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NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate, U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn), U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

SPECIES	METFLURAZONE 0.50 KG/HA		METFLURAZONE 1.5 KG/HA		METFLURAZONE 4.5 KG/HA	
LETTUCE (20)	83 43	xxxxxxxxxxxxxxxxxx xxxxxxxxx	75 36	xxxxxxxxxxxxxxxx xxxxxxx	75 36	xxxxxxxxxxxxxxxx xxxxxxx
SUG BEET (21)	100 71	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxx	100 50	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxx	100 43	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxx
AVE FATU (26)	100 86	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxx	100 64	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxx	100 50	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxx
ALO MYOS (27)	100 64	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxx	100 50	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxx	56 29	xxxxxxxxxxx xxxxxx
POA ANN (28)	94 64	xxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxx	94 50	xxxxxxxxxxxxxxxxxxx xxxxxxxxxx	88 36	xxxxxxxxxxxxxxxxx xxxxxxx
POA TRIV (29)	19 14	xxxx xxx	0 0		0 0	
SIN ARV (30)	17 14	xxx xxx	0 0		0 0	
RAPH RAP (31)	90 57	xxxxxxxxxxxxxxxxxx xxxxxxxxxxx	70 36	xxxxxxxxxxxxxx xxxxxxx	70 29	xxxxxxxxxxxxxx xxxxxx
CHRY SEG (32)	100 86	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxx	100 64	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxx	89 57	xxxxxxxxxxxxxxxxxx xxxxxxxxxx
TRIP MAR (33)	133 71	xxxxxxxxxxxxxxxxxxxxxx + xxxxxxxxxxxxx	133 57	xxxxxxxxxxxxxxxxxxxxxx + xxxxxxxxxx	133 43	xxxxxxxxxxxxxxxxxxxxxx + xxxxxxxxx
SEN VULG (34)	100 57	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxx	88 36	xxxxxxxxxxxxxxxxxx xxxxxxx	31 14	xxxxxx xxx
POL LAPA (35)	100 79	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	100 57	xxxxxxxxxxxxxxxxxxxx xxxxxxxxxxx	63 36	xxxxxxxxxxxxx xxxxxxx
POL AVIC (36)	100 79	xxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	100 57	xxxxxxxxxxxxxxxxxxxx xxxxxxxxxxx	100 43	xxxxxxxxxxxxxxxxxxxx xxxxxxxxx

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	METFLURAZONE 0.50 KG/HA		METFLURAZONE 1.5 KG/HA		METFLURAZONE 4.5 KG/HA	
GAL APAR	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(38)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
CHEN ALB	83	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	0	
(39)	43	xxxxxxxxx	29	xxxxxx	0	
STEL MED	56	xxxxxxxxxxx	25	xxxxx	0	
(40)	21	xxxx	14	xxx	0	
SPER ARV	81	xxxxxxxxxxxxxxxx	56	xxxxxxxxxxx	38	xxxxxxxx
(41)	29	xxxxxx	21	xxxx	14	xxx
AG REPEN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(47)	79	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	50	xxxxxxxxxx
AG STOLO	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(48)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(58)	57	xxxxxxxxxxx	50	xxxxxxxxxx	36	xxxxxxx
SORGHUM	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(59)	57	xxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx
RICE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(60)	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx
GRNDNUT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(64)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	36	xxxxxxx
SOYABEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(65)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	43	xxxxxxxxx
COTTON	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(66)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	36	xxxxxxx
JUTE	14	xxx	0		0	
(67)	7	x	0		0	

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	METFLURAZONE 0.50 KG/HA		METFLURAZONE 1.5 KG/HA		METFLURAZONE 4.5 KG/HA	
KENAF	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(68)	86	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx
TOBACCO	0		0		0	
(69)	0		0		0	
ELEU IND	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(74)	50	xxxxxxxxxx	43	xxxxxxxxx	43	xxxxxxxxx
ECH CRUS	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(75)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	43	xxxxxxxxx
ROT EXAL	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(76)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx
AMAR RET	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(78)	57	xxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
PORT OLE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(79)	43	xxxxxxxxx	43	xxxxxxxxx	36	xxxxxxx
CYN DACT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(82)	93	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx
CYP ROTU	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(86)	64	xxxxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx

NORFLURAZONE

Code numbers SAN H 52.143, HER 52.143 **Trade name** - SAN H 9789, SAN 9789, H 80 WP

Chemical name 4-chloro-5-methylamino-2-(3-trifluoromethylphenyl)pyridazin-3(2H)-one

Source Sandoz Ltd
3090 Agro Research
CH-4002 Basle
Switzerland

Information available and suggested uses

Information received from the manufacturer in 1973 reports good control of a wide range of annual weeds, particularly grasses, following pre-emergence applications. At higher rates, activity against *Cyperus* spp. and some *Carex* and *Juncus* spp. has been found. Practical crop tolerance was reported in cotton and perennial crops, such as cranberries, alfalfa, citrus, some deciduous fruit trees, tree nut, bananas and sugar cane. Pre-emergence treatments showed a relatively long lasting soil persistence. Little activity was found with post-emergence applications.

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

Spray volume in activity experiment 352 l/ha (31.3 gal/ac)
in post-emergence selectivity experiment 338 l/ha (30.1 gal/ac)

RESULTS

Full histogram results are given on pages 45-49 and potential selectivities are summarised in the following Table.

Rate (kg ai/ha)	CROPS: vigour reduced by less than 15%	WEEDS: number or vigour reduced by more than 70%
2.00	None	None listed as no crops tolerant
0.50	pea carrot parsnip rice soyabean kenaf	*Solanum nigrum* *Digitaria sanguinalis* + species below

(Table continued overleaf)

Rate (kg ai/ha)	CROPS: vigour reduced by less than 15%	WEEDS: number or vigour reduced by more than 70%
0.125	species above + wheat barley oat perennial ryegrass onion white clover kale cabbage swede lettuce sugar beet maize sorghum groundnut	Poa trivialis

Comments on results

General

In the activity experiment a high level of activity was found following surface and incorporated pre-emergence treatments, and there was little difference in activity between these two methods of application. Post-emergence foliar treatments caused only minor symptoms on annual species while soil drenches were active on all species and eventually produced similar results to the pre-emergence soil treatments. This pattern of activity was very close to that of the related metflurazone.

Results from the selectivity test showed a broad spectrum of crop tolerance at lower rates but the majority of weeds were only controlled at the highest dose. Both annual and perennial weeds were susceptible. The few selectivities achieved were marginal.

In view of the activity experiment results, it would appear that most of the activity found in the post-emergence selectivity experiment resulted from uptake from the soil rather than a direct effect through the foliage. This factor, which also operates for the related metflurazone, should be borne in mind when considering the results presented here.

