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ACIFLUORFEN

SPECIES		0.2 kg/ha		0.6 kg/ha		1.8 kg/ha
CYP ESCU	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(85)	64	xxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
CYP ROTU	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(86)	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	50	xxxxxxxxxx
OXAL LAT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(87)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
BROM PEC	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(88)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, R 40244 is flurochloridone

ARD 34/02

Code number

ARD 34/02
NP 55
BAS 9052

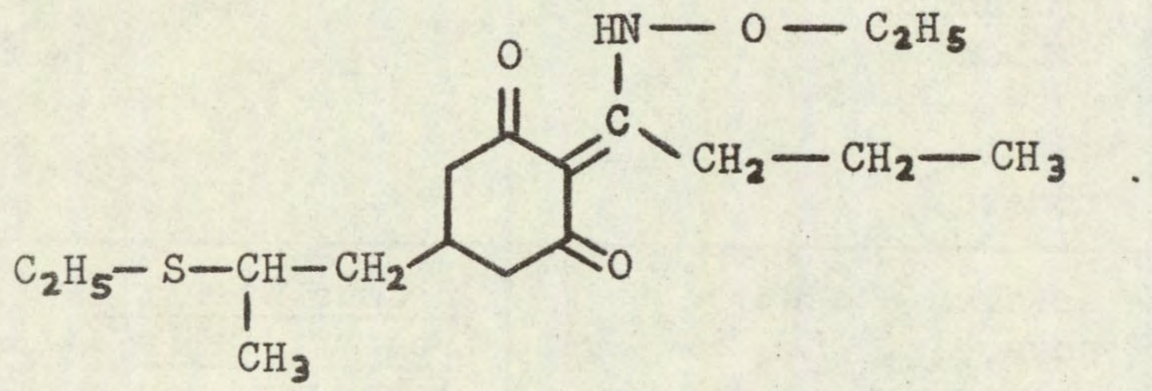
Proposed common name

cietoxidim

Chemical name

2-[N-(ethoxyamino)butylidene]-5-(2-ethylthiopropyl)-cyclohexan-1,3-dione

Structure



Note

There are alternative representations of this tautomeric structure, depending how the H is placed. Either form is correct but the above is consistent with the nomenclature used for the related alloxydim (see also Formigoni et al, 1979).

Source

May & Baker Ltd
Ongar Research Station
Fyfield Road
Ongar
Essex, UK

Information available and suggested uses

Annual and perennial grass weed control in dicotyledonous crops.

Formulation used

18.4% w/v a.i. emulsifiable concentrate

Spray volume

for activity experiment 370 l/ha
for post-emergence selectivity experiment 345 l/ha

RESULTS

Full results are given in the histograms on pages 35-41 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
1.6	onion dwarf bean field bean pea white clover rape kale cabbage	species below

continued on page 33

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
1.6	radish carrot parsnip lettuce sugar beet pigeon pea cowpea chickpea groundnut cotton jute kenaf tomato	species below
0.4	species above+ soyabean tobacco	Bromus sterilis Poa trivialis Agropyron repens Snowdenia polystachya Phalaris minor Bromus pectinatus + species below
0.1	species above + sesamum	Avena fatua Alopecurus myosuroides Holcus lanatus Agrostis stolonifera Oryza punctata Eleusine indica Echinochloa crus-galli Rottboellia exaltata Digitaria sanguinalis

Comments on results

Activity experiment

Activity was almost entirely confined to the grass species, these being sensitive to post- and pre-emergence applications. In the former, perennial ryegrass and Avena fatua were slightly more affected by soil drenches than the foliar spray, though activity was high even in the latter, the low dose of 0.1 kg/ha giving vigour reductions in the region of 50%. With Agropyron repens, however, the foliar spray was more effective than the soil drench at the higher doses. This should be borne in mind when considering the results of the post-emergence selectivity test where there was the possibility of both soil and foliar uptake. Pre-emergence surface treatments tended to be slightly more toxic than post-emergence on ryegrass and A. fatua, the former species being killed even at the lowest dose. The surface pre-emergence spray on these two species was more effective than when the herbicide was incorporated into the soil. A. repens showed this trend only at the middle dose.

Symptoms

A severe inhibition or stunting of growth developed on grasses treated post-emergence. This took several days to develop and was often accompanied by chlorosis and followed by necrosis and death. Sub-lethal doses on A. fatua and A. repens sometimes caused extra tillering, leading in some cases to recovery.

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, R 40244 is flurochloridone

but on A. fatua treated with the foliar spray even the tillers became chlorotic. Similar symptoms occurred on grasses treated pre-emergence but at higher doses there was often a failure to emerge from the soil or from the coleoptile. Apart from a slight stunting at the high dose with the foliar spray on kale and dwarf bean and a mild scorch of the unifoliate leaves of the latter, possibly due to the solvent in the formulation, no symptoms appeared on any broad-leaved species.

Post-emergence selectivity among temperate species

With the exception of Poa annua, all annual and perennial grass weeds were controlled by the two lowest doses. Poa annua was not controlled even at the high dose. Agropyron repens recovered from initially severe effects at 0.1 kg/ha but was killed at the two higher doses. The other perennial, Agrostis stolonifera, was eventually killed even at the lowest dose. All broad-leaved weeds were resistant.

All broad-leaved crops and onion were resistant. Several species were kept to observe any late effects but these did not occur (other than a possible slight reduction of nodulation of field bean roots).

Clearly this herbicide offers outstanding potential for control of grass weeds in onion and broad-leaved crops. Control of volunteer cereals and rye-grass is also possible, these species being as susceptible as most of the other grasses. Its activity on grasses is somewhat greater than the related alloxydim. The same defect in the weed spectrum is apparent, however, with the resistance of Poa annua and all broad-leaved weeds (Richardson & Parker, 1978). In view of their importance, in onion and many broad-leaved crops, studies on mixtures and sequences with herbicides used in these crops will need to be carried out.

