Click here for previous

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl,
SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

SPECIES	ARD 34/02 0.1 kg/ha		ARD 34/02 0.4 kg/ha		ARD 34/02 1.6 kg/ha	
MAIZE + A	97	xxxxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxxx +	62	xxxxxxxxxxxx
(56)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	36	xxxxxxx
MAIZE	103	xxxxxxxxxxxxxxxxxxx +	69	xxxxxxxxxxxxxx	0	
(57)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0	
SORG + A	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0	
(58)	43	xxxxxxxxx	29	xxxxxx	0	
SORGHUM	104	xxxxxxxxxxxxxxxxxxx +	98	xxxxxxxxxxxxxxxxxxx	0	
(59)	36	xxxxxxx	21	xxxx	0	
RICE	6	x	0		0	
(60)	29	xxxxxx	0		0	
PIGEON P	169	xxxxxxxxxxxxxxxxxxx +	150 R	xxxxxxxxxxxxxxxxxxx +	169	xxxxxxxxxxxxxxxxxxx +
(61)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
COWPEA	110	xxxxxxxxxxxxxxxxxxx +	120	xxxxxxxxxxxxxxxxxxx +	90	xxxxxxxxxxxxxxxxx
(62)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
CHICKPEA	103	xxxxxxxxxxxxxxxxxxx +	103	xxxxxxxxxxxxxxxxxxx +	94	xxxxxxxxxxxxxxxxxx
(63)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
GRNDNUT	109	xxxxxxxxxxxxxxxxxxx +	109 R	xxxxxxxxxxxxxxxxxxx +	109 R	xxxxxxxxxxxxxxxxxxx +
(64)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
SOYABEAN	91	xxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxx
(65)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
COTTON	104	xxxxxxxxxxxxxxxxxxx +	127	xxxxxxxxxxxxxxxxxxx +	115	xxxxxxxxxxxxxxxxxxx +
(66)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
JUTE	135	xxxxxxxxxxxxxxxxxxx +	116	xxxxxxxxxxxxxxxxxxx +	106	xxxxxxxxxxxxxxxxxxx +
(67)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
KENAF	89	xxxxxxxxxxxxxxxxx	115	xxxxxxxxxxxxxxxxxxx +	96	xxxxxxxxxxxxxxxxxx
(68)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx

PRE-EMERGENCE SELECTIVITY TEST

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl,
SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl,
SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

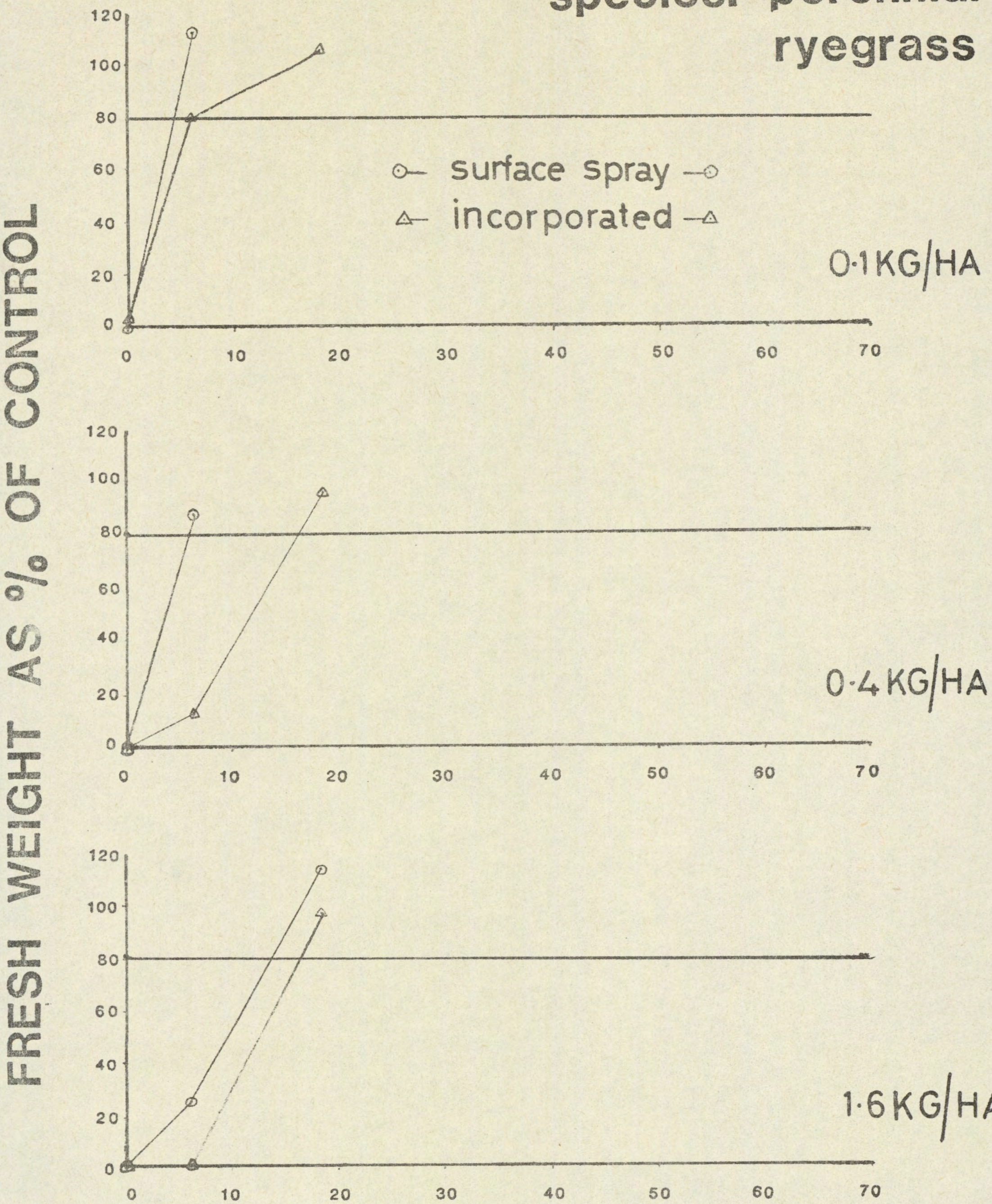
PRE-EMERGENCE SELECTIVITY TEST

SPECIES	ARD 34/02 0.1 kg/ha		ARD 34/02 0.4 kg/ha		ARD 34/02 1.6 kg/ha	
SESAMUM	177	xxxxxxxxxxxxxxxxxxxx +	100	xxxxxxxxxxxxxxxxxxxx +	41	xxxxxxxx
(70)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
TOMATO	86 M	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(71)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx
ECH CRUS	0		0		0	
(75)	0		0		0	
ROTT EXA	43	xxxxxxxxx	0		0	
(76)	36	xxxxxxx	0		0	
DIG SANG	0		0		0	
(77)	0		0		0	
SOL NIG	60	xxxxxxxxxxx	87	xxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx
(81)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx
BROM PEC	56	xxxxxxxxxx	0		0	
(82)	36	xxxxxxx	0		0	
SNOW POL	0		0		0	
(83)	0		0		0	
PHAL MIN	0		0		0	
(84)	0		0		0	
CYP ESCU	92	xxxxxxxxxxxxxxxxx	77	xxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(85)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
CYP ROTU	93	xxxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
(86)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
OXAL LAT	150	xxxxxxxxxxxxxxxxxxx +	136	xxxxxxxxxxxxxxxxxxx +	123	xxxxxxxxxxxxxxxxxxx +
(87)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

PERSISTENCE OF ARD 34/02

species: perennial ryegrass



TIME OF SOWING

weeks after treatment

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl,
SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

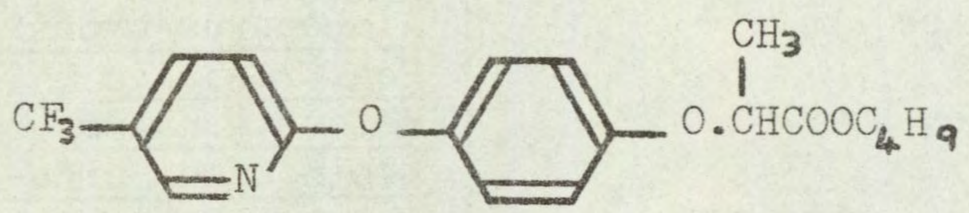
PP 009

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 — pre-emergence selectivity experiment 370 l/ha

RESULTS

Full results are given in the histograms on pages 38-42 and potential selectivities are summarised in the following table.