Symptoms

Symptoms were very similar to those caused by the related metflurazone but tended to be more severe at comparable rates. The pronounced chlorosis preceding necrosis and death is typical of this group of compounds as well as aminotriazole and pyriclor.

Temperate weeds and crops

Only Poa trivialis was controlled at 0.125 kg/ha and Solanum nigrum at 0.5 kg/ha. At this latter dose the majority of annual weeds were severely reduced in vigour and at 2.0 kg/ha all weeds were controlled

with the exception of Poa annua, Tripleurospermum maritimum, Polygonum lapathifolium and Chenopodium album. The pattern of results was similar to that found with metflurazone although the activity of norflurazone generally tended to be greater (Chenopodium album was control by metflurazone at only 1.5 kg/ha however).

All crops were tolerant at 0.125 kg/ha. Pea, carrot and parsnip were also resistant at 0.5 kg/ha and these crops showed considerable tolerance at 2.0 kg/ha, being reduced by only 22-29% compared with the untreated controls. Norflurazone was generally more active on the crops than metflurazone but the range of tolerant species was similar. [Carrot was also tolerant to pre-emergence applications of norflurazone when many more weeds were selectively controlled (Richardson and Dean, 1972)].

Potential selective control of Poa trivialis in all temperate crops and Solanum nigrum in pea, parsnip and carrot was found.

Tropical weeds and crops

All annual weeds were severely affected at 2.0 kg/ha and showed little likelihood of recovering. Digitaria sanguinalis was controlled at 0.5 kg/ha and observations suggested that the majority of smaller-seeded annual weeds would eventually die at this dose. Cynodon dactylon was the most resistant of the perennial species and recovered from 2.0 kg/ha. Oxalis latifolia also eventually recovered from this dose but both Cyperus spp. were susceptible. Eight weeks after treatment at 0.5 kg/ha, one replicate of C. rotundus was severely affected although the other was recovering. C. esculentus was eventually killed at 2.0 kg/ha and was severely reduced at 0.5 kg/ha but some replicate variation did occur. Death or severe reduction of foliage caused corresponding decreases in the rhizome system. The pattern of these results is similar to that obtained with metflurazone.

Rice, soyabean and kenaf showed slight to moderate symptoms at all rates, but were adequately tolerant at 0.5 kg/ha. The two latter species also exhibited some resistance at 2.0 kg/ha. Groundnut showed some marginal resistance at 0.5 kg/ha also. Somewhat surprisingly cotton was particularly sensitive in this test. The higher activity of norflurazone was again evident compared with metflurazone although the pattern of results was similar.

Only Digitaria sanguinalis was controlled at selective doses where rice, soyabean and kenaf were tolerant.

Possible uses and further testing

Although pea, carrot and parsnip could possibly tolerate post-emergence applications of greater than 0.5 kg/ha, when correspondingly more annual weeds would be controlled, advantages over herbicides presently used in these crops are not immediately apparent. At similar rates of application, post-emergence treatment caused less crop and weed damage compared with pre-emergence treatment (Richardson and Dean, 1972).

Potential selectivities in tropical crops were only marginal and although rice, soyabean and kenaf may tolerate doses greater than 0.5 kg/ha, the improved weed control would not offer any outstanding advantages. The eventual susceptibility of both Cyperus spp. may indeed be worth further investigation however.

In view of the extreme persistence of this compound and the control of a large range of species at higher rates, including perennial species, norflurazone would appear to offer possibilities in the non-crop and industrial weed control situation. It is unfortunate that the increased activity on weeds, compared with metflurazone, is not combined with the same degree of crop tolerance.

ACTIVITY EXPERIMENT

NORFLURAZONE

		0.67 kg/ha	2.00 kg/ha	6.00 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx
	P	xxxxxxxxxxxxx xxxxxxxx	xxxxxxxxx xxx	o o
	I	xxxxxxxxx xxxxx	xxxxxxx xx	xxxxx x
KALE	F	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxxx xxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxx	xxxxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxxxx xxxx
	P	o o	o o	o o
	I	o o	o o	o o
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxxx +	xxxxxxxxxxxxxxx xxxxxxxxx +	xxxxxxxxxxxxxxx xxxxx +
	I	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxx	xxxxxxxxxxxxxxx xx	xxxxxxxxxxxxxxx xx
	P	o o	o o	o o
	I	xxxxxxx xx	o o	o o
AVENA FATUA	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxxx xxxx
	P	xxxx xxxxxxx	o o	o o
	I	xxxxxxx xxx	o o	o o
AGROPYRON REPENS	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxxx xxxxx
	P	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxx xxxx
	I	xxxxxxxxxxxxxxx xxxxxx	xxxxxxx xx	xxxxxxxxxx xx

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

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	NORFLURAZONE 0.125 KG/HA		NORFLURAZONE 0.50 KG/HA		NORFLURAZONE 2.00 KG/HA	
WHEAT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	21	xxxx
BARLEY	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(2)	86	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
OAT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx
(3)	100	xxxxxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	29	xxxxxx
PER RYGR	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(4)	86	xxxxxxxxxxxxxxxxxx	36	xxxxxxx	14	xxx
ONION	119	xxxxxxxxxxxxxxxxxxxxxx +	119	xxxxxxxxxxxxxxxxxxxxxx +	59	xxxxxxxxxxx
(8)	100	xxxxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	29	xxxxxx
FLD BEAN	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(10)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
PEA	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(11)	100	xxxxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
W CLOVER	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxxx
(12)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	29	xxxxxx
KALE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(15)	86	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
CABBAGE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(16)	86	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
SWEDE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(17)	86	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
CARROT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(18)	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
PARSNIP	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(19)	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	NORFLURAZONE 0.125 KG/HA		NORFLURAZONE 0.50 KG/HA		NORFLURAZONE 2.00 KG/HA	
LETTUCE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(20)	86	xxxxxxxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
SUG BEET	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(21)	86	xxxxxxxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
AVE FATU	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(26)	86	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxxx	29	xxxxxx
ALO MYOS	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(27)	57	xxxxxxxxxxx	36	xxxxxxx	21	xxxx
POA ANN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx
(28)	100	xxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
POA TRIV	100	xxxxxxxxxxxxxxxxxxxx	6	x	0	
(29)	21	xxxx	7	x	0	
SIN ARV	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
(30)	86	xxxxxxxxxxxxxxxxxx	36	xxxxxxx	7	x
RAPH RAP	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(31)	57	xxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
TRIP MAR	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxx
(33)	93	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
SEN VULG	100	xxxxxxxxxxxxxxxxxxxx	68	xxxxxxxxxxxxx	0	
(34)	93	xxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0	
POL LAPA	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(35)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
RUM CRIS	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
(37)	86	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	29	xxxxxx
GAL APAR	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(38)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	NORFLURAZONE 0.125 KG/HA		NORFLURAZONE 0.50 KG/HA		NORFLURAZONE 2.00 KG/HA	
CHEN ALB	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(39)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
STEL MED	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	68	xxxxxxxxxxxxxx
(40)	71	xxxxxxxxxxxxxx	36	xxxxxxx	21	xxxx
SPER ARV	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	0	
(41)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	0	
SOL NIG	100	xxxxxxxxxxxxxxxxxxxx	41	xxxxxxxx	0	
(43)	86	xxxxxxxxxxxxxxxxx	29	xxxxxx	0	
AG REPEN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(47)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	29	xxxxxx
AG STOLO	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(48)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	21	xxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(58)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
SORGHUM	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(59)	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
RICE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(60)	93	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
GRNDNUT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(64)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
SOYABEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(65)	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
COTTON	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(66)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
JUTE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx
(67)	64	xxxxxxxxxxxx	29	xxxxxx	14	xxx