Post-emergence selectivity among tropical species

Excellent selectivity was demonstrated against all the grass weeds including Rottboellia exaltata at 0.4 kg/ha in all broad-leaved crops other than sesamum. The latter showed some deformities at this dose but it is not certain that these were due to the herbicide. It did not show corresponding susceptibility to the related alloxydim (Richardson & Parker, 1978). In general, the activity of ARD 34/02 on grasses was at least $2\frac{1}{2}$ times greater than that of alloxydim while selectivity was at least as good. Limited further studies at WRO have indicated a similarly greater activity on perennial grasses and this compound seems likely to have an important role in selective control of annual and perennial grasses in a wide range of tropical crops. Cyperus species are highly tolerant but so far there is no evidence for tropical grass species with tolerance comparable to that of Poa annua.

ACTIVITY EXPERIMENT

ARD 34/02 (= NP 55)

		0.1 kg/ha	0.4 kg/ha	1.6 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxx
	I	xxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxxxxxxx
KALE	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxxxxxxx
	I	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
	I	xxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxxxx xxxx	xxxxxxxxxxxxxxx xx
	S	xxxxxxxxxxxxxxx xxx	xxxxxxxxxxxxxxx xx	xxxxxxxxxxxxxxx xx
	P	o o	o o	o o
	I	xxxxxxxxx xxxxxxx	xxx xxxx	o o
AVENA FATUA	F	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxx	xxxxxxxxxxxxxxx xx
	S	xxxxxxxxxxxxxxx xxxxxxx	xxxxxxxxxx xx	xxxx x
	P	xxxxxxxxxxxx xxxxxxxxx	o o	x xx
	I	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxx	o o
AGROPYRON REPENS	F	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxxx xx
	S	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxx xxxxxxxxx	x xx
	I	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx	x x

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

POST-EMERGENCE SELECTIVITY EXPERIMENT

ARD 34/02 (= NP 55)

SPECIES		0.1 kg/ha		0.4 kg/ha		1.6 kg/ha
WHEAT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	0	
(1)	57	xxxxxxxxxxx	21	xxxx	0	
BARLEY	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	0	
(2)	50	xxxxxxxxxx	21	xxxx	0	
OAT	100	xxxxxxxxxxxxxxxxxxxx	0		0	
(3)	29	xxxxxx	0		0	
PER RYGR	62	xxxxxxxxxxx	0		0	
(4)	14	xxx	0		0	
ONION	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(8)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
DWF BEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
FLD BEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(10)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
PEA	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(11)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
W CLOVER	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(12)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
RAPE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(14)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
KALE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
CABBAGE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(16)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx

POST-EMERGENCE SELECTIVITY EXPERIMENT

ARD 34/02 (= NP 55)

SPECIES	0.1 kg/ha		0.4 kg/ha		1.6 kg/ha	
CARROT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(18)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
PARSNIP	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(19)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
LETTUCE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(20)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SUG BEET	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(21)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
FENUGREEK	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(22)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
BROM STE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(24)	71	xxxxxxxxxxxxxx	29	xxxxxx	21	xxxx
AVE FATU	100	xxxxxxxxxxxxxxxxxxx	0		0	
(26)	29	xxxxxx	0		0	
ALO MYOS	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	0	
(27)	29	xxxxxx	14	xxx	0	
POA ANN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
(28)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx
POA TRIV	100	xxxxxxxxxxxxxxxxxxx	42	xxxxxxxx	25	xxxxx
(29)	36	xxxxxxx	14	xxx	7	x
SIN ARV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(30)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
RAPH RAP	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx

ARD 34/02 (= NP 55)

SPECIES		0.1 kg/ha		0.4 kg/ha		1.6 kg/ha
TRIP MAR	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(33)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
SEN VULG	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(34)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
POL LAPA	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(35)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
GAL APAR	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
CHEN ALB	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(39)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
STEL MED	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
SPER ARV	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(41)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
VER PERS	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(42)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
RUM OBTU	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(44)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
HOLC LAN	80	xxxxxxxxxxxxxxxx	0		0	
(45)	21	xxxx	0		0	
AG REPEN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(47)	57	xxxxxxxxxxx	14	xxx	14	xxx
AG STOLO	87	xxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	0	
(48)	29	xxxxxx	14	xxx	0	

POST-EMERGENCE SELECTIVITY EXPERIMENT

ARD 34/02 (= NP 55)

SPECIES	0.1 kg/ha		0.4 kg/ha		1.6 kg/ha	
CIRS ARV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
MILLET	0		0		0	
(55)	0		0		0	
MAIZE	100	xxxxxxxxxxxxxxxxxxx	0		0	
(57)	29	xxxxxx	0		0	
SORGHUM	50	xxxxxxxxxx	0		0	
(59)	14	xxx	0		0	
PIGEON P	83	xxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx
(61)	86	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
COWPEA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(62)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
CHICKPEA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(63)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
GRNDNUT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(64)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SOYABEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(65)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
COTTON	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(66)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
JUTE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(67)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
KENAF	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(68)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx

POST-EMERGENCE SELECTIVITY EXPERIMENT

ARD 34/02 (= NP 55)