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
1.6	onion field bean pea* white clover rape kale radish carrot lettuce sugar beet pigeon pea soyabean cotton jute tomato	Veronica persica + species below

* note a stand reduction but not due to herbicide

(Table continued overleaf)

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

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 + dwarf bean fenugreek cowpea chickpea groundnut kenaf sesamum	Bromus sterilis Festuca rubra Avena fatua Poa annua Agropyron repens Bromus pectinatus + species below
0.1	species above + wheat barley oat maize + antidote	Alopecurus myosuroides Poa trivialis Holcus lanatus Echinochloa crus-galli Rottboellia exaltata Digitaria sanguinalis Snowdenia polystachya Phalaris minor

Comments on results

Activity experiment results, together with symptoms caused on susceptible species, and post-emergence selectivity, were reported earlier (Richardson et al, 1980). As with the preceding herbicide (ARD 34/02) a high level of pre- and post-emergence activity was found on grasses, with broad-leaved species highly tolerant.

Persistence in the soil

The graph on page 43 shows a considerable period of persistence of PP 009 in the soil. Surface and incorporated treatments were either no longer or only just detectable 18 weeks after treatment at 0.1 kg/ha. At 0.4 kg/ha the incorporated treatment could not be detected after 38 weeks but the surface treatment was still severely affecting perennial ryegrass even after 53 weeks. At 1.6 kg/ha, after 53 weeks both surface and incorporated treatments were still very active.

Pre-emergence selectivity among temperate species

All grass weeds were controlled at 0.4 kg/ha or lower. Broad-leaved weeds were resistant, with the exception of Veronica persica which was susceptible at the high dose.

Onion and broad-leaved crops were tolerant. Dwarf bean and fenugreek were the only crops which were affected at the high dose, but vigour reduction was only 21%. The cereals (wheat, barley and oat) tolerated the lowest dose of 0.1 kg/ha but were sensitive to higher doses.

The activity, weed control and crop tolerance for PP 009 pre-emergence are generally the same as those found post-emergence (Richardson et al, 1980). One important difference, however, is the susceptibility of Poa annua, pre-emergence. This species has shown considerable resistance to all other recently developed phenoxy-phenoxy compounds (eg trifop-methyl and diclofop-methyl) as well as alloxydim and ARD 34/02. Therefore, if Poa annua proves susceptible pre-emergence, PP 009 would seem to have a distinct advantage over these other herbicides. Another interesting difference in the otherwise similar weed spectra of ARD 34/02 and PP 009 is the susceptibility of Festuca rubra to PP 009. The long period of soil persistence would appear to rule out the

possibility of using PP 009 to control grass weeds in stubble prior to drilling cereals. However, it may well prove an advantage in broad-leaved crops and onion where control of late germinating weeds is desirable. The control of Veronica persica, though at high, probably uneconomic doses, is of academic interest, in that this was the only broad-leaved weed controlled by the other phenoxy-phenoxy herbicides, eg diclofop-methyl and clofop-isobutyl.

Selectivity among tropical species

This compound showed very similar effects to those of ARD 34/02 but with slightly greater general activity, providing complete kill of all but one of the annual grass weeds at 0.1 kg/ha and slightly more damage on broad-leaved species (crops and weeds) at 1.6 kg/ha. This damage, however, was still very mild and selectivity against grass weeds remains equally impressive.

Maize was quite well protected by NA and selectivity appears just feasible at about 0.1 kg/ha. Protection of sorghum by cyometrinil was inadequate to prevent eventual kill at 0.1 kg/ha. Fresh weights at six weeks are indicated in the table below. More recent work with post-emergence applications of PP 009 10 days after sowing have confirmed moderate protection of both maize and sorghum by NA but not enough to provide clear selectivity against Rottboellia.

Table 6. Shoot fresh wt as % of untreated at 6 weeks

	Control	PP 009 kg/ha		
		0.1	0.4	1.6
Maize	100	72	8	0
Maize + NA	85	74	70	0
Sorghum	100	0	0	0
Sorghum + cyometrinil	87	0	0	0

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

PRE-EMERGENCE SELECTIVITY TEST

SPECIES	PP 009 0.1 kg/ha		PP 009 0.4 kg/ha		PP 009 1.6 kg/ha	
WHEAT (1)	102	xxxxxxxxxxxxxxxxxxxx +	82	xxxxxxxxxxxxxxxx	0	
	86	xxxxxxxxxxxxxxxxx	14	xxx	0	
BARLEY (2)	104	xxxxxxxxxxxxxxxxxxxx +	78	xxxxxxxxxxxxxxxx	13	xxx
	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	7	x
OAT (3)	102	xxxxxxxxxxxxxxxxxxxx +	51	xxxxxxxxxx	0	
	100	xxxxxxxxxxxxxxxxxxxx	14	xxx	0	
PER RYGR (4)	5	x	0		0	
	7	x	0		0	
ONION (8)	82	xxxxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
DWF BEAN (9)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
FLD BEAN (10)	104	xxxxxxxxxxxxxxxxxxxx +	91	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxxx +
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
PEA (11)	120	xxxxxxxxxxxxxxxxxxxx +	90	xxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx
W CLOVER (12)	105	xxxxxxxxxxxxxxxxxxxx +	105	xxxxxxxxxxxxxxxxxxxx +	90	xxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx
RAPE (14)	104	xxxxxxxxxxxxxxxxxxxx +	100	xxxxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxxx +
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
KALE (15)	97	xxxxxxxxxxxxxxxxxx	101	xxxxxxxxxxxxxxxxxxxx +	105	xxxxxxxxxxxxxxxxxxxx +
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
CARROT (18)	104	xxxxxxxxxxxxxxxxxxxx +	86	xxxxxxxxxxxxxxxx	92	xxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
LETTUCE (20)	129	xxxxxxxxxxxxxxxxxxxx +	90	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx

SPECIES		PP 009 0.1 kg/ha		PP 009 0.4 kg/ha		PP 009 1.6 kg/ha
SUG BEET	95	xxxxxxxxxxxxxxxxxxxx	105	xxxxxxxxxxxxxxxxxxxx +	100	xxxxxxxxxxxxxxxxxxxx
(21)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
FENUGREK	94	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(22)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
BROM STE	31	xxxxxx	0		0	
(24)	71	xxxxxxxxxxxxxx	0		0	
FEST RUB	80	xxxxxxxxxxxxxxxx	14	xxx	0	
(25)	93	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0	
AVE FATU	104	xxxxxxxxxxxxxxxxxxx +	61	xxxxxxxxxxxx	0	
(26)	86	xxxxxxxxxxxxxxxxx	14	xxx	0	
ALO MYOS	12	xx	0		0	
(27)	14	xxx	0		0	
POA ANN	75	xxxxxxxxxxxxxxx	0		0	
(28)	79	xxxxxxxxxxxxxxxx	0		0	
POA TRIV	0		0		0	
(29)	0		0		0	
SIN ARV	105	xxxxxxxxxxxxxxxxxxx +	112	xxxxxxxxxxxxxxxxxxx +	82	xxxxxxxxxxxxxxxx
(30)	93	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
RAPH RAP	88	xxxxxxxxxxxxxxxxx	111	xxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxx +
(31)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
CHRY SEG	115	xxxxxxxxxxxxxxxxxxx +	77	xxxxxxxxxxxxxxx	38	xxxxxxxx
(32)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
TRIP MAR	106	xxxxxxxxxxxxxxxxxxx +	99	xxxxxxxxxxxxxxxxxxx	99	xxxxxxxxxxxxxxxxxxx
(33)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SEN VULG	70	xxxxxxxxxxxxxx	51	xxxxxxxxxx	48	xxxxxxxxxx
(34)	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx

PRE-EMERGENCE SELECTIVITY TEST

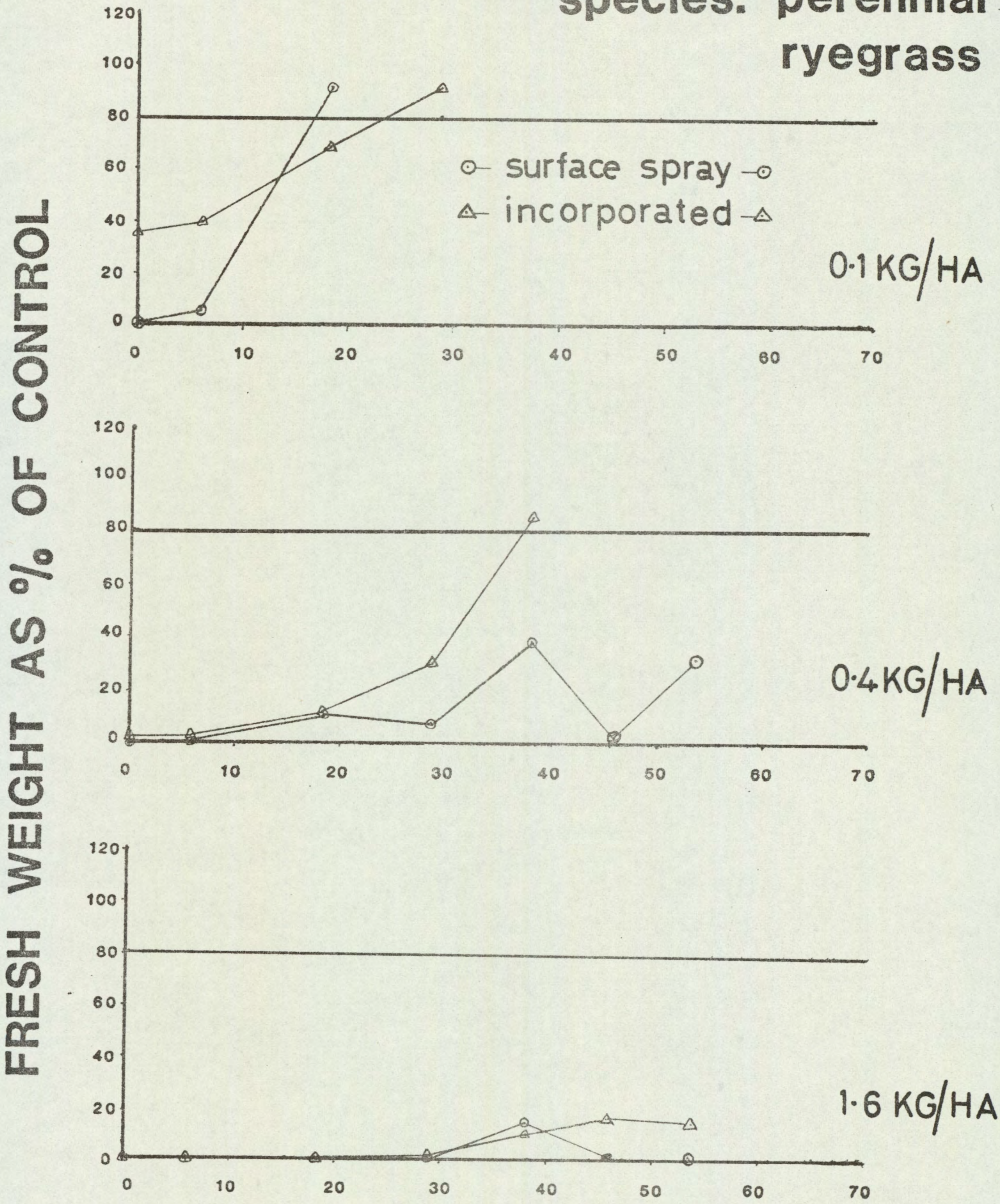
SPECIES		PP 009 0.1 kg/ha		PP 009 0.4 kg/ha		PP 009 1.6 kg/ha
POL LAPA	91	xxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxxx	111	xxxxxxxxxxxxxxxxxxx +
(35)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
POL AVIC	106	xxxxxxxxxxxxxxxxxxx +	119	xxxxxxxxxxxxxxxxxxx +	124	xxxxxxxxxxxxxxxxxxx +
(36)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
GAL APAR	101	xxxxxxxxxxxxxxxxxxx +	101	xxxxxxxxxxxxxxxxxxx +	93	xxxxxxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
CHEN ALB	103	xxxxxxxxxxxxxxxxxxx +	103	xxxxxxxxxxxxxxxxxxx +	79	xxxxxxxxxxxxxxx
(39)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
STEL MED	89	xxxxxxxxxxxxxxxxx	84	xxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
VER PERS	163	xxxxxxxxxxxxxxxxxxx +	111	xxxxxxxxxxxxxxxxxxx +	17	xxx
(42)	86	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
RUM OBTU	39	xxxxxxxx	39	xxxxxxxx	117	xxxxxxxxxxxxxxxxxxx +
(44)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
HOLC LAN	0		0		0	
(45)	0		0		0	
AG REPEN	51	xxxxxxxxxx	0		0	
(47)	64	xxxxxxxxxxxxx	0		0	
ALL VIN	105	xxxxxxxxxxxxxxxxxxx +	105	xxxxxxxxxxxxxxxxxxx +	114	xxxxxxxxxxxxxxxxxxx +
(49)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
CIRS ARV	71	xxxxxxxxxxxxxx	124	xxxxxxxxxxxxxxxxxxx +	88	xxxxxxxxxxxxxxxxx
(50)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
TUS FARF	109	xxxxxxxxxxxxxxxxxxx +	109	xxxxxxxxxxxxxxxxxxx +	109	xxxxxxxxxxxxxxxxxxx +
(51)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
MILLET	0		0		0	
(55)	0		0		0	

SPECIES		PP 009 0.1 kg/ha		PP 009 0.4 kg/ha		PP 009 1.6 kg/ha	
MAIZE + A	97	xxxxxxxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxxxx	0		
(56)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0		
MAIZE	69	xxxxxxxxxxxxxx	9	xx	0		
(57)	64	xxxxxxxxxxxxx	21	xxxx	0		
SORG + A	29	xxxxxx	0		0		
(58)	21	xxxx	0		0		
SORGHUM	0		0		0		
(59)	0		0		0		
RICE	0		0		0		
(60)	0		0		0		
PIGEON P	150	xxxxxxxxxxxxxxxxxxx +	75	R xxxxxxxxxxxxxxx	150	xxxxxxxxxxxxxxxxxxx +	
(61)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	
COWPEA	110	xxxxxxxxxxxxxxxxxxx +	110	xxxxxxxxxxxxxxxxxxx +	100	xxxxxxxxxxxxxxxxxxx	
(62)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	
CHICKPEA	56	xxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx	56	xxxxxxxxxx	
(63)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	
GRNDNUT	109	xxxxxxxxxxxxxxxxxxx +	109	R xxxxxxxxxxxxxxxxxxx +	82	xxxxxxxxxxxxxxx	
(64)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	
SOYABEAN	98	xxxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx	
(65)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	
COTTON	115	xxxxxxxxxxxxxxxxxxx +	127	xxxxxxxxxxxxxxxxxxx +	127	xxxxxxxxxxxxxxxxxxx +	
(66)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	
JUTE	19	xxxx	97	xxxxxxxxxxxxxxxxxx	135	xxxxxxxxxxxxxxxxxxx +	
(67)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	
KENAF	109	xxxxxxxxxxxxxxxxxxx +	96	xxxxxxxxxxxxxxxxxx	121	xxxxxxxxxxxxxxxxxxx +	
(68)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	