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	NORFLURAZONE 0.125 KG/HA		NORFLURAZONE 0.50 KG/HA		NORFLURAZONE 2.00 KG/HA	
KENAF	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(68)	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
TOBACCO	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(69)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx
SESAMUM	93	xxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxx
(70)	79	xxxxxxxxxxxxxxxx	43	xxxxxxxx	29	xxxxxx
ELEU IND	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(74)	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx
ECH CRUS	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(75)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	43	xxxxxxxxx
ROT EXAL	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(76)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx
DIG SANG	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx
(77)	79	xxxxxxxxxxxxxxxx	29	xxxxxx	21	xxxx
AMAR RET	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(78)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	43	xxxxxxxxx
PORT OLE	100	xxxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(79)	79	xxxxxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
CYN DACT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(82)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
CYP ESCU	133	xxxxxxxxxxxxxxxxxxxx +	125	xxxxxxxxxxxxxxxxxxxx +	116	xxxxxxxxxxxxxxxxxxxx +
(85)	86	xxxxxxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx
CYP ROTU	128	xxxxxxxxxxxxxxxxxxxx +	96	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
(86)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	29	xxxxxx
OXAL LAT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(87)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	50	xxxxxxxxxx

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

AC 50,191

Code number AC 50,191 Trade name -

Chemical name Confidential

Source Cyanamid of America
Cyanamid International
P O Box 400
Princeton NJ 08540
USA

Information available and suggested uses

Manufacturer's information from 1972 reveals selective post-emergence control of wild oats (Avena fatua) at the 2-5 leaf stage in winter and spring seeded wheat and barley following application at 0.25-1.0 kg/ha. Combinations with compatible broad-leaved herbicides have been reported as well as the use of surfactants to increase activity. Trials in sugar beet, potatoes, rape, flax and sunflower are suggested.

Formulation used 14.4% w/v a.i. water miscible concentrate. [+0.5% v/v Surfel (a 90% alkylpolyoxyethylene ether from Union Carbide also known as PM 4884) in activity experiment and 0.25% v/v Tergitol NPX non-ionic surfactant (an alkylphenylpolyethyleneglycol ether from Union Carbide) in post-emergence selectivity experiment].

Spray volume 352 l/ha (31.3 gal/ac) in both experiments

RESULTS

Full histogram results are given on pages 53-57 and potential selectivities are summarised in the following Table.

Rate (kg ai/ha)	CROPS: vigour reduced by less than 15%	WEEDS: number or vigour reduced by more than 70%
3.00	wheat barley perennial ryegrass onion kale carrot lettuce groundnut	Poa annua Polygonum lapathifolium Rumex crispus Amaranthus retroflexus + species below
1.00	species above + field bean swede radish maize rice	Solanum nigrum
0.33	None listed as no weeds controlled	None

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

Comments on results

General

Foliar applications of AC 50,191 caused symptoms on all species in the activity experiment. Avena fatua and kale showed particular susceptibility. Perennial ryegrass was the most resistant species. No soil activity was apparent with the exception of A. fatua following pre-emergence incorporation at 4.5 kg/ha.

Control for A. fatua was eventually found in the selectivity experiment and at rates where temperate cereals, with the exception of oats, were highly tolerant. A few broad-leaved weeds were controlled with Solanum nigrum showing particular susceptibility.

Symptoms

Symptoms were slow to develop in A. fatua but the main shoots were severely inhibited or killed eventually,while large yellow patches developed on the treated leaves. Further experiments have shown that plants treated at a later stage of growth develop a pronounced reddening of the leaves. At very low doses excessive tillering has been noted. These tillers were often retarded and ranged in colour from a very dark to a pale green. Germination of A. fatua was not affected by incorporating AC 50,191 before sowing, but the main shoots and the large number of tillers produced, were inhibited at 4.5 kg/ha. The leaves were narrow and shortened with interveinal chlorosis. In the activity experiment a mild temporary chlorosis was seen in Agropyron repens and perennial ryegrass. Susceptible broad-leaved species exhibited scorch on sprayed leaves which was more severe in the activity experiment perhaps due to the use of Surfel.

Temperate weeds and crops

A. fatua was not adequately controlled at the initial assessment (2 weeks after treatment) but complete kill was eventually achieved in one replicate at 3.0 kg/ha. Although plants recovered in the remaining replicate at this dose, only three panicles were produced. At 1.0 kg/ha all plants were severely inhibited and only one panicle developed. Treatment at 0.33 kg/ha caused excessive tillering and subsequent panicle production was increased compared with the untreated controls. [Greater activity was apparent in the activity experiment where 0.75 kg/ha eventually proved lethal and 0.125 kg/ha caused severe retardation. This discrepancy could be due to the use of different surfactants]. Poa annua was controlled at 3.0 kg/ha while P. trivialis and Agrostis stolonifera were severely reduced. Only three broad-leaved species were susceptible; Polygonum lapathifolium and Rumex crispus at 3.0 kg/ha and Solanum nigrum, which proved to be particularly sensitive at 1.0 kg/ha. A number of other broad-leaved weeds were severely reduced at the higher dose but many remained resistant.

The cereals wheat and barley were tolerant at 3.0 kg/ha. The latter was particularly resistant but oat was very susceptible. Perennial ryegrass and a selection of broad-leaved crops was also tolerant at this dose. The resistance of kale at 3.0 kg/ha contrasts with its susceptibility in the activity experiment and could be attributed to the use of different surfactants and their rates of use in the two experiments.