SPECIES		0.1 kg/ha		0.4 kg/ha		1.6 kg/ha
TOBACCO	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(69)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
SESAMUM	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(70)	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
TOMATO	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(71)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
OR PUNCT	60	xxxxxxxxxxxx	10	xx	0	
(73)	29	xxxxxx	14	xxx	0	
ELEU IND	100	xxxxxxxxxxxxxxxxxxxx	0		0	
(74)	29	xxxxxx	0		0	
ECH CRUS	67	xxxxxxxxxxxxx	0		0	
(75)	21	xxxx	0		0	
ROTT EXA	50	xxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	0	
(76)	29	xxxxxx	14	xxx	0	
DIG SANG	92	xxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx	0	
(77)	29	xxxxxx	14	xxx	0	
AMAR RET	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(78)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
PORT OLE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(79)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
SOL NIG	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(81)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
SNOW POL	100	xxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0	
(83)	57	xxxxxxxxxxx	14	xxx	0	

ARD 34/02 (= NP 55)

SPECIES		0.1 kg/ha		0.4 kg/ha		1.6 kg/ha
PHAL MIN	100	xxxxxxxxxxxxxxxxxxxx	7	x	0	
(84)	36	xxxxxxx	7	x	0	
CYP ESCU	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(85)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
CYP ROTU	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(86)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
OXAL LAT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(87)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
BROM PEC	100	xxxxxxxxxxxxxxxxxxxx	0		0	
(88)	64	xxxxxxxxxxxxx	0		0	

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, R 40244 is flurochloridone

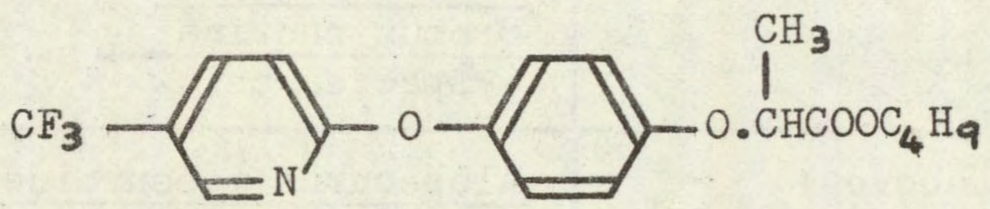
PP 009

Code number PP 009

Proposed common name Fluazifop-butyl

Chemical name Butyl 2-[4-(5-trifluoromethyl-2-pyridyloxy)phenoxy] propionate

Structure



Source

ICI Plant Protection Ltd
Jealott's Hill Research Station
Bracknell
Berks RG12 6EY
UK

Information available and suggested uses

Post-emergence control of annual and perennial grass weeds and self-sown cereals in a wide range of temperate and tropical broad-leaved crops.

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

Spray volume for activity experiment 370 l/ha
for post-emergence selectivity experiment 345 l/ha

RESULTS

Full results are given in the histograms on pages 45-51 and potential selectivities are summarised in the following table.

RATE (kg a.i./ha)	CROPS: vigour reduced by less than 15%	WEEDS: number or vigour reduced by 70% or more
1.6	onion dwarf bean field bean pea white clover rape kale cabbage radish carrot parsnip lettuce sugar beet fenugreek cowpea groundnut cotton	Bromus sterilis Poa trivialis Agropyron repens + species below

continued on page 43

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, R 40244 is flurochloridone

RATE (kg a.i./ha)	CROPS: vigour reduced by less than 15%	WEEDS: number or vigour reduced by 70% or more
0.4	species above + chickpea soyabean jute kenaf tobacco sesamum	Avena fatua Holcus lanatus Oryza punctata Digitaria sanguinalis Snowdenia polystachya Phalaris minor Bromus pectinatus + species below
0.1	species above + tomato	Alopecurus myosuroides Agrostis stolonifera Eleusine indica . Echinochloa crus-galli Rottboellia exaltata

Comments on results

Activity experiment

The grass species exhibited high sensitivity to PP 009 but broad-leaved species were resistant. Post-emergence, the foliar spray was slightly more active on perennial ryegrass and Agropyron repens than was the soil drench. Most toxicity resulted from the pre-emergence treatments, particularly the surface spray. Incorporating the herbicide into the soil reduced its effectiveness as compared with the surface spray.

Symptoms

A severe inhibition of growth accompanied by chlorosis and later necrosis were the symptoms commonly found on the grasses treated post- and pre-emergence. Sub-lethal doses of the foliar spray resulted in increased tiller production on perennial ryegrass. This species in other treatments at similar doses sometimes exhibited a darker green colour, shininess and twisting of leaves. With A. repens the chlorosis or almost albinism was also accompanied by a pink colouration of leaf tissue. Higher doses pre-emergence prevented grass species either from emerging from the soil or from the coleoptile. At lower doses plants appeared 'dart-like', which was later found to be accompanied by weakened root systems. Only minor symptoms, such as a slight lack of vigour, mild retardation or necrosis, were found on broad-leaved species and then only at the highest dose. Fenugreek actually appeared a darker green colour and looked more vigorous than untreated controls.

Post-emergence selectivity among temperate species

With the exception of Poa annua, control of grass weeds was outstanding. Alopecurus myosuroides and Agrostis stolonifera were controlled even at 0.1 kg/ha. Avena fatua and Holcus lanatus were reduced in vigour by 50% or more at this dose and killed or controlled at 0.4 kg/ha. Although the high dose of 1.6 kg/ha was needed to control Bromus sterilis, Poa trivialis and Agropyron repens, all were severely affected at lower doses. No effects were seen on broad-leaved weeds.

Onion and all broad-leaved crops tolerated the high dose of 1.6 kg/ha. The cereals and perennial ryegrass were sensitive even at the lower doses.

