
(25)	79	xxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	36	xxxxxxx
AVE FATU	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(26)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	0	
ALO MYOS	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(27)	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
POA ANN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(28)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0	
POA TRIV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(29)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	0	

SPECIES		GLUFOSINATE 0.1 kg/ha		GLUFOSINATE 0.4 kg/ha		GLUFOSINATE 1.6 kg/ha	
SIN ARV	100	xxxxxxxxxxxxxxxxxxx	70	xxxxxxxxxxxxx	0		
(30)	79	xxxxxxxxxxxxxxx	29	xxxxxx	0		
RAPH RAP	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0		
(31)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	0		
TRIP MAR	100	xxxxxxxxxxxxxxxxxxx	0		0		
(33)	86	xxxxxxxxxxxxxxxx	0		0		
POL LAPA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0		
(35)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	0		
GAL APAR	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0		
(38)	93	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxx	0		
STEL MED	100	xxxxxxxxxxxxxxxxxxx	5	x	0		
(40)	86	xxxxxxxxxxxxxxxx	21	xxxx	0		
SPER ARV	56	xxxxxxxxxx	0		0		
(41)	50	xxxxxxxxx	0		0		
VER PERS	60	xxxxxxxxxxx	0		0		
(42)	64	xxxxxxxxxxxx	0		0		
RUM OBTU	100	R xxxxxxxxxxxxxxxxxxx	33	R xxxxxxx	33	R xxxxxxx	
(44)	71	xxxxxxxxxxxxx	29	xxxxxx	14	xxx	
HOLC LAN	100	xxxxxxxxxxxxxxxxxxx	10	xx	0		
(45)	86	xxxxxxxxxxxxxxxx	7	x	0		
AG REPEN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0		
(47)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	0		
AG STOLO	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	0		
(48)	100	xxxxxxxxxxxxxxxxxxx	14	xxx	0		

SPECIES		GLUFOSINATE 0.1 kg/ha		GLUFOSINATE 0.4 kg/ha		GLUFOSINATE 1.6 kg/ha
CIRS ARV	75	xxxxxxxxxxxxxx	25	xxxxx	0	
(50)	71	xxxxxxxxxxxxxx	7	x	0	
MILLET	100	xxxxxxxxxxxxxxxxxxx	10	xx	0	
(55)	79	xxxxxxxxxxxxxxx	14	xxx	0	
MAIZE + S	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	25	xxxxx
(56)	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	21	xxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(57)	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0	
SORG + S	100	xxxxxxxxxxxxxxxxxxx	0		0	
(58)	86	xxxxxxxxxxxxxxxx	0		0	
SORGHUM	100	xxxxxxxxxxxxxxxxxxx	0		0	
(59)	86	xxxxxxxxxxxxxxxx	0		0	
PIGEON P	100	xxxxxxxxxxxxxxxxxxx	0		0	
(61)	64	xxxxxxxxxxxx	0		0	
COWPEA	100	xxxxxxxxxxxxxxxxxxx	0		0	
(62)	71	xxxxxxxxxxxxx	0		0	
CHICKPEA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(63)	79	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	0	
GRNDNUT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(64)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
SOYABEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(65)	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxx	0	
COTTON	100	xxxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxx	60	xxxxxxxxxxx
(66)	79	xxxxxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx

SPECIES		GLUFOSINATE 0.1 kg/ha		GLUFOSINATE 0.4 kg/ha	GLUFOSINATE 1.6 kg/ha
JUTE	100	xxxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	0
(67)	71	xxxxxxxxxxxxxx	14	xxx	0
KENAF	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0
(68)	79	xxxxxxxxxxxxxxxx	29	xxxxxx	0
TOBACCO	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0
(69)	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	0
SESAMUM	19	xxxx	0		0
(70)	50	xxxxxxxxxx	0		0
TOMATO	100	xxxxxxxxxxxxxxxxxxx	0		0
(71)	64	xxxxxxxxxxxxx	0		0
RICE	87	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0
(72)	79	xxxxxxxxxxxxxxxx	36	xxxxxxx	0
RICE + S	100	xxxxxxxxxxxxxxxxxxx	37	xxxxxxx	0
(73)	93	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0
ELEU IND	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0
(74)	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0
ECH CRUS	100	xxxxxxxxxxxxxxxxxxx	17	xxx	0
(75)	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0
ROTT EXA	100	xxxxxxxxxxxxxxxxxxx	44	xxxxxxxxx	0
(76)	79	xxxxxxxxxxxxxxxx	14	xxx	0
DIG SANG	100	xxxxxxxxxxxxxxxxxxx	33	xxxxxxx	0
(77)	93	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0
AMAR RET	60	xxxxxxxxxxxx	5	x	0
(78)	50	xxxxxxxxxx	21	xxxx	0