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

Avena fatua, Poa annua, Polygonum lapathifolium, Rumex crispus and Solanum nigrum were all selectively controlled where wheat, barley, perennial ryegrass, onion and several broad-leaved crops were tolerant. Possible selective control of Solanum nigrum in field bean, swede and radish was noted.

Tropical weeds and crops

Amaranthus retroflexus was the only tropical weed controlled at 3.0 kg/ha. All the annual grasses showed some symptoms initially but soon recovered. The perennial species reacted in a similar manner.

All crop species showed slight to moderate symptoms initially at all doses. The cereals maize and rice were both tolerant at 1.0 kg/ha and the latter showed marginal resistance at 3.0 kg/ha. Groundnut proved to be tolerant at all rates. Many crops which were more severely affected initially developed new healthy foliage and tobacco showed marginal tolerance at 1.0 and 3.0 kg/ha. Selectivities were, however, limited to the control of Amaranthus retroflexus in groundnut.

Possible uses and further testing

AC 50,191 showed promise for the selective control of A. fatua in wheat and barley. The degree of control was less than with AC 84,777 but it appeared to be safer in wheat. Further pot testing at different growth stages has produced very similar results with both compounds.

The control of broad-leaved weeds was not outstanding but addition of relevant compatible herbicides could well improve the spectrum of activity. Variation in surfactants and their concentration also has an effect on degree of activity and could be worth further investigation.

There would appear to be little application for this compound in the tropical situation except where A. fatua is a problem.

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

ACTIVITY EXPERIMENT

AC 50,191

		0.125 kg/ha	0.75 kg/ha	4.5 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx	xxxx x
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxx xxxxxxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
KALE	F	xxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx +	xxxxx xx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +
	I	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxx xxxxxxxxxxxxxx
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxx xxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxx
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +
	I	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxx
AVENA FATUA	F	xxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxx xxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +
	I	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxx +
AGROPYRON REPENS	F	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxxx xxxxxxxxxxxxxx
	I	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxxxxxxxxxxxxx +	xxxxxxxxxxxxx xxxxxxxxxxxxxx +

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

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

SPECIES	AC 50,191 0.33 KG/HA		AC 50,191 1.0 KG/HA		AC 50,191 3.0 KG/HA	
WHEAT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(1)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx
BARLEY	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(2)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
OAT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(3)	93	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
PER RYGR	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(4)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
ONION	100	xxxxxxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(8)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
FLD BEAN	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(10)	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
PEA	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(11)	86	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
W CLOVER	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(12)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
KALE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(15)	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx
CABBAGE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(16)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
SWEDE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(17)	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
CARROT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(18)	93	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx
PARSNIP	100	xxxxxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx
(19)	79	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxx

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

SPECIES	AC 50,191 0.33 KG/HA		AC 50,191 1.0 KG/HA		AC 50,191 3.0 KG/HA	
LETTUCE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(20)	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx
SUG BEET	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(21)	86	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxx
AVE FATU	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(26)	64	xxxxxxxxxxxx	50	xxxxxxxxxx	50	xxxxxxxxxx
ALO MYOS	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(27)	100	xxxxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
POA ANN	100	xxxxxxxxxxxxxxxxxxxxxx	68	xxxxxxxxxxxxx	12	xx
(28)	100	xxxxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx
POA TRIV	100	xxxxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	62	xxxxxxxxxxx
(29)	100	xxxxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
SIN ARV	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(30)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
RAPH RAP	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(31)	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx
TRIP MAR	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(33)	100	xxxxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx
SEN VULG	100	xxxxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxx
(34)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
POL LAPA	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(35)	79	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	21	xxxx
RUM CRIS	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
(37)	86	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	29	xxxxx
GAL APAR	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxxx

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

SPECIES	AC 50,191 0.33 KG/HA		AC 50,191 1.0 KG/HA		AC 50,191 3.0 KG/HA	
CHEN ALB	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(39)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxxx
STEL MED	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx
SPER ARV	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxxx
(41)	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
SOL NIG	83	xxxxxxxxxxxxxxxxx	16	xxx	0	
(43)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
AG REPEN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(47)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
AG STOLO	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(48)	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(58)	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
SORGHUM	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(59)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
RICE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(60)	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
GRNDNUT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(64)	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
SOYABEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(65)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	50	xxxxxxxxxx
COTTON	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(66)	64	xxxxxxxxxxxx	50	xxxxxxxxxx	36	xxxxxxx
JUTE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(67)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

SPECIES	AC 50,191 0.33 KG/HA		AC 50,191 1.0 KG/HA		AC 50,191 3.0 KG/HA	
KENAF	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(68)	57	xxxxxxxxxxx	21	xxxx	14	xxx
TOBACCO	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(69)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
SESAMUM	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxxx
(70)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	57	xxxxxxxxxxx
ELEU IND	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx
(74)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	36	xxxxxxx
ECH CRUS	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(75)	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
ROT EXAL	94	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(76)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
DIG SANG	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(77)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
AMAR RET	100	xxxxxxxxxxxxxxxxxxxx	84	xxxxxxxxxxxxxxxxx	54	xxxxxxxxxxx
(78)	71	xxxxxxxxxxxxxx	36	xxxxxxx	21	xxxx
PORT OLE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxxx
(79)	93	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx
CYN DACT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx
(82)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
CYP ESCU	114	xxxxxxxxxxxxxxxxxxxx +	128	xxxxxxxxxxxxxxxxxxxx +	93	xxxxxxxxxxxxxxxxxx
(85)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx
CYP ROTU	103	xxxxxxxxxxxxxxxxxxxx +	66	xxxxxxxxxxxxx	59	xxxxxxxxxxxx
(86)	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
OXAL LAT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
(87)	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

AC 84,777

Code numbers AC 84,777, CL 84,777 **Trade name** Avenge

Chemical name 1,2-dimethyl-3,5-diphenylpyrazolium methyl sulphate

Source
Cyanamid of America
Cyanamid International
P O Box 400
Princeton, NJ 08540
USA

Information available and suggested uses

Technical information received in 1972 and 1973 reports selective post-emergence control of wild oats (*Avena fatua*, *A. ludoviciana* and *A. sterilis*) in wheat, barley and several other crops. The degree of control is affected by rate of application, concentration of surfactant, degree of crop competition and stage of growth at application. Investigation in winter and spring barley and wheat at rates of 0.5-1.25 kg/ha is suggested; also testing in sugar beet, peas and potatoes at 0.5-1.0 kg/ha. Stage of growth, surfactant variation and compatability with selective broad-leaved herbicides are factors requiring further testing.

Formulation used 40% w/v a.i. aqueous formulation [+0.5% v/v Surfel (a 90% alkylpolyoxylethylene ether from Union Carbide also known as PM 4884) in activity experiment and 0.25% v/v Tergitol NPX non-ionic surfactant (an alkylphenyl-polyethyleneglycol ether from Union Carbide) in post-emergence selectivity experiment].