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, R 40244 is flurochloridone

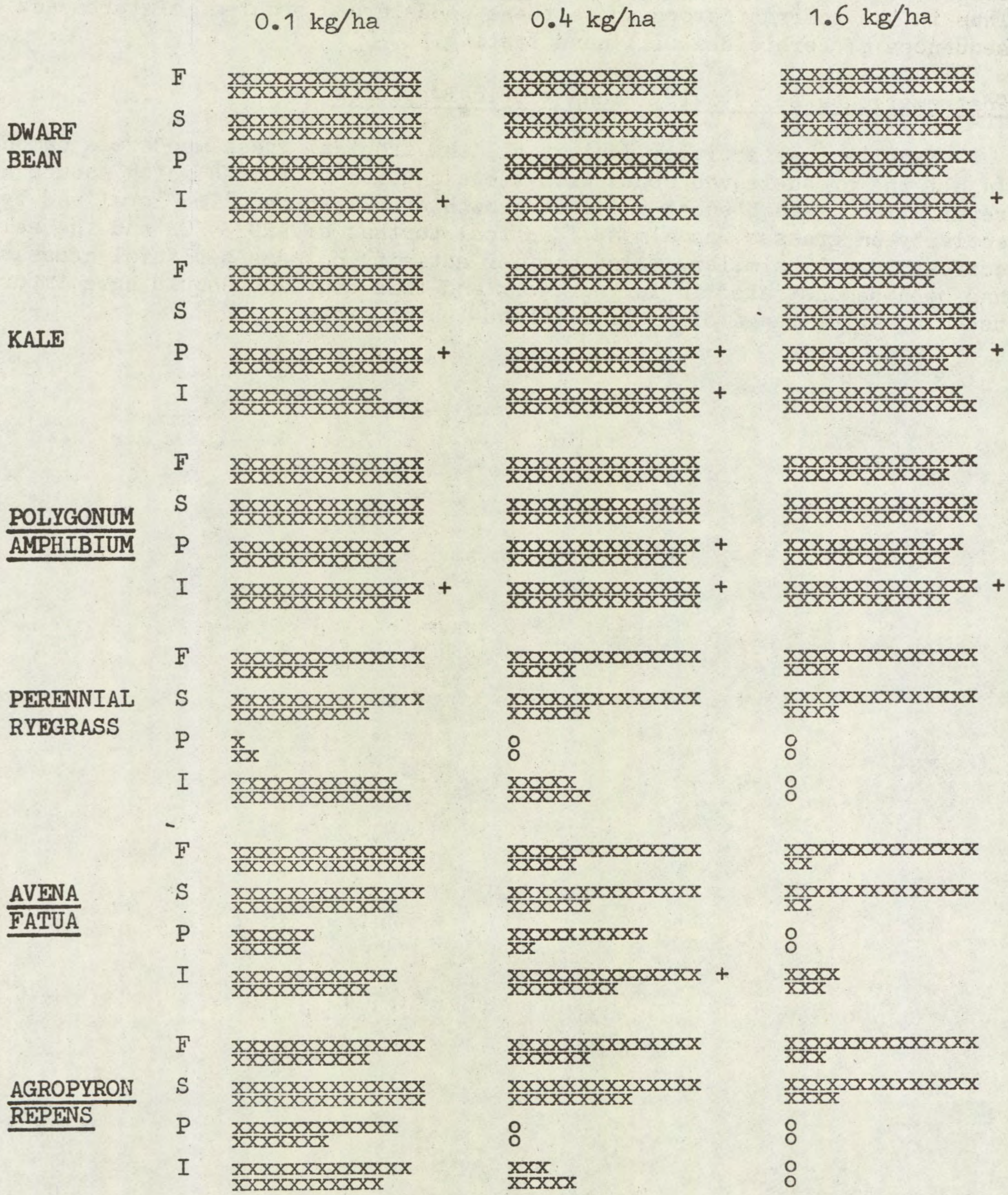
PP 009 thus shows outstanding selective control of annual and perennial grass weeds, including volunteer cereals and ryegrass in onion and broad-leaved crops. The similarity between it and the previous herbicide ARD 34/02 is striking. The latter appears slightly more effective on some grass weeds. Both have the intriguing defect of Poa annua and broad-leaved weed resistance. Thus in the tolerant crops where these weeds are a problem, mixtures and sequences of herbicides will need testing.

Post-emergence selectivity among tropical species

Excellent selectivity against all the tropical grass weeds was demonstrated in all the broad-leaved crops with the exception of tomato which showed a minor retardation of both shoot and root growth at 0.4 kg/ha. The level and type of activity on grasses was almost identical to that of ARD 34/02 and the selectivity correspondingly similar. Also similar activity on some perennial grass species has been demonstrated in further work and this compound should have important uses in a wide range of tropical broad-leaved crops.

ACTIVITY EXPERIMENT

PP009



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

POST-EMERGENCE SELECTIVITY EXPERIMENT

PP 009

SPECIES		0.1 kg/ha		0.4 kg/ha		1.6 kg/ha
WHEAT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(1)	57	xxxxxxxxxxx	14	xxx	14	xxx
BARLEY	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx
(2)	79	xxxxxxxxxxxxxxxx	29	xxxxxx	14	xxx
OAT	00	xxxxxxxxxxxxxxxxxxxx	30	xxxxxx	0	
(3)	71	xxxxxxxxxxxxxx	14	xxx	0	
PER RYGR	100	xxxxxxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxx	0	
(4)	57	xxxxxxxxxxx	29	xxxxxx	0	
ONION	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(8)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
DWF BEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
FLD BEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(10)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
PEA	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(11)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx.
W CLOVER	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(12)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
RAPE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(14)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
KALE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
CABBAGE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(16)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, R 40244 is flurochloridone