SPECIES		PP 009 0.1 kg/ha		PP 009 0.4 kg/ha		PP 009 1.6 kg/ha	
SESAMUM	100 R	xxxxxxxxxxxxxxxxxxxx	100 R	xxxxxxxxxxxxxxxxxxxx	28 R	xxxxxx
(70)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	43	xxxxxxxx
TOMATO	114	xxxxxxxxxxxxxxxxxxxx +	121	xxxxxxxxxxxxxxxxxxxx +	79	xxxxxxxxxxxxxxxx
(71)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
ECH CRUS	0		0		0	
(75)	0		0		0	
ROTT EXA	0		0		0	
(76)	0		0		0	
DIG SANG	0		0		0	
(77)	0		0		0	
SOL NIG	73	xxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	47	xxxxxxxx
(81)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
BROM PEC	44	xxxxxxxxx	0		0	
(82)	43	xxxxxxxxx	0		0	
SNOW POL	0		0		0	
(83)	0		0		0	
PHAL MIN	0		0		0	
(84)	0		0		0	
CYP ESCU	92	xxxxxxxxxxxxxxxxx	23	xxxxx	77	xxxxxxxxxxxxxx
(85)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
CYP ROTU	129	xxxxxxxxxxxxxxxxxxx +	103	xxxxxxxxxxxxxxxxxxx +	119	xxxxxxxxxxxxxxxxxxx +
(86)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
OXAL LAT	95	xxxxxxxxxxxxxxxxxx	136	xxxxxxxxxxxxxxxxxxx +	95	xxxxxxxxxxxxxxxxxx
(87)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx

PERSISTENCE OF PP009

species: perennial ryegrass



TIME OF SOWING

weeks after treatment

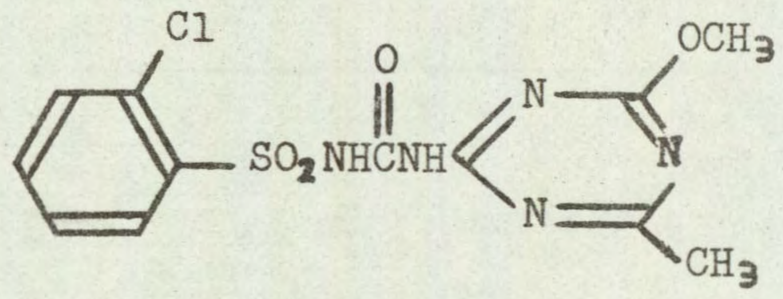
NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

DPX 4189

Code number — DPX 4189

Chemical name — 2-chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl) aminocarbonyl]benzenesulphonamide

Structure



Source

Du Pont (UK) Ltd
Biochemicals Department
Maylands Avenue
Hemel Hempstead
Herts HP2 7DP
UK

Information available and suggested uses

Pre- or post-emergence control of broad-leaved and certain grass weeds in spring and winter cereals (wheat, barley, rye and oats) and possibly flax post-emergence at doses ranging from 0.005-0.060 kg (5-60 g) a.i./ha. Also promising for use in non-crop land, pastures, grass seed crops and in reduced tillage fallow systems.

Formulation used — 80% w/w a.i. wettable powder

Spray volume — for pre-emergence selectivity experiment 370 l/ha

RESULTS

Full results are given in the histograms on pages 47-51 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
0.16	barley	Polygonum aviculare Galium aparine Agropyron repens Rottboellia exaltata + species below

(Table continued overleaf)

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
0.04	species above + wheat maize + antidote	Alopecurus myosuroides Poa annua Echinochloa crus-galli Digitaria sanguinalis Solanum nigrum Phalaris minor + species below
0.01	species above + oat sorghum + antidote	Festuca rubra Poa trivialis Sinapis arvensis Raphanus raphanistrum Chrysanthemum segetum Tripleurospermum maritimum Senecio vulgaris Polygonum lapathifolium Chenopodium album Stellaria media Veronica persica Rumex obtusifolius Holcus lanatus Allium vineale Cirsium arvense Tussilago farfara Snowdenia polystachya Oxalis latifolia

Comments on results

Activity, post-emergence selectivity and symptoms caused on susceptible species were the subject of a recent report (Richardson et al, 1980). A very high level of pre- and post-emergence activity was evident due to a powerful inhibition of meristems in both shoots and roots. In pre-emergence treatments it was not possible to establish differences between surface and incorporated treatments, both being equally effective even at the lowest dose of 0.025 kg/ha.

Persistence in the soil

The graph on page 52 shows that persistence in the soil is long. The test species, sugar beet, was still severely affected or killed, 53 weeks after treatment at the lowest dose, whether applied to the surface or incorporated.

Pre-emergence selectivity among temperate species

All weeds tested were controlled at the highest dose with the exception of Avena fatua and Bromus sterilis. Of the 24 weeds tested, 16 (mainly broad-leaved) were controlled by the lowest dose of 0.01 kg/ha. This included the perennial weeds, Allium vineale, Cirsium arvense and Tussilago farfara. Composite, cruciferous and most polygonaceous weeds were susceptible and significantly, Veronica persica. Three grass weeds were also susceptible the higher dose of 0.04 kg/ha being required to control Poa annua and Alopecurus myosuroides, but both were reduced in vigour by greater than 50% at the lowest dose. Similarly with Galium aparine, the highest dose of 0.16 kg/ha was required to secure adequate control, but plants were reduced in vigour by 50% or more at the lower doses. In fact growth virtually ceased for a period of several weeks before axillary shoots and leaves developed and plants recovered.

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

Crop tolerance was confined to the cereals. Barley tolerated the highest dose, wheat the medium dose and oat the lowest dose. Although symptoms were seen at the high dose on wheat at the main assessment 5-6 weeks after spraying, as slightly darker green-coloured and narrower leaves with some slight retardation of growth, plants recovered and headed normally and fresh weights of shoots were the same as in the untreated controls. Barley exhibited an enhanced red pigmentation on the lower stems but no depression of shoot fresh weights was found at harvest. All other crops tested were highly sensitive with the possible exception of dwarf and field bean, which were reduced in vigour by only 29 and 36% respectively at the lowest dose of 0.01 kg/ha.

DPX 4189 would appear to offer outstanding potential for pre-emergence control of a very broad spectrum of annual and perennial weeds in wheat and barley, paralleling results found earlier post-emergence (Richardson et al, 1980). Control of grass weeds was more effective pre- rather than post-emergence. The long period of persistence could prove an advantage in the continuous growing of cereals and in fallow when long term weed control, including control of late germinating weeds is desirable, but some caution is necessary regarding the use of crops other than cereals in the rotation. The control of Allium vineale in cereals found in this test deserves further investigation, post- as well as pre-emergence, as this weed tends to persist in some areas and available treatments such as repeated application of 2,4-D butyl ester still only give partial control or temporary suppression. The resistance of Avena fatua is unfortunate, necessitating mixture studies primarily with herbicides of specific use on this weed.

Selectivity among tropical species

Although showingdramatically high activity on most of the tropical annual weeds species, this compound is almost as damaging to all the crops too at 0.01 kg (10 g) per ha. It is hardly valid to make direct comparisons between the tropical and temperate halves of the experiment but it is interesting to note the probable selectivity against Phalaris minor and Snowdenia polystachya in wheat at 0.04 kg/ha. Bromus pectinatus was somewhat less susceptible but recovery from 0.16 kg/ha was very doubtful.

Cyperus species were highly tolerant but Oxalis latifolia showed even greater susceptibility pre-emergence than that already observed from post-emergence application (Richardson et al, 1980). After 16 weeks there was still good suppression by 0.01 and 0.04 kg/ha and most bulbs had been killed at 0.16 kg/ha.

The only selectivity within the tropical crops was demonstrated with maize when treated with NA. The degree of protection was quite outstanding (see table below) well over four-fold and approaching 16-fold, such that there was good tolerance of 0.04 kg/ha and hence selectivity against a wide range of weeds. This range barely includes Rottboellia but subsequent work already published elsewhere (Parker et al, 1980) suggests that the possibility of such selectivity is well worth exploring further. Sorghum shows only moderate protection by cyometrinil. It has since been shown to be protected more efficiently by NA (Parker et al, 1980) but the safe dose is still substantially lower than that for maize and practical value is doubtful.