Spray volume 352 l/ha (31.3 gal/ac) in both experiments

RESULTS

Full histogram results are given on pages 61-65 and potential selectivities are summarised in the following Table.

Rate (kg ai/ha)	CROPS: vigour reduced by less than 15%	WEEDS: number or vigour reduced by more than 70%
3.00	barley perennial ryegrass onion kale carrot	*Poa annua* *Senecio vulgaris* *Polygonum lapathifolium* *Eleusine indica* *Amaranthus retroflexus* + species below
1.00	species above + wheat cabbage lettuce maize rice groundnut	*Solanum nigrum*
0.33	None listed as no weeds controlled	None

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

Comments on results

General

The type of activity, symptoms found on susceptible species and selectivities of AC 84,777 were very similar to those of AC 50,191. Avena fatua and wheat were more susceptible to AC 84,777 in the selectivity experiment, however.

Temperate weeds and crops

The pattern of activity of AC 84,777 against A. fatua resembled AC 50,191 very closely. A. fatua was not adequately controlled at the initial assessment, but fresh weights of plants were reduced by 89 and 92% at 1.0 and 3.0 kg/ha respectively twelve weeks after treatment. No panicles were produced on these plants but those treated at 0.33 kg/ha recovered from initial retardation. [Levels of phytotoxicity in the selectivity experiment were less than in the activity experiment probably due to a different surfactant and rate of use]. At the initial assessment (two weeks after treatment) certain other annual grass weeds were controlled or severely reduced at 3.0 kg/ha. Two broad-leaved weeds were also controlled in this test at 3.0 kg/ha and Solanum nigrum proved to be susceptible at 1.0 kg/ha. Several other species were reduced by 50% or greater at 3.0 kg/ha including Sinapis arvensis, Rumex crispus and Spergula arvensis.

Barley showed tolerance at all rates of application. Wheat proved to be more susceptible showing inhibition and excessive tillering at 3.0 kg/ha. Oat was only resistant at 0.33 kg/ha. Perennial ryegrass, onion, carrot and kale were all tolerant at 3.0 kg/ha. The resistance of the latter, compared with its sensitivity in the activity experiment, is presumed due to the variation in surfactants or concentration used, as was the case with AC 50,191. Cabbage also exhibited a marginal degree of tolerance at 3.0 kg/ha.

Selective control of A. fatua was eventually achieved where barley and wheat were tolerant. A number of broad-leaved and grass weeds were also controlled in a range of crop species. The potential selectivities were similar to AC 50,191.

Tropical weeds and crops

The annual grass weeds were particularly tolerant of AC 84,777 with the exception of Eleusine indica, which was controlled at 3.0 kg/ha. Both annual broad-leaved weeds were severely reduced at 1.0 kg/ha and Amaranthus retroflexus was controlled at 3.0 kg/ha. These effects were marginally more severe than with AC 50,191 but the response of the perennial species was generally similar.

With the exception of groundnut, all broad-leaved crops were sensitive. Groundnut, maize and rice were tolerant at 1.0 kg/ha, and all three species showed marginal resistance at 3.0 kg/ha, but there were no distinct selectivities.

Possible uses and further testing

This herbicide would appear to have potential for the post-emergence control of A. fatua in barley and wheat. Further pot experiments have

shown that it is active against early and very late stages of growth of A. fatua. Control of A. fatua with AC 84777 in the selectivity experiment was somewhat better than with AC 50,191. However wheat was more tolerant of AC 50,191 while the resistance of barley was good with both compounds.

The poor control of most broad-leaved weeds parallels that of AC 50,191 and other post-emergence wild oat herbicides. Compatibility studies with other herbicides, to achieve a broader weed control spectrum are needed.

The potential selective control of certain annual grasses in onion may also be worth further testing.

This compound would appear to have little to offer in the tropical situation unless A. fatua is a problem.

ACTIVITY EXPERIMENT

AC 84,777

		0.125 kg/ha	0.75 kg/ha	4.5 kg/ha
DWARF BEAN	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible]	[illegible]	[illegible] +
	I	[illegible]	[illegible]	[illegible]
KALE	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible] +	[illegible] +	[illegible] +
	I	[illegible] +	[illegible]	[illegible]
POLYGONUM AMPHIBIUM	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible]	[illegible]	[illegible]
	I	[illegible]	[illegible] +	[illegible]
PERENNIAL RYEGRASS	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible]	[illegible] +	[illegible] +
	I	[illegible]	[illegible]	[illegible]
AVENA FATUA	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible] +	[illegible] +	[illegible] +
	I	[illegible]	[illegible]	[illegible] +
AGROPYRON REPENS	F	[illegible]	[illegible]	[illegible]
	S	[illegible]	[illegible]	[illegible]
	P	[illegible]	[illegible]	[illegible]
	I	[illegible] +	[illegible]	[illegible]

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

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate, U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn), U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	AC 84,777 0.33 KG/HA		AC 84,777 1.0 KG/HA		AC 84,777 3.0 KG/HA	
WHEAT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(1)	93	xxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
BARLEY	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(2)	100	xxxxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
OAT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(3)	93	xxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx
PER RYGR	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(4)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
ONION	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(8)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
FLD BEAN	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(10)	79	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxxx
PEA	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(11)	86	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	50	xxxxxxxxxx
W CLOVER	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxxx
(12)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
KALE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(15)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx
CABBAGE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(16)	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
SWEDE	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(17)	86	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
CARROT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(18)	93	xxxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxxx
PARSNIP	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx
(19)	79	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	50	xxxxxxxxxx

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate, U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn), U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	AC 84,777 0.33 KG/HA		AC 84,777 1.0 KG/HA		AC 84,777 3.0 KG/HA	
LETTUCE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(20)	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
SUG BEET	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(21)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	71	xxxxxxxxxxxxx
AVE FATU	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(26)	64	xxxxxxxxxxxx	50	xxxxxxxxx	43	xxxxxxxx
ALO MYOS	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(27)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxx
POA ANN	100	xxxxxxxxxxxxxxxxxxx	43	xxxxxxxx	0	
(28)	79	xxxxxxxxxxxxxxxx	36	xxxxxx	0	
POA TRIV	100	xxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	50	xxxxxxxxx
(29)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxx
SIN ARV	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(30)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	50	xxxxxxxxx
RAPH RAP	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxx
(31)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxx
TRIP MAR	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(33)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
SEN VULG	100	xxxxxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxx	0	
(34)	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0	
POL LAPA	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(35)	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
RUM CRIS	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
(37)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
GAL APAR	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate, U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn), U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	AC 84,777 0.33 KG/HA		AC 84,777 1.0 KG/HA		AC 84,777 3.0 KG/HA	
CHEN ALB (39)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	79	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
STEL MED (40)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
SPER ARV (41)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx
SOL NIG (43)	100	xxxxxxxxxxxxxxxxxxxx	25	xxxxx	0	
	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
AG REPEN (47)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
AG STOLO (48)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	71	xxxxxxxxxxxxxx
MAIZE (58)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
SORGHUM (59)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
RICE (60)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
GRNDNUT (64)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
SOYABEAN (65)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	71	xxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	36	xxxxxxx
COTTON (66)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	71	xxxxxxxxxxxxxx	29	xxxxxx	14	xxx
JUTE (67)	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	57	xxxxxxxxxxx