POST-EMERGENCE SELECTIVITY EXPERIMENT

PP 009

SPECIES		0.1 kg/ha		0.4 kg/ha		1.6 kg/ha
CARROT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(18)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
PARSNIP	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(19)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
LETTUCE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(20)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SUG BEET	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(21)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
FENUGREEK	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(22)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
BROM STE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(24)	71	xxxxxxxxxxxxxx	36	xxxxxxx	14	xxx
AVE FATU	100	xxxxxxxxxxxxxxxxxxx	0		0	
(26)	36	xxxxxxx	0		0	
ALO MYOS	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	0	
(27)	29	xxxxxx	14	xxx	0	
POA ANN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(28)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx
POA TRIV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	58	xxxxxxxxxxx
(29)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
SIN ARV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(30)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
RAPH RAP	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx

Type text here

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, R 40244 is flurochloridone

PP 009

SPECIES	0.1 kg/ha		0.4 kg/ha		1.6 kg/ha	
TRIP MAR	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(33)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SEN VULG	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(34)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
POL LAPA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(35)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
GAL APAR	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
CHEN ALB	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(39)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
STEL MED	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
SPER ARV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(41)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
VER PERS	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(42)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
RUM OBTU	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(44)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
HOLC LAN	100	xxxxxxxxxxxxxxxxxxx	30	xxxxxx	0	
(45)	50	xxxxxxxxxx	14	xxx	0	
AG REPEN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(47)	64	xxxxxxxxxxxxx	36	xxxxxxx	14	xxx
AG STOLO	100	xxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxx	0	
(48)	29	xxxxxx	14	xxx	0	

POST-EMERGENCE SELECTIVITY EXPERIMENT

PP 009

SPECIES	0.1 kg/ha		0.4 kg/ha		1.6 kg/ha	
CIRS ARV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
MILLET	0		0		0	
(55)	0		0		0	
MAIZE	100	xxxxxxxxxxxxxxxxxxx	0		0	
(57)	21	xxxx	0		0	
SORGHUM	100	xxxxxxxxxxxxxxxxxxx	33	xxxxxxx	0	
(59)	14	xxx	7	x	0	
PIGEON PEA	100	xxxxxxxxxxxxxxxxxxx	70	xxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(61)	71	xxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
COWPEA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(62)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
CHICKPEA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(63)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
GRNDNUT	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(64)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SOYABEAN	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(65)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
COTTON	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(66)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
JUTE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(67)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
KENAF	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(68)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx

POST-EMERGENCE SELECTIVITY EXPERIMENT

PP 009

SPECIES		0.1 kg/ha		0.4 kg/ha		1.6 kg/ha
TOBACCO	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(69)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
SESAMUM	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(70)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
TOMATO	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(71)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
OR PUNCT	60	xxxxxxxxxxxx	0		0	
(73)	43	xxxxxxxxx	0		0	
ELEU IND	87	xxxxxxxxxxxxxxxxx	6	x	0	
(74)	29	xxxxxx	7	x	0	
ECH CRUS	58	xxxxxxxxxxxx	0		0	
(75)	29	xxxxxx	0		0	
ROTT EXA	100	xxxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	0	
(76)	29	xxxxxx	14	xxx	0	
DIG SANG	100	xxxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	0	
(77)	36	xxxxxxx	29	xxxxxx	0	
AMAR RET	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(78)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
PORT OLE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx
(79)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
SOL NIG	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(81)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
SNOW POL	100	xxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
(83)	57	xxxxxxxxxxx	14	xxx	0	

POST EMERGENCE SELECTIVITY EXPERIMENT

PP 009

SPECIES		0.1 kg/ha		0.4 kg/ha		1.6 kg/ha
PHAL MIN	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	0	
(84)	71	xxxxxxxxxxxxxx	21	xxxx	0	
CYP EXCU	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(85)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
CYP ROTU	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(86)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
OXAL LAT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(87)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
BROM PEC	100	xxxxxxxxxxxxxxxxxxxx	0		0	
(88)	79	xxxxxxxxxxxxxxxx	0		0	

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REFERENCES

FORMIGONI, A., IWATAKI, I. and ISHIHARA, H. (1979) Selective post-emergence grass control in different broad-leaf crops with the new herbicide NP 55. Proceedings EWRS Symposium. The influence of different factors on the development and control of weeds, 403-410.

JOHNSON, W.O., KOLLMAN G.E., SWITHENBANK, C. and YIH, R.H. (1978) RH-6201 (Blazer): A new broad spectrum herbicide for postemergence use in soybeans. Journal of Agricultural and Food Chemistry, 26, (1), 285-286.

RICHARDSON, W.G. and DEAN, M.L. (1974) The activity and post-emergence selectivity of some recently developed herbicides: oxadiazon, U-29,722, U-27,658, metflurazone, norflurazone, AC 50,191, AC 84,777 and iprymidam. Technical Report Agricultural Research Council Weed Research Organization, 32, pp 74.

RICHARDSON, W.G. and PARKER, C. (1977) The activity and post-emergence selectivity of some recently developed herbicides: KUE 2079A, HOE 29152, RH 2915, triclopyr and Dowco 290. Technical Report Agricultural Research Council Weed Research Organization, 42, pp 53.

RICHARDSON, W.G. and PARKER, C. (1978) The activity and post-emergence selectivity of some recently developed herbicides: NP 48, RH 5205 and pyridate. Technical Report Agricultural Research Council Weed Research Organization, 49, pp 38.

RICHARDSON, W.G., WEST, T.M. and PARKER, C. (1979) The activity and pre-emergence selectivity of some recently developed herbicides: R 40244, AC 206784, pendimethalin, butralin, acifluorfen and FMC 39821. Technical Report Agricultural Research Council Weed Research Organization, 57, pp 71.