POST-EMERGENCE SELECTIVITY TEST

SPECIES		GLUFOSINATE 0.1 kg/ha		GLUFOSINATE 0.4 kg/ha		GLUFOSINATE 1.6 kg/ha
PORT OLE	33	xxxxxxx	0		0	
(79)	50	xxxxxxxxxx	0		0	
SOL NIG	100	xxxxxxxxxxxxxxxxxxx	33	xxxxxxx	8	xx
(81)	64	xxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx
BROM PEC	100	xxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx	0	
(82)	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
SNO POL	100	xxxxxxxxxxxxxxxxxxx	56	xxxxxxxxxxx	0	
(83)	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
PHAL MIN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	0	
(84)	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0	
CYP ESCU	-		-		-	
(85)	71	xxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx
CYP ROTU	-		-		-	
(86)	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx
OXAL LAT	-		-		-	
(87)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	36	xxxxxxx
CYN DACT	-		-		-	
(88)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	14	xxx

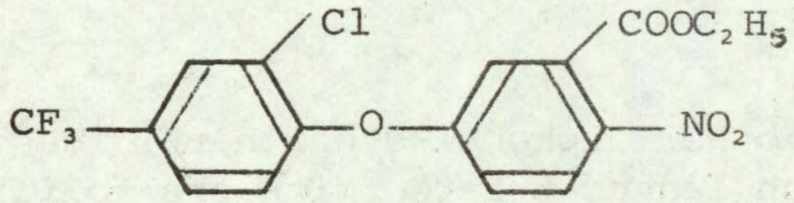
RH 8817

Code number RH 8817

Common name Acifluorfen-ethyl ester (suggested)

Chemical name ethyl-5-[2-chloro-4-trifluoromethylphenoxy]-2 nitrobenzoate

Structure



Source

Rohm & Haas (UK) Ltd
Lennig House
2 Masons Avenue
Croydon
Surrey CR9 3NB

Information available and suggested uses

Pre-emergence weed control at 0.13 to 0.56 kg a.i./ha in soyabean and possibly rice and groundnuts.

Formulation used 24% a.i. emulsifiable concentrate

Spray volume for activity experiment 386 l/ha
for post-emergence selectivity experiment 371 l/ha

RESULTS

Full results are given in the histograms on pages 27-33 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
3.20 or 0.8	None	None listed as no crops tolerant
0.20	barley maize + safener (NA) soyabean rice + safener (NA)	Beta vulgaris Sinapis arvensis Raphanus raphanistrum Tripleurospermum maritimum Galium aparine Stellaria media Spergula arvensis Veronica persica Portulaca oleracea Solanum nigrum

Comments on results

Activity experiment

The foliar spray was initially very damaging on all, particularly broad-leaved species, but recovery was considerable. Soil drenches tended to be the least effective means of application while surface pre-emergence sprays were the most effective, particularly on the smaller-seeded species, kale and ryegrass. With incorporation, there tended to be less effect than with the surface spray on all species except dwarf bean. These results are similar to those found with other diphenyl-ether herbicides.

Symptoms on susceptible species

These were the same as with other diphenyl-ether herbicides. A rapid and severe contact damage developed on leaves treated with the foliar spray. However growing points were not always affected and often made a full recovery. Sometimes new leaves were trapped, causing deformities. Soil drenches caused severe necrosis, especially to the stems of broad-leaved plants. With higher doses pre-emergence, there was often failure to emerge from the soil or from the coleoptile of grasses. Where plants survived this stage, leaf trapping and deformity was often seen,as well as necrosis.

Post-emergence selectivity among temperate species

Six of the eight annual broad-leaved weeds were controlled at the lowest dose of 0.2 kg/ha, including Galium aparine, Veronica persica and interestingly Stellaria media, the latter species usually being resistant to diphenyl-ether herbicides. Only the two polygonaceous weeds (Polygonum lapathifolium and Rumex obtusifolius) survived this dose, though both were reduced in number and vigour by about 50% or more. Grass weeds were generally resistant.

Barley was the only crop to show any tolerance and then only at the lowest dose of 0.2 kg/ha. Neither barley or wheat were safened by NA. Onion, white clover, sugar beet and certain brassica crops eg radish were very sensitive.

The potential control of G. aparine and V. persica in barley is interesting in view of their importance in this crop. The lack of effect on grass weeds will mean that mixtures with other herbicides will be necessary. Urea herbicides such as metoxuron, isoproturon and chlortoluron are worth considering as the latter may be well complemented by RH 8817, the ureas being weak on G. aparine and V. persica.

Selectivity among tropical species

Soyabean and rice showed the greatest tolerance among the tropical crops, but there was clear selectivity only against two broad-leaved species and the selective potential for this compound as a post-emergence treatment, therefore, appears doubtful. Crop safety was only marginally improved by NA on rice and maize and not at all by cyometrinil on sorghum. Perennials recovered quite rapidly from 0.8 kg/ha but all showed prolonged damage from 3.2 kg/ha perhaps suggesting long persistence in the soil.