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate, U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn), U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)

SPECIES	AC 84,777 0.33 KG/HA		AC 84,777 1.0 KG/HA		AC 84,777 3.0 KG/HA	
KENAF (68)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
	50	xxxxxxxxxx	36	xxxxxxx	14	xxx
TOBACCO (69)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
	79	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxxx	57	xxxxxxxxxxx
SESAMUM (70)	100	xxxxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxxx	6	x
	86	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxxx	21	xxxx
ELEU IND (74)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	81	xxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	29	xxxxxx
ECH CRUS (75)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
ROT EXAL (76)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
DIG SANG (77)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
AMAR RET (78)	100	xxxxxxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxxxx	59	xxxxxxxxxxx
	79	xxxxxxxxxxxxxxxxx	36	xxxxxxx	14	xxx
PORT OLE (79)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxxx
CYN DACT (82)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxxx
CYP ESCU (85)	114	xxxxxxxxxxxxxxxxxxxxxx +	79	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxx
CYP ROTU (86)	106	xxxxxxxxxxxxxxxxxxxxxx +	43	xxxxxxxx	73	xxxxxxxxxxxxxxx
	79	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
OXAL LAT (87)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	69	xxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxxx	43	xxxxxxxx	43	xxxxxxxx

IPRYMIDAN

Code numbers HER 52.123, SAN 52.123H Trade name -

Chemical name 2-amino-4-chloro-6-isopropyl-aminopyrimidine

Source

Sandoz Ltd
3090 Agro Research
CH-4002 Basle
Switzerland

Information available and suggested uses

A preliminary data sheet coupled with field trials project sheets received during 1970 suggests pre and post-emergence activity against a range of mono and dicotyledonous weed species with promising selectivity in potato.

Formulation used 80% w/w in wettable powder

Spray volume in activity experiment 338 1/ha (30.1 gal/ac)
in post-emergence selectivity experiment 352 1/ha (31.3 gal/ac)

RESULTS

Full histogram results are given on pages 69-73 and potential selectivities are summarised in the following Table.

Rate (kg ai/ha)	CROPS: vigour reduced by less than 15%	WEEDS: number or vigour reduced by more than 70%
3.00 and 1.00	None	None listed as no crops tolerant
0.33	pea maize kenaf	Poa trivialis Senecio vulgaris Rumex crispus Chenopodium album Spergula arvensis Solanum nigrum Amaranthus retroflexus Portulaca oleracea

Comments on results

General

All methods of application were effective in the activity experiment although foliar treatments were less active than the various soil treatments. Pre-emergence surface and incorporated treatments produced similar results while post-emergence soil drenches were as effective. Larger seeded annual species and perennials were more resistant than the small seeded annuals.

In the selectivity experiment the majority of crop and weed species were killed or severely reduced at 3.0 kg/ha with the exception of Oxalis latifolia and Cyperus rotundus. Crop tolerance was only observed with a limited number of species at 0.33 kg/ha. Both mono and dicotyledonous annual weeds were susceptible at higher doses.

Symptoms

Foliar application resulted in a high degree of contact scorch which was sometimes accompanied by chlorosis at lower doses. Pre-emergence soil treatments caused chlorosis of plants from the 2-4 leaf stage prior to dying back. The symptoms observed are typical of a photosynthetic inhibitor.

Temperate weeds and crops

All the annual weeds were controlled at 1.0 kg/ha except Tripleurospermum maritimum and Galium aparine which were particularly resistant. Five broad-leaved annual weeds were controlled, and three others were severely reduced at 0.33 kg/ha. Poa trivialis was also controlled at 0.33 kg/ha while P. annua and Alopecurus myosuroides were substantially reduced in vigour. Avena fatua was resistant at this dose but was killed at 1.0 kg/ha. Agrostis stolonifera was eventually killed at 1.0 kg/ha but Agropyron repens was recovering from the initial effects two weeks after treatment.

Pea was the only tolerant crop at 0.33 kg/ha and was reduced by only 21% at 1.0 kg/ha. Field bean was slightly scorched at both these doses, but new leaves were unaffected and eventually healthy flowers were borne. Although dwarf bean does not appear in the histograms, observations suggested that it was sensitive to iprymidan.

Selective control of mainly annual broad-leaved weeds was achieved where pea was tolerant.

Tropical weeds and crops

Portulaca oleracea was particularly sensitive to iprymidan and was killed at 0.33 kg/ha at which dose Amaranthus retroflexus was controlled. Annual grass weeds showed less damage than corresponding temperate species. Rottboellia exaltata was only reduced by 50% at 3.0 kg/ha and was recovering. Eleusine indica, Echinochloa crus-galli and Digitaria sanguinalis however were all severely reduced or controlled at 1.0 kg/ha. Oxalis latifolia was outstandingly resistant while Cyperus rotundus and Cynodon dactylon were initially weakened at 3.0 kg/ha, but were recovering eight weeks after treatment. C. esculentus was the most susceptible perennial weed but also recovered.

Only maize and kenaf showed any tolerance at 0.33 kg/ha. The legumes, groundnut and soyabean exhibited some very marginal resistance at this dose and kenaf was only reduced by 22% at 1.0 kg/ha.

Amaranthus retroflexus and Portulaca oleracea were selectively controlled in maize and kenaf.

Possible uses and further testing

These results obtained with post-emergence applications of iprymidan exhibit a similar pattern to pre-emergence applications (Richardson and

Dean, 1972). In the latter however crop tolerance was achieved at higher rates of application and the number of tolerant species was greater. The range, number of species and degree of weed control was also greater in the pre-emergence treatments. In field testing, therefore, emphasis should be placed on pre-emergence application, although there may be a role for this compound as a post-emergence directed spray in certain crops, provided the risk of contact scorch can be avoided. The apparent greater tolerance of tropical annual grasses and perennials compared with temperate species may limit usefulness in the tropical situation.

