Click here for previous

DIMETHACHLOR

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha	
COWPEA	87	xxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	0		
(62)	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0		
CHICKPEA	58	xxxxxxxxxxxx	58	xxxxxxxxxxxx	19	xxxx	
(63)	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	29	xxxxxx	
SOYABEAN	116	xxxxxxxxxxxxxxxxxxx+	106	xxxxxxxxxxxxxxxxxxx+	39	xxxxxxxx	
(65)	93	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx	
COTTON	87	xxxxxxxxxxxxxxxxx	48	xxxxxxxxxx	29	xxxxxx	
(66)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	43	xxxxxxxxx	
JUTE	43	xxxxxxxxx	0		0		
(67)	36	xxxxxxx	0		0		
KENAF	129	xxxxxxxxxxxxxxxxxxx+	86	xxxxxxxxxxxxxxxxx	0		
(68)	64	xxxxxxxxxxxxx	29	xxxxxx	0		
SESAMUM	150	xxxxxxxxxxxxxxxxxxx+	68	xxxxxxxxxxxxxx	0		
(70)	79	xxxxxxxxxxxxxxx	43	xxxxxxxxx	0		
TOMATO	30	xxxxxx	0		0		
(71)	36	xxxxxxx	0		0		
OR PUNCT	0		0		0		
(73)	0		0		0		
ELEU IND	0		0		0		
(74)	0		0		0		
ECH CRUS	0		0		0		
(75)	0		0		0		
ROTT EXA	66	xxxxxxxxxxxxx	35	xxxxxxx	13	xxx	
(76)	64	xxxxxxxxxxxxx	36	xxxxxxx	21	xxxx	
DIG SANG	0		0		0		
(77)	0		0		0		