Appendix 1. Species abbreviations, varieties and stages of growth at spraying and assessment for post-emergence selectivity test.

	Designation and computer serial number	Cultivar or source	Stage of growth at spraying	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Temperate species				
Wheat (Triticum aestivum)	WHEAT (1)	Maris Huntsman	8 leaves, 2-3 tillers	20 leaves, 8 tillers
Barley (Hordeum vulgare)	BARLEY (2)	Sonja	8 leaves, 2 - 3 tillers	18 leaves, 6 tillers
Oat (Avena sativa)	OAT (3)	Peniarth	6 leaves, tillering	19 leaves, 8 tillers
Perennial ryegrass (Lolium perenne)	PER RYGR (4)	S 23	4 leaves	19 leaves, 8 tillers
Onion (Allium cepa)	ONION (8)	Robusta	$1\frac{1}{2}$-$2\frac{1}{2}$ leaves	3 leaves
Dwarf bean (Phaseolus vulgaris)	DWF BEAN (9)	The Prince	2 unifoliate leaves	2-3 trifoliate leaves
Field bean (Vicia faba)	FLD BEAN (10)	Maris Bead	$3\frac{1}{2}$-$4\frac{1}{2}$ leaves	10 leaves
Pea (Pisum sativum)	PEA (11)	Dark Skinned Perfection	5-6 leaves	9 leaves
White clover (Trifolium repens)	W CLOVER (12)	S 100	2-$2\frac{1}{2}$ trifoliate leaves	4-5 trifoliate leaves
Rape (Brassica napus oleifera)	RAPE (14)	Rapora	$2\frac{1}{2}$ leaves	6 leaves
Kale (Brassica oleracea acephala)	KALE (15)	Marrow Stem	$2\frac{1}{2}$-3 leaves	5 leaves
Cabbage (Brassica oleracea capitata)	CABBAGE (16)	Derby Day	$2\frac{1}{2}$-$3\frac{1}{2}$ leaves	6 leaves
Carrot (Daucus carota)	CARROT (18)	Chantenay Red Core	$3\frac{1}{2}$-4 leaves	6 leaves

Appendix 1. (cont.)

	Designation and computer serial number	Cultivar or source	Stage of growth at spraying	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Parsnip (Pastinaca sativa)	PARSNIP (19)	Avonresister	2½ leaves	4 leaves
Lettuce (Lactuca sativa)	LETTUCE (20)	Reskia	5-6 leaves	10 leaves
Sugar beet (Beta vulgaris)	SUG BEET (21)	Nomo	3½ leaves	8 leaves
Fenugreek (Trigonella foenumgraecum)	FENUGREK (22)	Paul	2½ trifoliate leaves	6 trifoliate leaves, anthesis
Bromus sterilis	BROM STE (24)	Bourton on the Water	8 leaves, 2 tillers	20 leaves, 5 - 6 tillers
Avena fatua	AVE FATU (26)	WRO 1977	6-8 leaves, 1-2 tillers	14 leaves, 3-6 tillers
Alopecurus myosuroides	ALO MYOS (27)	B & S Supplies 1976	8 leaves, 2-3 tillers	30-40 leaves, up to 15 tillers
Poa annua	POA ANN (28)	B & S Supplies 1977	4-6 leaves 0-1 tiller	15-20 leaves, up to 10 tillers
Poa trivialis	POA TRIV (29)	WRO 1978	9 leaves, tillering	30 leaves, up to 10 tillers
Sinapis arvensis	SIN ARV (30)	WRO 1971	2½-3 leaves	7 leaves
Raphanus raphanistrum	RAPH RAP (31)	Long Black Spanish	2½-3½ leaves	6 leaves
Tripleurospermum maritimum	TRIP MAR (33)	WRO 1975	5-6 leaves	10 leaves
Senecio vulgaris	SEN VULG (34)	WRO 1977	4-6 leaves	12-14 leaves, anthesis
Polygonum lapathifolium	POL LAPA (35)	WRO 1976	2½-3½ leaves	7 leaves, flowering
Polygonum aviculare	POL AVIC (36)	B & S Supplies 1976	nil germination	-
Galium aparine	GAL APAR (38)	WRO 1978	5-6 whorls	16-30 whorls

Appendix 1. (cont.)

	Designation and computer serial number	Cultivar or source	Stage of growth at spraying	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Chenopodium album	CHEN ALB (39)	B & S Supplies 1973	4-5 leaves	7 leaves
Stellaria media	STEL MED (40)	B & S Supplies 1975	6 leaves	20 leaves
Spergula arvensis	SPER ARV (41)	WRO 1968	2 whorls	15 whorls
Veronica persica	VER PERS (42)	WRO 1977	8 leaves	17 leaves, flowering
Rumex obtusifolius	RUM OBTU (44)	B & S Supplies 1977	2½-3 leaves	3-4 leaves
Holcus lanatus	HOLC LAN (45)	WRO 1976	4-5 leaves 0-1 tiller	14-20 leaves, up to 7 tillers
Agropyron repens	AG REPEN (47)	WRO Clone 31*	3½-5 leaves, 0 - 1 tiller	10 leaves, up to 3 tillers
Agrostis stolonifera	AG STOLO (48)	B and S Supplies 1976	2-3 leaves, 0-1 tiller	numerous tillers
Cirsium arvense	CIRS ARV (50)	WRO Clone 1**	6-8 leaves	7 leaves
Tropical species (grown under higher temperature regime)				
Millet (Pennisetum americanum)	MILLET (57)	ex Bornu	3 leaves	7½ leaves
Maize (Zea mays)	MAIZE (58)	Julia	3½ leaves	8 leaves
Sorghum (Sorghum bicolor)	SORGHUM (59)	Swarna	3-3½ leaves	7½ leaves
Rice (Oryza sativa)	RICE (60)	IR 298	3-3½ leaves	4-5 leaves
Pigeon pea (Cajanus cajan)	PIGEON P (61)	India 1977	0-1 trifoliate leaf	4½ trifoliate leaves
Cowpea (Vigna unguiculata)	COWPEA (62)	India 1977	0-1 trifoliate leaf	1½-2 trifoliate leaves
Chickpea (Cicer arietinum)	CHICKPEA (63)	India 1976	7-9 pinnate leaves	12 pinnate leaves

* one node rhizome pieces

** root fragments

Appendix 1. (cont.)