ACTIVITY EXPERIMENT

IPRYMIDAN

		0.66 kg/ha (S 1.00 kg/ha)	2.00 kg/ha (S 3.00 kg/ha)	6.00 kg/ha (S 9.00 kg/ha)
DWARF BEAN	F	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxx xxxxx	xxxxx xx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxx xxxxx	xxxxxxxxx xxxx
	P	xxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxx xxx
	I	xxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxx xxxxxx
KALE	F	xxxxxxxxxxxxxxx xxxxxxx	xxxx xx	o o
	S	o o	o o	o o
	P	xxx x	x x	o o
	I	xxxxxxxxx xxx	x xx	o o
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxxxxx
	S	xxxxxxxxxxx xxxx	xxxxxxxxxx xxx	xxxxxxxxxx xxx
	P	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxxxx
	I	xxxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxx xxxxxx
	S	xxxxxxxxxxx xxxx	xxx xx	o o
	P	xxxxxxx xxx	o o	o o
	I	xxxxxxxxxxxxxx xxxxx	xx xxxx	o o
AVENA FATUA	F	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxx xxxxx
	S	xxx x	o o	o o
	P	xx xx	o o	o o
	I	xxxx xxxx	x xx	o o
AGROPYRON REPENS	F	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxx	xxxxxxxx xxxx	xxxxxxxxxx xx
	P	xxxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxxx xxxx	xxxxxxxx xxx
	I	xxxxxxxxxxxxxx xxxxxxx	xxxxxxxxxx xxxxx	xxxxxxxxxxxx xxx

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

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES		IPRYMIDAN 0.33 KG/HA		IPRYMIDAN 1.00 KG/HA		IPRYMIDAN 3.00 KG/HA	
WHEAT	100	xxxxxxxxxxxxxxxxxxxx	0		0		
(1)	57	xxxxxxxxxxx	0		0		
BARLEY	100	xxxxxxxxxxxxxxxxxxxx	62	xxxxxxxxxxxx	0		
(2)	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	0		
OAT	87	xxxxxxxxxxxxxxxx	37	xxxxxxx	0		
(3)	71	xxxxxxxxxxxxxx	29	xxxxxx	0		
PER RYGR	100	xxxxxxxxxxxxxxxxxxxx	25	xxxxx	0		
(4)	71	xxxxxxxxxxxxxx	36	xxxxxxx	0		
ONION	79	xxxxxxxxxxxxxxxx	9	xx	0		
(8)	79	xxxxxxxxxxxxxxxx	21	xxxx	0		
FLD BEAN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	25	xxxxx	
(10)	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	29	xxxxxx	
PEA	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	0		
(11)	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	0		
W CLOVER	31	xxxxxx	0		0		
(12)	29	xxxxxx	0		0		
KALE	100	xxxxxxxxxxxxxxxxxxxx	29	xxxxxx	0		
(15)	79	xxxxxxxxxxxxxxxx	14	xxx	0		
CABBAGE	100	xxxxxxxxxxxxxxxxxxxx	29	xxxxxx	0		
(16)	64	xxxxxxxxxxxxx	14	xxx	0		
SWEDE	100	xxxxxxxxxxxxxxxxxxxx	19	xxxx	0		
(17)	57	xxxxxxxxxxx	29	xxxxxx	0		
CARROT	100	xxxxxxxxxxxxxxxxxxxx	0		0		
(18)	71	xxxxxxxxxxxxxx	0		0		
PARSNIP	91	xxxxxxxxxxxxxxxxx	0		0		
(19)	43	xxxxxxxxx	0		0		

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	IPRYMIDAN 0.33 KG/HA		IPRYMIDAN 1.00 KG/HA		IPRYMIDAN 3.00 KG/HA
LETTUCE	0		0		0
(20)	0		0		0
SUG BEET	66	xxxxxxxxxxxxx	0		0
(21)	43	xxxxxxxxx	0		0
AVE FATU	100	xxxxxxxxxxxxxxxxxxxx	0		0
(26)	71	xxxxxxxxxxxxxx	0		0
ALO MYOS	100	xxxxxxxxxxxxxxxxxxxx	0		0
(27)	50	xxxxxxxxxx	0		0
POA ANN	81	xxxxxxxxxxxxxxxx	37	xxxxxxx	0
(28)	57	xxxxxxxxxxx	29	xxxxxx	0
POA TRIV	0		0		0
(29)	0		0		0
SIN ARV	100	xxxxxxxxxxxxxxxxxxxx	0		0
(30)	43	xxxxxxxxx	0		0
RAPH RAP	100	xxxxxxxxxxxxxxxxxxxx	0		0
(31)	64	xxxxxxxxxxxxx	0		0
TRIP MAR	100	xxxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0
(33)	100	xxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0
SEN VULG	0		0		0
(34)	0		0		0
POL LAPA	68	xxxxxxxxxxxxxx	0		0
(35)	36	xxxxxxx	0		0
RUM CRIS	29	xxxxx	0		0
(37)	14	xxx	0		0
GAL APAR	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	0
(38)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	0

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES		IPRYMIDAN 0.33 KG/HA		IPRYMIDAN 1.00 KG/HA		IPRYMIDAN 3.00 KG/HA	
CHEN ALB	66	xxxxxxxxxxxxx	0		0		
(39)	29	xxxxxx	0		0		
STEL MED	100	xxxxxxxxxxxxxxxxxxxx	6	x	0		
(40)	43	xxxxxxxxx	14	xxx	0		
SPER ARV	8	xx	0		0		
(41)	29	xxxxxx	0		0		
SOL NIG	8	xx	0		0		
(43)	14	xxx	0		0		
AG REPEN	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	37	xxxxxxx	
(47)	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx	
AG STOLO	100	xxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0		
(48)	57	xxxxxxxxxxx	29	xxxxxx	0		
MAIZE	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	
(58)	93	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx	
SORGHUM	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	
(59)	71	xxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx	
RICE	100	xxxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx	0		
(60)	57	xxxxxxxxxxx	21	xxxx	0		
GRNDNUT	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	
(64)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxx	21	xxxx	
SOYABEAN	100	xxxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx	50	xxxxxxxxxx	
(65)	71	xxxxxxxxxxxxxx	14	xxx	7	x	
COTTON	100	xxxxxxxxxxxxxxxxxxxx	22	xxxx	0		
(66)	50	xxxxxxxxxx	14	xxx	0		
JUTE	66	xxxxxxxxxxxxx	0		0		
(67)	21	xxxx	0		0		