PRE-EMERGENCE SELECTIVITY EXPERIMENT

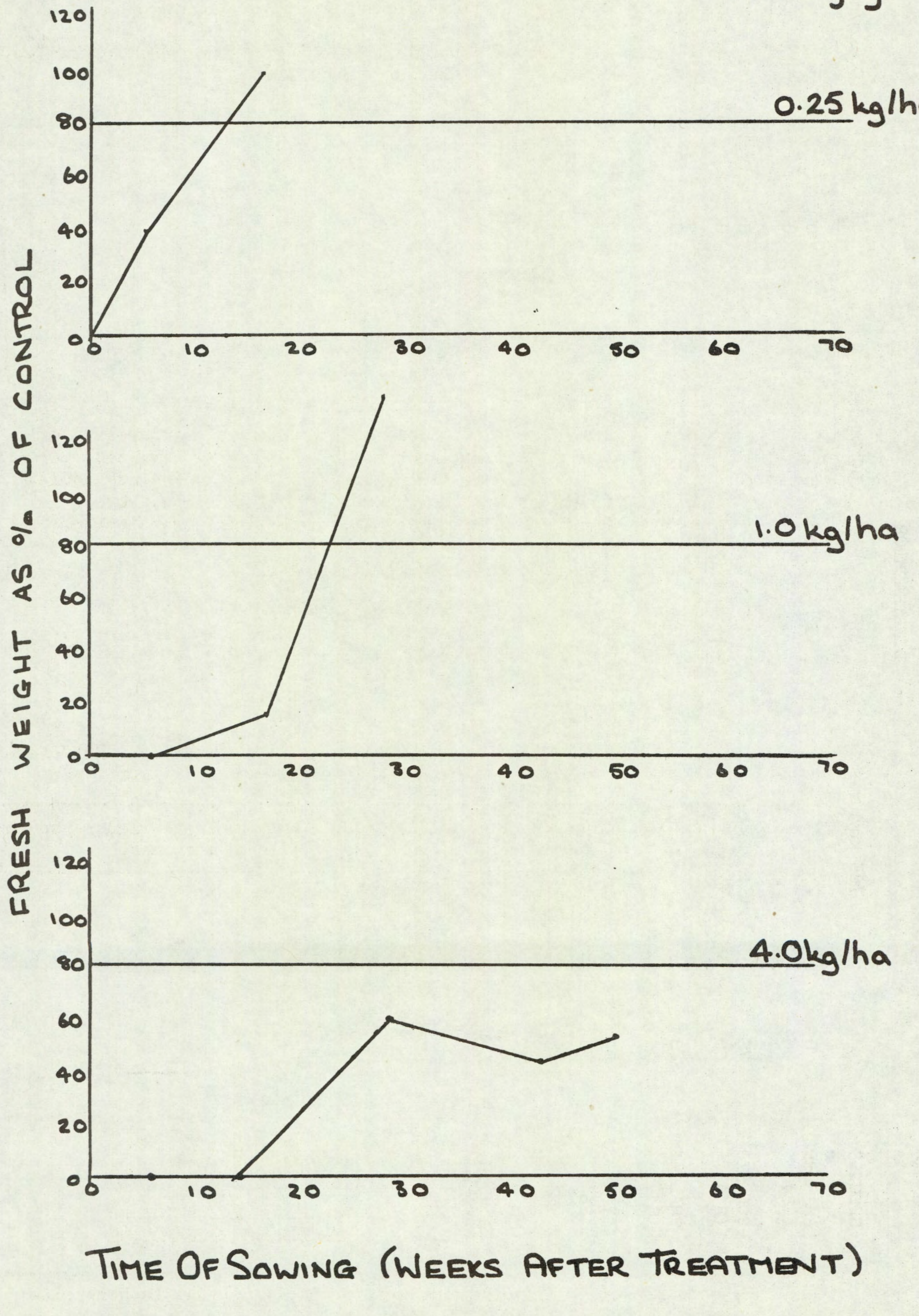
DIMETHACHLOR

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
AMAR RET	0		0		0	
(78)	0		0		0	
SOL NIG	76	xxxxxxxxxxxxxxx	4	x	0	
(81)	50	xxxxxxxxxx	14	xxx	0	
PHAL MIN	3	x	0		0	
(84)	14	xxx	0		0	
CYP ROTU	80	xxxxxxxxxxxxxxxx	30	xxxxxx	0	
(86)	71	xxxxxxxxxxxxxx	14	xxx	0	

PERSISTENCE OF DIMETHACHLOR

(surface spray)

Species Perennial ryegrass



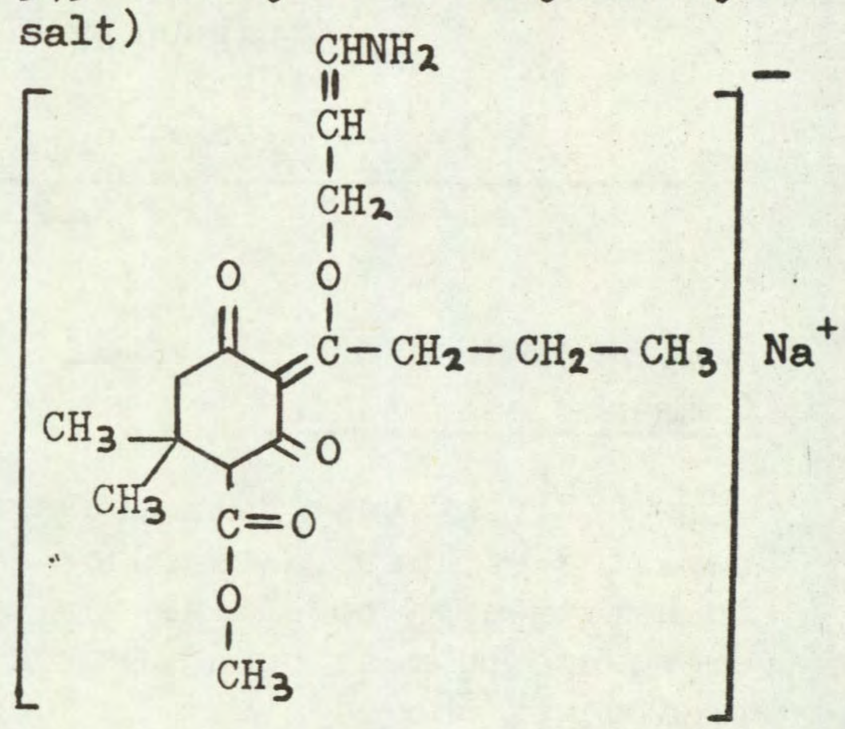
ALLOXYDIM-SODIUM

Code number NP48 (also BA5 9021) Trade name Fervin

Former suggested common name alloxydimedon-sodium, carbodimedon

Chemical name 2-(1-allyloxyaminobutylidene)-5,5-dimethyl-4-methoxycarbonyl cyclohexane-1,3-dione (sodium salt)

Structure



Source Nippon Soda Co. Ltd.,
Agrochemicals Department,
221, Ohtemachi, Chiyoda-ku,
Tokyo,
Japan.

Information available and suggested uses

Suggested post-emergence for control of grass weeds. Broad-leaved weeds are resistant. Dosage for annual weeds, 1.0-2.0 kg a.i./ha; for perennials 1.5 to 2.5 kg a.i./ha, two application times being advisable. Recommended for use in sugar beet, soyabean, cotton and rape. Other tolerant crops are peas, groundnuts, potato, beans, sunflower, tobacco, vines and various vegetables. Also active pre-emergence but not recommended, due to its short persistence in the soil.