ACTIVITY EXPERIMENT

RH 8817

		0.1 kg/ha	0.5 kg/ha	2.5 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxx xxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxx
KALE	F	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx	xxx xxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxx xxxxx
	P	xxxxxxxxxxxxx xxxxxxxxxxxxx	xx xxxx	o o
	I	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxx	xxxx xxxxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxx xxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxx
	P	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxx xxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxx xxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxx xxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxx xxxxxxxxx	o o
	I	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxx xxxxxx
AVENA FATUA	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxx
	P	xxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxxx	xxxxxxxxx xxxxx
	I	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxx
AGROPYRON REPENS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx
	P	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxxxxxxxx	xxxxxxxxxx xxxxxx
	I	xxxxxxxxxxxxxx + xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxx + xxxxxxxxxx

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

POST-EMERGENCE SELECTIVITY TEST

SPECIES		RH 8817 0.2 kg/ha		RH 8817 0.8 kg/ha		RH 8817 3.2 kg/ha
WHEAT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	30	xxxxxx
(1)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
WHEAT + S	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx
(2)	64	xxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
BARLEY	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	20	xxxx
(3)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
BARLEY + S	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	70	xxxxxxxxxxxxxx
(4)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	21	xxxx
OAT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	10	xx
(5)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	7	x
PER RYGR	87	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxx
(6)	64	xxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
ONION	0		0		0	
(8)	0		0		0	
DWF BEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(9)	36	xxxxxxx	29	xxxxxx	14	xxx
FLD BEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
(10)	57	xxxxxxxxxxx	21	xxxx	7	x
PEA	100	xxxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxx	0	
(11)	57	xxxxxxxxxxx	29	xxxxxx	0	
W CLOVER	19	xxxx	0		0	
(12)	29	xxxxxx	0		0	
RAPE	100	xxxxxxxxxxxxxxxxxxx	10	xx	0	
(14)	79	xxxxxxxxxxxxxxxx	14	xxx	0	

SPECIES		RH 8817 0.2 kg/ha		RH 8817 0.8 kg/ha		RH 8817 3.2 kg/ha
KALE	90	xxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxx	60	xxxxxxxxxxxx
(15)	50	xxxxxxxxxx	29	xxxxxx	14	xxx
CABBAGE	50	xxxxxxxxxx	0		0	
(16)	29	xxxxxx	0		0	
CARROT	105	xxxxxxxxxxxxxxxxxxx+	95	xxxxxxxxxxxxxxxxxx	42	xxxxxxxx
(18)	57	xxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
PARSNIP	90	xxxxxxxxxxxxxxxxx	10	xx	0	
(19)	29	xxxxxx	7	x	0	
SUG BEET	0		0		0	
(22)	0		0		0	
BETA VUL	0		0		0	
(23)	0		0		0	
BROM STE	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	10	xx
(24)	71	xxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
FEST RUB	69	xxxxxxxxxxxxx	6	x	0	
(25)	57	xxxxxxxxxx	14	xxx	0	
AVE FATU	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	20	xxxx
(26)	79	xxxxxxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
ALO MYOS	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
(27)	86	xxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	36	xxxxxxx
POA ANN	100	xxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxx	62	xxxxxxxxxxxx
(28)	71	xxxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxxx
POA TRIV	94	xxxxxxxxxxxxxxxxx	50	xxxxxxxxx	31	xxxxxx
(29)	57	xxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx

SPECIES		RH 8817 0.2 kg/ha		RH 8817 0.8 kg/ha		RH 8817 3.2 kg/ha
SIN ARV	0		0		0	
(30)	0		0		0	
RAPH RAP	10	xx	0		0	
(31)	7	x	0		0	
TRIP MAR	0		0		0	
(33)	0		0		0	
POL LAPA	45	xxxxxxxxx	0		0	
(35)	57	xxxxxxxxxxx	0		0	
GAL APAR	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	67	xxxxxxxxxxxxx
(38)	29	xxxxxx	14	xxx	14	xxx
STEL MED	25	xxxxx	0		0	
(40)	21	xxxx	0		0	
SPER ARV	0		0		0	
(41)	0		0		0	
VER PERS	0		0		0	
(42)	0		0		0	
RUM OBTU	33	R xxxxxxx	0	R	0	R
(44)	43	xxxxxxxxx	0		0	
HOLC LAN	40	xxxxxxxx	0		0	
(45)	43	xxxxxxxxx	0		0	
AG REPEN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(47)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx
AG STOLO	100	xxxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxx	40	xxxxxxxx
(48)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx

Click here to continue