POST-EMERGENCE SELECTIVITY EXPERIMENT

SPECIES	IPRYMIDAN 0.33 KG/HA		IPRYMIDAN 1.00 KG/HA		IPRYMIDAN 3.00 KG/HA	
KENAF	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(68)	86	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
TOBACCO	100	xxxxxxxxxxxxxxxxxxxxxx	69	xxxxxxxxxxxxxx	9	xx
(69)	50	xxxxxxxxxx	21	xxxx	7	x
SESAMUM	0		0		0	
(70)	0		0		0	
ELEU IND	100	xxxxxxxxxxxxxxxxxxxxxx	31	xxxxxx	0	
(74)	79	xxxxxxxxxxxxxxxxx	29	xxxxxx	0	
ECH CRUS	100	xxxxxxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxxxx	0	
(75)	64	xxxxxxxxxxxxx	36	xxxxxxx	0	
ROT EXAL	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxxx
(76)	93	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	50	xxxxxxxxxx
DIG SANG	75	xxxxxxxxxxxxxxx	33	xxxxxxx	0	
(77)	71	xxxxxxxxxxxxxx	36	xxxxxxx	0	
AMAR RET	39	xxxxxxxx	0		0	
(78)	29	xxxxxx	0		0	
PORT OLE	0		0		0	
(79)	0		0		0	
CYN DACT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxxx
(82)	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
CYP ESCU	100	xxxxxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	41	xxxxxxxx
(85)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxxx
CYP ROTU	100	xxxxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
(86)	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
OXAL LAT	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx
(87)	71	xxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx

ACKNOWLEDGEMENTS

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AGRICULTURAL RESEARCH COUNCIL

WEED RESEARCH ORGANIZATION

Technical reports available

5. A survey of the problem of aquatic weed control in England and Wales. October, 1967. T.O. Robson. Price - £0.25.

6. The botany, ecology, agronomy and control of Poa trivialis L. rough-stalked meadow-grass. November 1966. G.P. Allen. Price - £0.25.

7. Flame cultivation experiments 1965. October, 1966. G.W. Ivens. Price - £0.25.

8. The development of selective herbicides for kale in the United Kingdom. 2. The methylthiotriazines. Price - £0.25.

9. The post-emergence selectivity of some newly developed herbicides (NC 6627, NC 4780, NC 4762, BH 584, BH 1455). December, 1967. K. Holly and Mrs. A.K. Wilson. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.50.

10. The liverwort, Marchantia polymorpha L. as a weed problem in horticulture; its extent and control. July, 1968. I.E. Henson. Price - £0.25.

11. Raising plants for herbicide evaluation; a comparison of compost types. July, 1968. I.E. Henson. Price - £0.25.

12. Studies on the regeneration of perennial weeds in the glasshouse; I. Temperate species. May, 1969. I.E. Henson. Price - £0.25.

13. Changes in the germination capacity of three Polygonum species following low temperature moist storage. June, 1969. I.E. Henson. Price - £0.25.

14. Studies on the regeneration of perennial weeds in the glasshouse. II. Tropical species. May, 1970. I.E. Henson. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.50.

15. Methods of analysis for herbicide residues in use at the Weed Research Organization. December, 1970. R.J. Hance and C.E. McKone. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.50.

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17. The pre-emergence selectivity of some newly developed herbicides, Orga 3045 (in comparison with dalapon), haloxydine (PP 493), HZ 52.112, pronamide (RH 315) and R 12001. January, 1971. W.G. Richardson, C. Parker and K. Holly. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.50.

18. A survey from the roadside of the state of post-harvest operations in Oxfordshire in 1971. November, 1971. A. Phillipson. Price - U.K. and overseas surface mail - £0.12; overseas airmail - £0.34.

19. The pre-emergence selectivity of some recently developed herbicides in jute, kenaf and sesamum, and their activity against Oxalis latifolia. December 1971. M.L. Dean and C. Parker. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.45.

20. A survey of cereal husbandry and weed control in three regions of England. July 1972. A. Phillipson, T.W. Cox and J.G. Elliott. Price - U.K. and overseas surface mail - £0.35; overseas airmail - £0.75.

21. An automatic punching counter. November 1972. R.C. Simmons. Price - U.K. and overseas surface mail - £0.30; overseas airmail - £0.50.

22. The pre-emergence selectivity of some newly developed herbicides: bentazon, BAS 3730H, metflurazone, SAN 9789, HER 52.123, U 27,267. December 1972. W.G. Richardson and M.L. Dean. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.45.

23. A survey of the presence of wild oats and blackgrass in parts of the United Kingdom during summer 1972. A. Phillipson. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.45.

24. The conduct of field experiments at the Weed Research Organization. February 1973. J.G. Elliott, J. Holroyd and T.O. Robson. Price - U.K. and overseas surface mail - £1.25; overseas airmail - £1.47.

25. The pre-emergence selectivity of some recently developed herbicides: lenacil, RU 12068, metribuzin, cyprazine, EMD-IT 5914 and benthiocarb. August 1973. W.G. Richardson and M.L. Dean. Price - U.K. and overseas surface mail - £1.75; overseas airmail - £2.20.

26. The post-emergence selectivity of some recently developed herbicides: bentazon, EMD-IT 6412, cyprazine, metribuzin, chlornitrofen, glyphosate, MC 4379, chlorfenprop-methyl. October 1973. W.G. Richardson and M.L. Dean. Price - U.K. and overseas surface mail - £3.31; overseas airmail - £3.56.

27. Selectivity of benzene sulphonyl carbamate herbicides between various pasture grasses and clover. October 1973. A.M. Blair. Price - U.K. and overseas surface mail - £1.05; overseas airmail - £1.30.

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29. The pre-emergence selectivity between pasture grasses of twelve herbicides: haloxydine, pronamide, NC 8438, Orga 3045, chlortoluron, metoxuron, dicamba, isopropalin, carbetamide, MC 4379, MBR 8251 and EMD-IT 5914. November 1973. A.M. Blair. Price - U.K. and overseas surface mail - £1.30; overseas airmail - £1.50.

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31. Factors affecting the selectivity of six soil acting herbicides against Cyperus rotundus. February 1974. M.L. Dean and C. Parker. Price - U.K. and overseas surface mail - £1.10; overseas airmail - £1.35.

32. The activity and post-emergence selectivity of some recently developed herbicides: oxadiazone, U-29,722, U-27,658, metflurazone, norflurazone, AC 50-191, AC 84,777 and iprymidan. June 1974. W.G. Richardson and M.L. Dean. Price - U.K. and overseas surface mail £3.62; overseas airmail - £3.88.

NB:AC 50-191 is confidential (Cyanamid), AC 84777 is difenzoquat metilsulfate,
U-27,658 is 2-(3,4,5-tribromopyrazol-1-yl)acetic acid (Upjohn),
U-29,722 is 3,4,5-tribromo-@-methyl-pyrazole-1-acetic acid (Upjohn)