Formulation used 75% w/w a.i. water soluble powder.

Spray volume 366 l/ha.

RESULTS

Full results are given in the histograms on pages 39-44 and potential selectivities are summarized 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
4.0	field bean white clover rape kale carrot lettuce radish cowpea soyabean sesamum	Avena fatua** Poa annua Eleusine indica Rottboellia exaltata + species below
1.0	onion* pea sugar beet chickpea cotton* kenaf	Holcus lanatus Agropyron repens Oryza punctata Echinchloa crus-galli Digitaria sanguinalis + species below

* some reduction in plant numbers, probably not due to herbicide
** eventually killed at 0.25 kg/ha

Table cont.

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
0.25	species above + dwarf bean pigeon pea jute tomato	Alopecurus myosuroides Poa trivialis Phalaris minor

Comments on results

Activity test data and symptoms caused on susceptible species were reported earlier (Richardson and Parker, 1978), when alloxydim-sodium was found to have a high potential for control of most grass weeds, post- or pre-emergence to most broad-leaved crops. Surface or incorporated pre-emergence treatments showed a similar degree of toxicity to perennial ryegrass and Avena fatua but the effect on Agropyron repens was improved slightly by incorporating the herbicide. This should be borne in mind when considering the results of the pre-emergence selectivity test, when alloxydim-sodium was fully incorporated into the soil.

Symptoms

These were described previously for the six species used in the activity experiment and the range of species in the post-emergence selectivity test (Richardson and Parker, 1978). Pre-emergence treatments to grasses caused a severe inhibition of growth of the leaves. It was common to see plants in a state of suspended growth at the 2 to 3 leaf stage, the leaf blades being generally narrow and pointed giving an almost "dart-like" appearance. This is a feature common to herbicides causing inhibition of roots and later observation showed that this was the case, roots only having reached a few mm in length and being swollen and necrotic. Plants remained in this state of suspended growth for several days or even weeks before eventual recovery or necrosis and death. This made assessment difficult in some instances. Thus Avena fatua and Alopecurus myosuroides eventually succumbed to the lowest dose of 0.25 kg/ha, whereas Agropyron repens, Holcus lanatus, wheat and barley recovered from this dose. Before necrosis and death of the plants, a mild to severe chlorosis or even albinism often developed. At the highest dose, some grass species failed to emerge, either from the soil or from the coleoptile, or died soon after emerging.

Generally little or no effect was seen on the majority of broad-leaved species, even though many of these were kept for late assessment, to detect any differences from untreated controls. However, some effects were observed with certain of the legumes, onion and sugar beet. With the latter at the main assessment, a 43% depression in vigour was observed at 4.0 kg/ha but later more inhibition was seen, the new leaves being very small, such that shoot fresh weights were only 58% of control at harvest while root systems were very weak. Meanwhile at the lower doses, plants had become slightly stunted and new leaves darker green and shinier in appearance. The high dose on onions had resulted in some plants dying back soon after they emerged. However, a following experiment showed that this crop was unaffected by doses up to 4.0 kg/ha, with either surface or incorporated treatments. Some dwarf bean plants were retarded by the high dose and roots failed to nodulate. This was not the case at the same dose in the earlier experiment, however, where

nodules were produced, as were flowers and pods eventually, even though occasional necrosis of roots and some stunting of shoots occurred. Pea at the high dose showed a slight retardation of shoots while roots were more sparse and the number of nodules less than in the controls. This effect was found in the earlier post-emergence test (Richardson and Parker, 1978) and led to some further work at W.R.O. (Greaves, Lockhart and Richardson, 1978). It seems that some interrelationship may exist between alloxydim-sodium and pea root nodulation but that the factors governing this (e.g. nitrogen level) are complex and need further investigation, preferably under carefully controlled environment conditions.

Soil persistence

Results are presented in the graph on page 44. The sensitive test species, perennial ryegrass, indicated a relatively short period of persistence in the soil for alloxydim-sodium. Doses of 0.25 and 1.0 kg/ha were undetectable when soil was assayed 17 weeks after spraying. The highest dose of 4.0 kg/ha was only just detectable at this date, and by the next assay no symptoms were found.

Pre-emergence selectivity among temperate species

Activity was confined to the grass weeds, all being controlled at one or other of the doses. Although 4.0 kg/ha was needed to control Poa annua, it was reduced in vigour by more than 50% at 1.0 kg/ha. All broad-leaved weeds and Allium vineale were highly resistant.