Table 7. Shoot fresh wt as % of untreated at 6 weeks

	Control	DPX 4189 kg/ha 0.01	0.04	0.16
Maize	100	69	3	1
Maize + NA	85	91	90	47
Sorghum	100	44	9	1
Sorghum + cyometrinil	87	61	35	2

SPECIES	DPX 4189 0.01 kg/ha		DPX 4189 0.04 kg/ha		DPX 4189 0.16 kg/ha	
WHEAT	109	xxxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxxx +	102	xxxxxxxxxxxxxxxxxxxx +
(1)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
BARLEY	98	xxxxxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxxx +	104	xxxxxxxxxxxxxxxxxxxx +
(2)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
OAT	96	xxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx +
(3)	93	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	57	xxxxxxxxxx
PER RYGR	61	xxxxxxxxxxxx	10	xx	15	xxx
(4)	29	xxxxxx	29	xxxxxx	14	xxx
ONION	6	x	0		0	
(8)	14	xxx	0		0	
DWF BEAN	100	xxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxx	40	xxxxxxxx
(9)	71	xxxxxxxxxxxxxx	36	xxxxxxx	14	xxx
FLD BEAN	104	xxxxxxxxxxxxxxxxxxx +	104	xxxxxxxxxxxxxxxxxxx +	91	xxxxxxxxxxxxxxxxx
(10)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	36	xxxxxxx
PEA	45	xxxxxxxxx	0		0	
(11)	21	xxxx	0		0	
W CLOVER	109	xxxxxxxxxxxxxxxxxxx +	101	xxxxxxxxxxxxxxxxxxx +	82	xxxxxxxxxxxxxxxx
(12)	14	xxx	14	xxx	14	xxx
RAPE	0		19	xxxx	22	xxxx
(14)	0		7	x	7	x
KALE	47	xxxxxxxxx	39	xxxxxxxx	55	xxxxxxxxxx
(15)	14	xxx	14	xxx	14	xxx
CARROT	67	xxxxxxxxxxxxx	37	xxxxxxx	37	xxxxxxx
(18)	29	xxxxxx	14	xxx	14	xxx
LETTUCE	90	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	105	xxxxxxxxxxxxxxxxxx +
(20)	29	xxxxxx	21	xxxx	14	xxx

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl,
SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl,
SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

SPECIES	DPX 4189 0.01 kg/ha		DPX 4189 0.04 kg/ha		DPX 4189 0.16 kg/ha	
SUG BEET	9	xx	14	xxx	9	xx
(21)	7	x	14	xxx	7	x
FENUGREK	100	xxxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx
(22)	29	xxxxxx	14	xxx	14	xxx
BROM STE	97	xxxxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx +	97	xxxxxxxxxxxxxxxxxx
(24)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx
FEST RUB	46	xxxxxxxxx	23	xxxxx	17	xxx
(25)	29	xxxxxx	29	xxxxxx	29	xxxxxx
AVE FATU	73	xxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx +
(26)	93	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
ALO MYOS	129	xxxxxxxxxxxxxxxxxxx +	76	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
(27)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
POA ANN	34	xxxxxxx	14	xxx	7	x
(28)	36	xxxxxxx	7	x	7	x
POA TRIV	62	xxxxxxxxxxxx	42	xxxxxxxx	21	xxxx
(29)	14	xxx	14	xxx	14	xxx
SIN ARV	105	xxxxxxxxxxxxxxxxxxx +	37	xxxxxxx	67	xxxxxxxxxxxx
(30)	14	xxx	7	x	14	xxx
RAPH RAP	88	xxxxxxxxxxxxxxxxx	74	xxxxxxxxxxxxxxx	69	xxxxxxxxxxxxxx
(31)	21	xxxx	14	xxx	14	xxx
CHRY SEG	26	xxxxx	19	xxxx	13	xxx
(32)	7	x	7	x	7	x
TRIP MAR	37	xxxxxxx	44	xxxxxxxxx	26	xxxxx
(33)	14	xxx	14	xxx	14	xxx
SEN VULG	0		0		0	
(34)	0		0		0	

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl,
SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

PRE-EMERGENCE SELECTIVITY TEST

SPECIES	DPX 4189 0.01 kg/ha		DPX 4189 0.04 kg/ha		DPX 4189 0.16 kg/ha	
POL LAPA	9	xx	6	x	0	
(35)	7	x	7	x	0	
POL AVIC	106	xxxxxxxxxxxxxxxxxxxx +	71	xxxxxxxxxxxxxx	110	xxxxxxxxxxxxxxxxxxxx +
(36)	43	xxxxxxxxx	36	xxxxxxx	29	xxxxxx
GAL APAR	110	xxxxxxxxxxxxxxxxxxxx +	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
(38)	50	xxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
CHEN ALB	0		0		0	
(39)	0		0		0	
STEL MED	29	xxxxxx	19	xxxx	12	xx
(40)	14	xxx	14	xxx	7	x
VER PERS	0		0		0	
(42)	0		0		0	
RUM OBTU	91	xxxxxxxxxxxxxxxxx	0		65	xxxxxxxxxxxx
(44)	14	xxx	0		7	x
HOLC LAN	58	xxxxxxxxxxxx	58	xxxxxxxxxxxx	46	xxxxxxxxx
(45)	21	xxxx	14	xxx	14	xxx
AG REPEN	103	xxxxxxxxxxxxxxxxxxx +	103	xxxxxxxxxxxxxxxxxxx +	43	xxxxxxxxx
(47)	43	xxxxxxxxx	36	xxxxxxx	14	xxx
ALL VIN	32	xxxxxx	8	xx	0	
(49)	14	xxx	7	x	0	
CIRS ARV	0		0		0	
(50)	0		0		0	
TUS FARF	0		0		0	
(51)	0		0		0	
MILLET	85	xxxxxxxxxxxxxxxx	53	xxxxxxxxxx	4	x
(55)	43	xxxxxxxxx	29	xxxxxx	7	x

Type text here

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl,
SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

SPECIES	DPX 4189 0.01 kg/ha		DPX 4189 0.04 kg/ha		DPX 4189 0.16 kg/ha	
MAIZE + A	97	xxxxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxxxx +	97	xxxxxxxxxxxxxxxxxxx
(56)	93	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
MAIZE	94	xxxxxxxxxxxxxxxxxxx	77	xxxxxxxxxxxxxxx	26	xxxxx
(57)	64	xxxxxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
SORG + A	93	xxxxxxxxxxxxxxxxxxx	114	xxxxxxxxxxxxxxxxxxxx +	107	xxxxxxxxxxxxxxxxxxxx +
(58)	86	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	43	xxxxxxxxx
SORGHUM	104	xxxxxxxxxxxxxxxxxxx +	91	xxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxxx
(59)	57	xxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
RICE	79	xxxxxxxxxxxxxxxx	28	xxxxxx	6	x
(60)	50	xxxxxxxxxx	36	xxxxxxx	14	xxx
PIGEON P	94	xxxxxxxxxxxxxxxxxx	19	xxxx	0	
(61)	64	xxxxxxxxxxxxx	21	xxxx	0	
COWPEA	110	xxxxxxxxxxxxxxxxxxx +	80	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx
(62)	79	xxxxxxxxxxxxxxxx	36	xxxxxxx	14	xxx
CHICKPEA	84	xxxxxxxxxxxxxxxxx	9	xx	0	
(63)	36	xxxxxxx	14	xxx	0	
GRNDNUT	55 R	xxxxxxxxxxx	0		0	
(64)	57	xxxxxxxxxxx	0		0	
SOYABEAN	91	xxxxxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxx
(65)	50	xxxxxxxxxx	29	xxxxxx	29	xxxxxx
COTTON	115	xxxxxxxxxxxxxxxxxxx +	127	xxxxxxxxxxxxxxxxxxx +	58	xxxxxxxxxxxx
(66)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
JUTE	0		0		0	
(67)	0		0		0	
KENAF	83	xxxxxxxxxxxxxxxx	77	xxxxxxxxxxxxxx	51	xxxxxxxxx
(68)	36	xxxxxx	29	xxxxx	29	xxxxxx