	Designation and computer serial number	Cultivar or source	Stage of growth at spraying	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Groundnut (Arachis hypogaea)	GRNDNUT (64)	S 38	2-3 pinnate leaves	6½ pinnate leaves
Soyabean (Glycine max)	SOYABEAN (65)	Bragg	2 trifoliate leaves	5 trifoliate leaves
Cotton (Gossypium hirsutum)	COTTON (66)	26 J	1-2 leaf	3½-4 leaves
Jute (Corchorus olitorius)	JUTE (67)	Egypt 1971	4 leaves	9 leaves
Kenaf (Hibiscus cannabinus)	KENAF (68)	A 63-440	4-6 leaves	7-8 leaves
Tobacco (Nicotiana tabacum)	TOBACCO (69)	Yellow Mammoth	5-6 leaves	Many
Sesamum (Sesamum indicum)	SESAMUM (70)	E 8, India 1977	2 leaves	7-8 leaves
Tomato (Lycopersicum esculentum)	TOMATO (71)	Ailsa Craig	4-5 pinnate leaves	6-7 pinnate leaves
Oryza punctata	OR PUNCT (73)	Swaziland 1974	2 leaves	4-5 leaves, some tillering
Eleusine indica	ELEU IND (74)	Zimbabwe 1967	5-5½ leaves	Tillering vigourously
Echinochloa crus-galli	ECH CRUS (75)	WRO 1970	3½-4 leaves	6-7 leaves
Rottboellia exaltata	ROT EXAL (76)	Zimbabwe 1974	2½-3 leaves	6-7 leaves
Digitaria sanguinalis	DIG SANG (77)	WRO 1973	4½-5 leaves, tillering	Tillering vigourously
Amaranthus retroflexus	AMAR RET (78)	WRO 1972	6-7 leaves	12 leaves, flowering
Portulaca oleracea	PORT OLE (79)	WRO 1973	4-5 leaves	10-12 leaves
Solanum nigrum	SOL NIG (81)	WRO 1976	6 leaves	15 leaves, flowering

Appendix 1. (cont.)

	Designation and computer serial number	Cultivar or source	Stage of growth at spraying	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Snowdenia polystachva	SNOW POL (83)	Ethiopia 1978	5½-6 leaves, tillering	8-9 leaves
Phalaris minor	PHAL MIN (84)	Jordan 1977	4-5 leaves, tillering	Tillering vigourously, anthesis
Cyperus esculentus	CYP ESCU (85)	WRO Clone 2* (ex South Africa)	6½ leaves	10 leaves
Cyperus rotundus	CYP ROTU (86)	WRO Clone 1* (ex Zimbabwe)	4½-5½ leaves	15 leaves
Oxalis latifolia	OXAL LAT (87)	WRO Clone 2** (ex Cornwall)	2-6 trifoliate leaves	12 trifoliate leaves
Bromus pectinatus	BROM PEC (88)	Tanzania 1978	2½-3 leaves	6-6½ leaves

* tubers ** bulbs

ABBREVIATIONS

ångström	Å	freezing point	f.p.
Abstract	Abs.	from summary	F.s.
acid equivalent*	a.e.	gallon	gal
acre	ac	gallons per hour	gal/h
active ingredient*	a.i.	gallons per acre	gal/ac
approximately equal to*	≃	gas liquid chromatography	GLC
aqueous concentrate	a.c.	gramme	g
bibliography	bibl.	hectare	ha
boiling point	b.p.	hectokilogram	hkg
bushel	bu	high volume	HV
centigrade	C	horse power	hp
centimetre*	cm	hour	h
concentrated	concd	hundredweight*	cwt
concentration	concn	hydrogen ion concentration*	pH
concentration x time product	ct	inch	in.
concentration required to kill 50% test animals	LC50	infra red	i.r.
cubic centimetre*	cm^3	kilogramme	kg
cubic foot*	ft^3	kilo ($x10^3$)	k
cubic inch*	in^3	less than	<
cubic metre*	m^3	litre	l.
cubic yard*	yd^3	low volume	LV
cultivar(s)	cv.	maximum	max.
curie*	Ci	median lethal dose	LD50
degree Celsius*	^oC	medium volume	MV
degree centigrade	^oC	melting point	m.p.
degree Fahrenheit*	^oF	metre	m
diameter	diam.	micro ($x10^{-6}$)	μ
diameter at breast height	d.b.h.	microgramme*	μg
divided by*	÷ or /	micrometre (micron)*	μm (or μ)
dry matter	d.m.	micron (micrometre)*†	μm (or μ)
emulsifiable concentrate	e.c.	miles per hour*	mile/h
equal to*	=	milli ($x10^{-3}$)	m
fluid	fl.	milliequivalent*	m.equiv.
foot	ft	milligramme	mg
		millilitre	ml

† The name micrometre is preferred to micron and μm is preferred to μ.