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl,
SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

SPECIES	DPX 4189 0.01 kg/ha		DPX 4189 0.04 kg/ha		DPX 4189 0.16 kg/ha	
SESAMUM	0		0		0	
(70)	0		0		0	
TOMATO	107	xxxxxxxxxxxxxxxxxxxx +	36	xxxxxxx	29	xxxxxx
(71)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
ECH CRUS	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	4	x
(75)	36	xxxxxxx	29	xxxxxx	7	x
ROTT EXA	76	xxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxx	76	xxxxxxxxxxxxxxx
(76)	43	xxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
DIG SANG	85	xxxxxxxxxxxxxxxx	29	xxxxxx	8	xx
(77)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
SOL NIG	87	xxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxx
(81)	36	xxxxxxx	29	xxxxxx	29	xxxxxx
BROM PEC	96	xxxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxx	63	xxxxxxxxxxxx
(82)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx
SNOW POL	40	xxxxxxxx	37	xxxxxxx	22	xxxx
(83)	29	xxxxxx	29	xxxxxx	29	xxxxxx
PHAL MIN	75	xxxxxxxxxxxxxxx	61	xxxxxxxxxxx	47	xxxxxxxxx
(84)	36	xxxxxxx	29	xxxxxx	29	xxxxxx
CYP ESCU	54	xxxxxxxxxxx	85	xxxxxxxxxxxxxxxx	62	xxxxxxxxxxxx
(85)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
CYP ROTU	88	xxxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxxx +
(86)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
OXAL LAT	164	xxxxxxxxxxxxxxxxxxx +	55	xxxxxxxxxxx	14	xxx
(87)	29	xxxxxx	29	xxxxxx	14	xxx

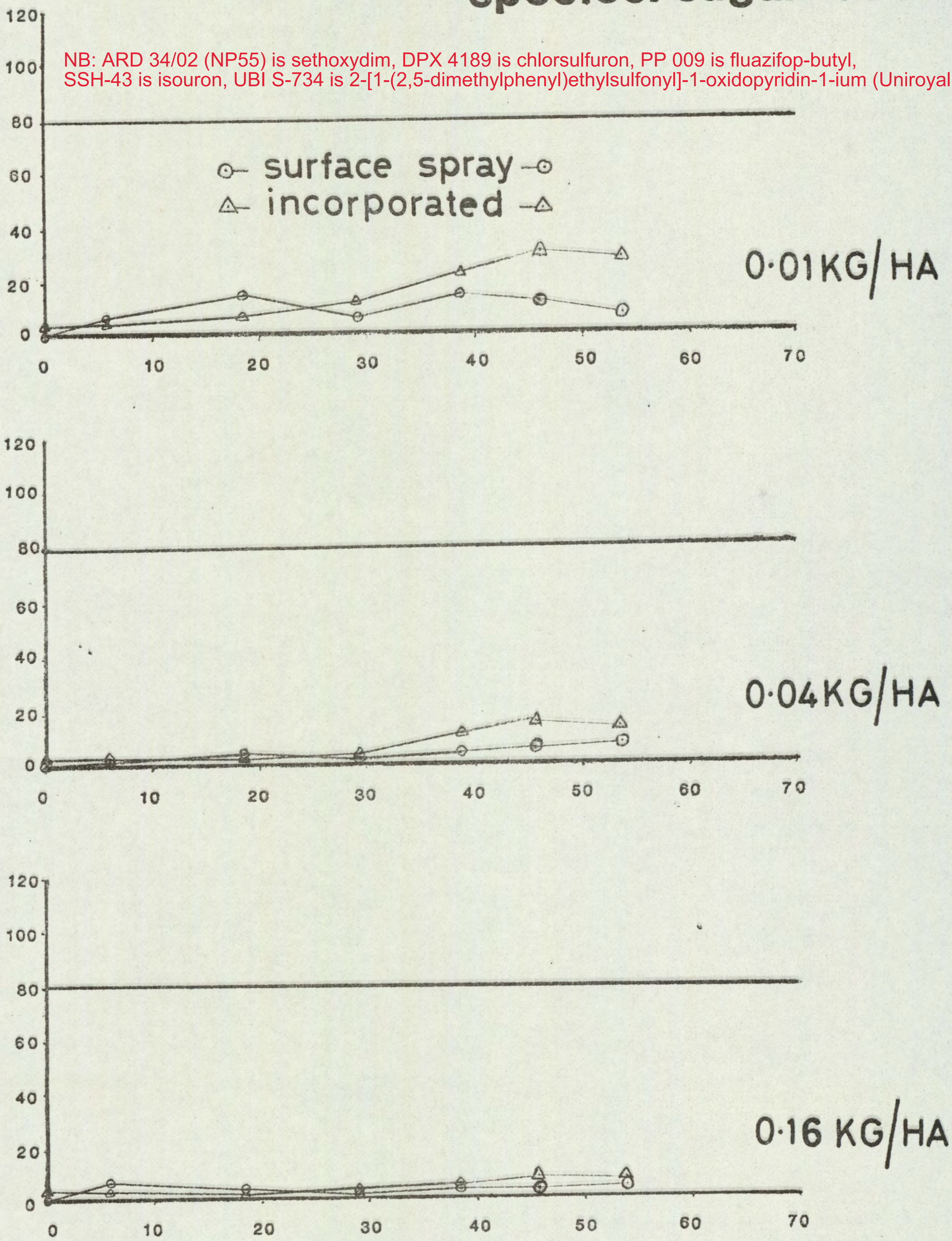
Type text here

PERSISTENCE OF DPX 4189

Type text here

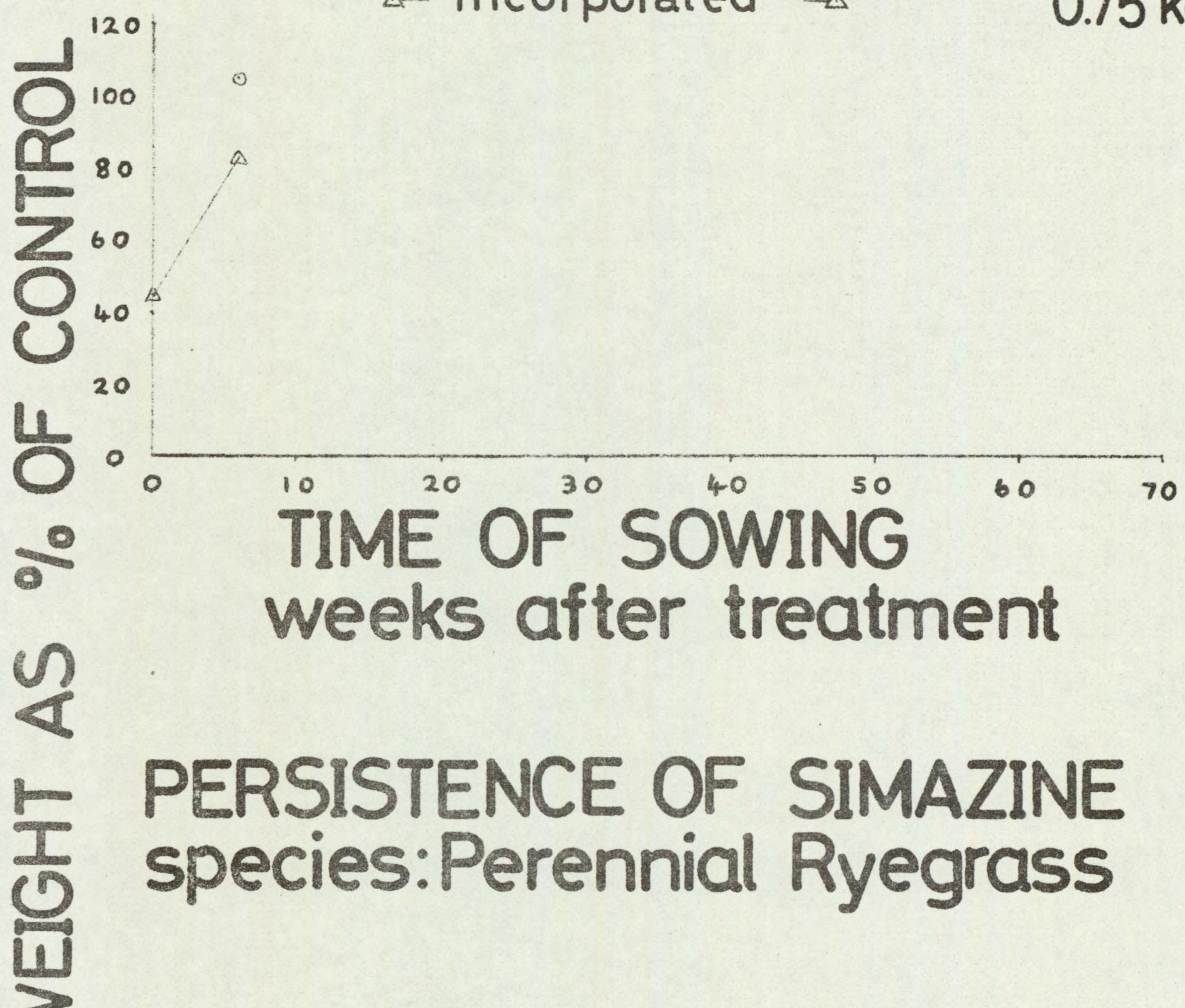
species: sugar beet

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

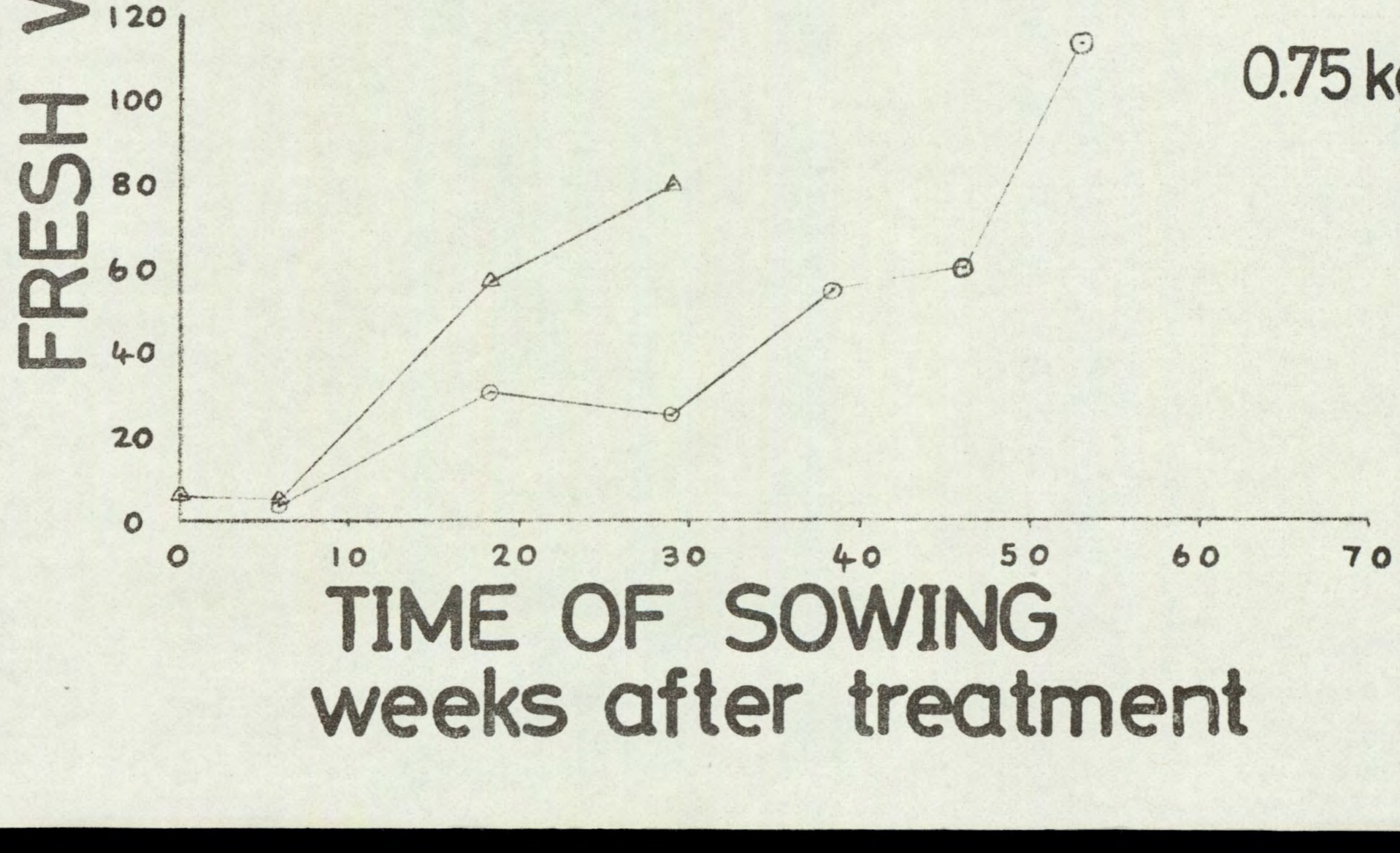


TIME OF SOWING
weeks after treatment

PERSISTENCE OF CYANAZINE
species: Perennial Ryegrass



PERSISTENCE OF SIMAZINE
species: Perennial Ryegrass



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Appendix 1. Species, abbreviations, cultivars and stage of growth at assessment

	Designation and computer serial number	Cultivar or source	No. per pot	Depth of planting (cm)	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Temperate species					
Wheat (Triticum aestivum)	WHEAT (1)	Maris Huntsman	8	1.0	8-9 leaves, tillering
Barley (Hordeum vulgare)	BARLEY (2)	Maris Mink	8	1.0	5-6 leaves, tillering
Oat (Avena sativa)	OAT (3)	Peniarth	8	1.0	9 leaves, tillering
Perennial ryegrass (Lolium perenne)	PER RYGR (4)	S 23	15	0.5	10-12 leaves, tillering
Onion (Allium cepa)	ONION	Rijnsburger, w. Robusta	15	0.5	2-3 leaves
Dwarf bean* (Phaseolus vulgaris)	DWF BEAN (9)	The Prince	3	2.0	$1\frac{1}{2}$-$2\frac{1}{2}$ trifoliate leaves
Field Bean (Vicia faba)	FLD BEAN (10)	Maris Blaze	4	2.0	$5\frac{1}{2}$-6 leaves
Pea (Pisum sativum)	PEA (11)	Dark Skinned Perfection	4	1.0	8-9 leaves
White Clover (Trifolium repens)	W Clover (12)	S 100	15	0.5	$2\frac{1}{2}$ trifoliate leaves
Rape (Brassica napus oleifera)	RAPE (14)	Rapora	15	0.5	$2\frac{1}{2}$-$3\frac{1}{2}$ leaves
Kale (Brassica oleracea acephala)	KALE (15)	Marrowstem	10	0.5	$2\frac{1}{2}$-$4\frac{1}{2}$ leaves
Carrot (Daucus carota)	CARROT (18)	Chantenay Red Core	10	0.5	$2\frac{1}{2}$-$3\frac{1}{2}$ leaves
Lettuce (Lactuca sativa)	LETTUCE (20)	Reskia	12	0.5	6-7 leaves
Sugar beet (Beta vulgaris)	SUG BEET (21)	Nomo	12	1.0	$3\frac{1}{2}$ leaves

* raised with tropical species until emergence, then transferred to lower temperature regime.