millimetre*	mm
millimicro* (nano: $x10^{-9}$)	n or mμ
minimum	min.
minus	-
minute	min
molar concentration*	M (small cap)
molecule, molecular	mol.
more than	>
multiplied by*	x
normal concentration*	N (small cap)
not dated	n.d.
oil miscible concentrate	o.m.c. (tables only)
organic matter	o.m.
ounce	oz
ounces per gallon	oz/gal
page	p.
pages	pp.
parts per million	ppm
parts per million by volume	ppmv
parts per million by weight	ppmw
percent(age)	%
pico (micromicro: $x10^{-12}$)	p or μμ
pint	pint
pints per acre	pints/ac
plus or minus*	±
post-emergence	post-em
pound	lb
pound per acre*	lb/ac
pounds per minute	lb/min
pound per square inch*	lb/in^2
powder for dry application	p. (tables only)
power take off	p.t.o.
precipitate (noun)	ppt.
pre-emergence	pre-em.
quart	quart
relative humidity	r.h.
revolution per minute*	rev/min
second	s
soluble concentrate	s.c.
soluble powder	s.p.
solution	soln
species (singular)	sp.
species (plural)	spp.
specific gravity	sp. gr.
square foot*	ft^2
square inch	in^2
square metre*	m^2
square root of*	$\sqrt{}$
sub-species*	ssp.
summary	s.
temperature	temp.
ton	ton
tonne	t
ultra-low volume	ULV
ultra violet	u.v.
vapour density	v.d.
vapour pressure	v.p.
varietas	var.
volt	V
volume	vol.
volume per volume	v/v
water soluble powder	w.s.p. (tables only)
watt	W
weight	wt
weight per volume*	w/v
weight per weight*	w/w
wettable powder	w.p.
yard	yd
yards per minute	yd/min

* Those marked * should normally be used in the text as well as in tables etc.

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35. A survey of aquatic weed control methods used by Internal Drainage Boards, 1973. January 1975. T O Robson. Price - £1.39

36. The activity and pre-emergence selectivity of some recently developed herbicides: Bayer 94871, tebuthiuron, AC 92553. March 1975. W G Richardson and M L Dean. Price - £1.54

37. Studies on Imperata cylindrica (L.) Beauv. and Eupatorium odoratum L. October 1975. G W Ivens. Price - £1.75

38. The activity and pre-emergence selectivity of some recently developed herbicides: metamitron, HOE 22870, HOE 23408, RH 2915, RP 20630. March 1976. W G Richardson, M L Dean and C Parker. Price - £3.25

39. The activity and post-emergence selectivity of some recently developed herbicides: HOE 22870, HOE 23408, flamprop-methyl, metamitron and cyperquat. May 1976. W G Richardson and C Parker. Price - £3.20

40. The activity and pre-emergence selectivity of some recently developed herbicides: RP 20810, oxadiazon, chlornitrofen, nitrofen, flamprop--isopropyl. August 1976. W G Richardson, M L Dean and C Parker. Price - £2.75.

41. The activity and pre-emergence selectivity of some recently developed herbicides: K 1441, mefluidide, WL 29226, epronaz, Dowco 290 and triclopyr. November 1976. W G Richardson and C Parker. Price - £3.40.

42. The activity and post-emergence selectivity of some recently developed herbicides: KUE 2079A, HOE 29152, RH 2915, Triclopyr and Dowco 290. March 1977. W G Richardson and C Parker. Price - £3.50

43. The activity and pre-emergence selectivity of some recently developed herbicides: dimefuron, hexazinone, trifop-methyl, fluothiuron, buthidazole and butam. November 1977. W G Richardson and C Parker. Price - £3.75.

44. The activity and selectivity of the herbicides: ethofumesate, RU 12709 and isoproturon. December 1977. W G Richardson, C Parker, & M L Dean. Price - £4.00

45. Methods of analysis for determining the effects of herbicides on soil soil micro-organisms and their activities. January 1978. M P Greaves, S L Cooper, H A Davies, J A P Marsh & G I Wingfield. Price - £4.00

46. Pot experiments at the Weed Research Organization with forest crop and weed species. February 1978. D J Turner and W G Richardson. Price - £2.70

47. Field experiments to investigate the long-term effects of repeated applications of MCPA, tri-allate, simazine and linuron - effects on the quality of barley, wheat, maize and carrots. July 1978. J D Fryer, P D Smith and J W Ludwig. Price - £1.20.

48. Factors affecting the toxicity of paraquat and dalapon to grass swards. March 1978. A K Oswald. Price - £2.90

49. The activity and post-emergence selectivity of some recently developed herbicides: NP 48, RH 5205 and Pyridate. May 1978. W G Richardson and C Parker. Price - £2.50

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, R 40244 is flurochloridone

50. Sedge weeds of East Africa - II. Distribution. July 1978. P J Terry. Price - £1.50

51. The activity and selectivity of the herbicides methabenzthiazuron, metoxuron, chlortoluron and cyanazine. September 1978. W G Richardson and C Parker. Price - £2.20.

52. Antidotes for the protection of field bean (Vicia faba L.) from damage by EPTC and other herbicides. February 1979. A M Blair. Price - £1.35

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58. The tolerance of fenugreek (Trigonella foenumgraecum L.) to various herbicides. December 1979. W G Richardson. Price - £1.55

59. Recommended tests for assessing the side-effects of pesticides on the soil microflora. April 1980. M P Greaves, N J Poole, K H Domsch, G Jagnow and W Verstraete. Price - £2.00

60. Properties of natural rainfalls and their simulation in the laboratory for pesticide research. September 1980. R C Simmons. Price - £1.25

61. The activity and post-emergence selectivity of some recently developed herbicides: R 40244, DPX 4189, acifluorfen, ARD 34/02 (NP 55) and PP 009. November 1980. W G Richardson, T M West and C Parker. Price - £3.75