	Designation and computer serial number	Cultivar or source	No. per pot	Depth of planting (cm)	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Fenugreek (Trigonella foenumgraecum)	FENUGREK (22)	Paul	4	0.5	3½ trifoliate leaves
Bromus sterilis	BROM STE (24)	Bourton on the water 1979	10	0.5	10 leaves, tillering
Festuca rubra	FEST RUB (25)	Boreal CDN 86-0192	20	0.5	7 leaves
Avena fatua	AVE FATU (26)	B and S Supplies 1977	12	1.0	4½-6 leaves, some tillering
Alopecurus myosuroides	ALO MYOS (27)	B and S Supplies 1976	25	0.25	15 leaves, tillering
Poa annua	POA ANN (28)	B and S Supplies 1977	15	0.5	4-5 leaves, some tillering
Poa trivialis	POA TRIV (29)	WRO 1978	20	0.5	9 leaves, tillering
Sinapis arvensis	SIN ARV (30)	WRO 1965	20	0.5	5 leaves
Raphanus raphanistrum	RAPH RAP (31)	Long Black Spanish	12	0.5	4½ leaves
Chrysanthemum segetum	CHRY SEG (32)	WRO 1979	25	surface	8 leaves
Tripleurospermum maritium	TRIP MAR (33)	WRO 1976	20	surface	12 leaves
Senecio vulgaris	SEN VULG (34)	B and S Supplies 1979	40	0.25	10-12 leaves
Polygonum lapathifolium	POL LAPA (35)	WRO 1978	15	0.5	2½ leaves
Polygonum aviculare	POL AVIC (36)	B and S Supplies 1976	50	0.5	7-8 leaves
Galium aparine	GAL APAR (38)	WRO 1978	12	1.0	9-15 whorls
Chenopodium album	CHEN ALB (39)	B and S Supplies 1977	30	0.5	0-5 leaves
Stellaria media	STEL MED (40)	B and S Supplies 1977	25	0.5	20 leaves

NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

	Designation and computer serial number	Cultivar or source	No. per pot	Depth of planting (cm)	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Veronica persica	VER PERS (42)	WRO 1977	20	0.5	12 leaves
Rumex obtusifolius	RUM OBTU (44)	B and S Supplies 1977	15	0.25	2 leaves
Holcus lanatus	HOLC LAN (45)	WRO 1977	15	0.5	8-9 leaves, tillering
Agropyron repens	AG REPEN (47)	WRO Clone 31	6/	1.0	$5\frac{1}{2}$ leaves, some tillering
Allium vineale	ALL VIN (49)	WRO 1979	12+	1.0	2-3 leaves
Cirsium arvense	CIRS ARV (50)	WRO Clone 1	4//	1.0	6 leaves
Tussilago farfara	TUS FARF (51)	WRO Clone 1	4/	1.0	4 leaves
Tropical species (grown under higher temperature regime)					
Millet (Pennisetum americanum)	MILLET (55)	ICRISAT 1977	10	0.5	$3\frac{1}{2}$-$4\frac{1}{2}$ leaves
Maize + antidote (Zea mays)	MAIZE + A (56)	Julia	6	2.0	4-$4\frac{1}{2}$ leaves
Maize (Zea mays)	MAIZE (57)	Julia	6	2.0	4-$4\frac{1}{2}$ leaves
Sorghum + antidote (Sorghum vulgare)	SORG + A (58)	Funk (ex Ciba Geigy)	8	1.0	5 leaves
Sorghum (Sorghum vulgare)	SORGHUM (59)	Funk	8	1.0	5 leaves
Rice (Oryza sativa)	RICE (60)	IR 298	10	1.0	4 leaves
Pigeon pea (Cajanus cajan)	PIGEON P (61)	ICRISAT 1 G 1977	6	1.0	5-6 trifoliate leaves
Cowpea (Vigna unguiculata)	COWPEA (62)	ICRISAT S7 1977	6	1.0	2 trifoliate leaves
Chickpea (Cicer arietinum)	CHICKPEA (63)	G 62404	6	1.0	10-15 pinnate leaves

	Designation and computer serial number	Cultivar or source	No. per pot	Depth of planting (cm)	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Groundnut (Arachis hypogaea)	GRNDNUT (64)	Nigeria 1977	4	2.0	6-8 pinnate leaves
Soyabean (Glycine max)	SOYABEAN (65)	Fiskby V.	8	1.0	2-3 trifoliate leaves
Cotton (Gossypium hirsutum)	COTTON (66)	S 71	6	1.0	2-3 leaves
Jute (Corchorus olitorius)	JUTE (67)	UAR 1971	20	0.5	5-6 leaves
Kenaf (Hibiscus cannabinus)	KENAF (68)	Ghana A 63-440, 1978	10	0.5	4-5 leaves
Sesamum (Sesamum indicum)	SESAMUM (70)	ICRISAT 1977 E 8	30	0.5	4-6 leaves
Tomato (Lycopersicum esculentum)	TOMATO (71)	Ailsa Criag	6	0.5	6-10 leaves
Eleusine indica	ELEU IND (74)	WRO 1977	15	0.5	3-10 leaves
Echinochloa crus-galli	ECH CRUS (75)	WRO 1976	15	0.5	4 leaves
Rottboellia exaltata	ROTT EXA (76)	Zambia, 1978	15	0.5	4-6 leaves
Digitaria sanguinalis	DIG SANG (77)	WRO 1973	20	0.25	4-6 leaves
Amaranthus retroflexus	AMAR RET (78)	WRO 1972	50	0.25	Not assessed
Solanum nigrum	SOL NIG (81)	WRO 1977	50	0.25	7-8 leaves
Bromus pectinatus	BROM PEC (82)	Tanzania	15	0.5	$2\frac{1}{2}$ leaves
Snowdenia polystachya	SNO POL (83)	Ethiopia 1978	35	0.25	$3\frac{1}{2}$-5 leaves
Phalaris minor*	PHAL MIN (84)	Jordan 1977	20	0.25	2-$2\frac{1}{2}$ leaves

* raised with temperate species until emergence, then transferred to higher temperature regime.

	Designation and computer serial number	Cultivar or source	No. per pot	Depth of planting (cm)	Stage of growth at assessment (untreated controls, leaf numbers exclusive of cotyledons)
Cyperus esculentus	CYP ESCU (85)	WRO Clone 2 (ex South Africa)	7**	2.0	5-8 leaves/ shoot
Cyperus rotundus	CYP ROTU (86)	WRO Clone 1 (Zimbabwe)	5**	2.0	10-12 leaves
Oxalis latifolia	OXAL LAT (87)	WRO Clone 2 (Cornwall)	15 bulbs	1.0	5-15 trifoliate leaves

** = tubers
/ = one node rhizome fragments
// = 4 cm root fragments
+ = aerial bulbils

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.
		kilogramme	kg
cubic centimetre*	cm^3	kilo ($x10^3$)	k
cubic foot*	ft^3	less than	<
cubic inch*	in^3	litre	l.
cubic metre*	m^3	low volume	LV
cubic yard*	yd^3	maximum	max.
cultivar(s)	cv.	median lethal dose	LD50
curie*	Ci	medium volume	MV
degree Celsius*	^oC	melting point	m.p.
degree centigrade	^oC	metre	m
degree Fahrenheit*	^oF	micro ($x10^{-6}$)	µ
diameter	diam.	microgramme*	µg
diameter at breast height	d.b.h.	micromicro (pico: $x10^{-12}$)*	µµ
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
		milli ($x10^{-3}$)	m
equal to*	=	milliequivalent*	m.equiv.
fluid	fl.	milligramme	mg
foot	ft	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*	$\surd$
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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NB: ARD 34/02 (NP55) is sethoxydim, DPX 4189 is chlorsulfuron, PP 009 is fluazifop-butyl, SSH-43 is isouron, UBI S-734 is 2-[1-(2,5-dimethylphenyl)ethylsulfonyl]-1-oxidopyridin-1-ium (Uniroyal)

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