All broad-leaved crops and onion showed some degree of tolerance. Some effects were seen however on sugar beet and onion at 4.0 kg/ha and on dwarf bean even at 1.0 kg/ha. In the earlier activity experiment, (Richardson and Parker, 1978), however, dwarf bean was hardly affected by 4.0 kg/ha.

As well as the earlier reported post-emergence control of most grass weeds in most broad-leaved crops and onion (Richardson and Parker, 1978), the present test confirms that pre-emergence control in virtually the same crops is probable. Control of volunteer cereals and ryegrass in these crops is also indicated. The short persistence of the herbicide could be a disadvantage for control of later germinating grass weeds, but a distinct advantage with regard to following crops in the rotation, including cereals. The difference in response of the Poa species is intriguing, parallelling post-emergence results with this compound and with trifop-methyl. If the somewhat higher dose necessary to control Poa annua proves to be uneconomical, consideration will have to be given to a mixture with another herbicide. This will be necessary in any case to achieve control of broad-leaved weeds.

Pre-emergence selectivity among tropical species

Although not recommended by the manufacturers for pre-emergence use, alloxydim-sodium is shown to have excellent selectivity against most annual grasses in most broad-leaved crops at doses between 1 and 4 kg/ha. These doses are somewhat higher than those required for early post-emergence treatments but could still be of interest for certain situations. Only a few Rottboellia plants recovered eventually from a dose of 1 kg/ha, and none from 4 kg/ha. Cyperus species and Oxalis were undamaged by 4 kg/ha.

ALLOXYDIM-SODIUM

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
WHEAT	100	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	14	xxx
(1)	71	xxxxxxxxxxxxxx	29	xxxxxx	7	x
BARLEY	100	xxxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxxx	62	xxxxxxxxxxxx
(2)	57	xxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
OAT	89	xxxxxxxxxxxxxxxxx	102	xxxxxxxxxxxxxxxxxxx	0	
(3)	57	xxxxxxxxxxx	43	xxxxxxxxx	0	
PER RYGR	8	xx	0		0	
(4)	14	xxx	0		0	
ONION	114	xxxxxxxxxxxxxxxxxxx+	71	xxxxxxxxxxxxxx	29	xxxxxx
(8)	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
DWF BEAN	112	xxxxxxxxxxxxxxxxxxx+	94	xxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(9)	93	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	57	xxxxxxxxxx
FLD BEAN	95	xxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxx	109	xxxxxxxxxxxxxxxxxx+
(10)	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
PEA	71	xxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxx
(11)	93	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
W CLOVER	46	xxxxxxxxx	76	xxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxx
(12)	86	xxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
RAPE	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxx
(14)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxx
KALE	107	xxxxxxxxxxxxxxxxxx+	99	xxxxxxxxxxxxxxxxx	107	xxxxxxxxxxxxxxxxxx+
(15)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
CARROT	132	xxxxxxxxxxxxxxxxxx+	124	xxxxxxxxxxxxxxxxxx+	124	xxxxxxxxxxxxxxxxxx+
(18)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx

ALLOXYDIM-SODIUM

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
LETTUCE	90	xxxxxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxxxx+	99	xxxxxxxxxxxxxxxxxxx
(20)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
SUG BEET	109	xxxxxxxxxxxxxxxxxxx+	86	xxxxxxxxxxxxxxxxx	73	xxxxxxxxxxxxxx
(21)	100	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxx
AVE FATU	87	xxxxxxxxxxxxxxxxx	37	xxxxxxx	12	xx
(26)	57	xxxxxxxxxx	43	xxxxxxxxx	7	x
ALO MYOS	34	xxxxxxx	24	xxxxx	0	
(27)	29	xxxxxx	29	xxxxx	0	
POA ANN	96	xxxxxxxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx	54	xxxxxxxxxx
(28)	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
POA TRIV	5	x	3	x	0	
(29)	14	xxx	14	xxx	0	
SIN ARV	96	xxxxxxxxxxxxxxxxxx	54	xxxxxxxxxx	32	xxxxxx
(30)	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
RAPH RAP	109	xxxxxxxxxxxxxxxxxx+	93	xxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxx
(31)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
CHRY SEG	56	xxxxxxxxxx	77	xxxxxxxxxxxxxx	98	xxxxxxxxxxxxxxxxxx
(32)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
TRIP MAR	104	xxxxxxxxxxxxxxxxxx+	133	xxxxxxxxxxxxxxxxxx+	119	xxxxxxxxxxxxxxxxxx+
(33)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
SEN VULG	148	xxxxxxxxxxxxxxxxxx+	107	xxxxxxxxxxxxxxxxxx+	95	xxxxxxxxxxxxxxxxx
(34)	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
POL LAPA	41	xxxxxxxx	109	xxxxxxxxxxxxxxxxxx+	95	xxxxxxxxxxxxxxxxx
(35)	93	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
POL AVIC	112	xxxxxxxxxxxxxxxxxx+	112	xxxxxxxxxxxxxxxxxx+	75	xxxxxxxxxxxxxx
(36)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx

ALLOXYDIM-SODIUM

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
GAL APAR	122	xxxxxxxxxxxxxxxxxxx+	100	xxxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxx
(38)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
STEL MED	119	xxxxxxxxxxxxxxxxxxx+	70	xxxxxxxxxxxxx	73	xxxxxxxxxxxxxx
(40)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
VER PERS	112	xxxxxxxxxxxxxxxxxxx+	85	xxxxxxxxxxxxxxxx	77	xxxxxxxxxxxxxx
(42)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
RUM OBTU	157	xxxxxxxxxxxxxxxxxxx+	86	xxxxxxxxxxxxxxxx	114	xxxxxxxxxxxxxxxxxx+
(44)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxx
HOLC LAN	39	xxxxxxxx	9	xx	0	
(45)	43	xxxxxxxxx	29	xxxxxx	0	
AG REPEN	100	xxxxxxxxxxxxxxxxxxx	42	xxxxxxxx	0	
(47)	57	xxxxxxxxxxx	29	xxxxxx	0	
ALL VIN	122	xxxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx	170	xxxxxxxxxxxxxxxxxx+
(49)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxx
TUS FARF	79	xxxxxxxxxxxxxxx	126	xxxxxxxxxxxxxxxxxx+	126	xxxxxxxxxxxxxxxxxx+
(51)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
CONV ARV	72	xxxxxxxxxxxxxx	120	xxxxxxxxxxxxxxxxxx+	108	xxxxxxxxxxxxxxxxxx+
(52)	13	xxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
MILLET	75	xxxxxxxxxxxxxx	45	xxxxxxxxx	22	xxxx
(57)	50	xxxxxxxxxx	29	xxxxxx	29	xxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxxx	33	xxxxxxx	0	
(58)	64	xxxxxxxxxxxxx	43	xxxxxxxxx	0	
SORGHUM	108	xxxxxxxxxxxxxxxxxxx+	100	xxxxxxxxxxxxxxxxxx	115	xxxxxxxxxxxxxxxxxx+
(59)	57	xxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx
RICE	102	xxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxx	11	xx
(60)	64	xxxxxxxxxxxxx	36	xxxxxxx	14	xxx

ALLOXYDIM-SODIUM

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
PIGEON P	83	xxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	72	xxxxxxxxxxxxxx
(61)	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
COWPEA	87	xxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxxx+	116	xxxxxxxxxxxxxxxxxxx+
(62)	100	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
CHICKPEA	106	xxxxxxxxxxxxxxxxxxx+	106	xxxxxxxxxxxxxxxxxxx+	97	xxxxxxxxxxxxxxxxx
(63)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
SOYABEAN	135	xxxxxxxxxxxxxxxxxx+	116	xxxxxxxxxxxxxxxxxx+	126	xxxxxxxxxxxxxxxxxx+
(65)	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
COTTON	116	xxxxxxxxxxxxxxxxxx+	77	xxxxxxxxxxxxxx	48	xxxxxxxxx
(66)	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
JUTE	171	xxxxxxxxxxxxxxxxxx+	86	xxxxxxxxxxxxxxxx	129	xxxxxxxxxxxxxxxxxx+
(67)	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	57	xxxxxxxxxx
KENAF	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	186	xxxxxxxxxxxxxxxxxx+
(68)	86	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
SESAMUM	68	xxxxxxxxxxxxxx	150	xxxxxxxxxxxxxxxxxx+	123	xxxxxxxxxxxxxxxxxx+
(70)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx
TOMATO	100	xxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	70	xxxxxxxxxxxxx
(71)	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
OR PUNCT	106	xxxxxxxxxxxxxxxxxx+	0		5	x
(73)	57	xxxxxxxxxx	0		21	xxxx
ELEU IND	79	xxxxxxxxxxxxxx	34	xxxxxx	0	
(74)	36	xxxxxx	36	xxxxxx	0	
ECH CRUS	60	xxxxxxxxxxx	11	xx	0	
(75)	50	xxxxxxxxx	29	xxxxx	0	
ROTT EXA	93	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	62	xxxxxxxxxxx
(76)	64	xxxxxxxxxxxx	43	xxxxxxxx	29	xxxxx

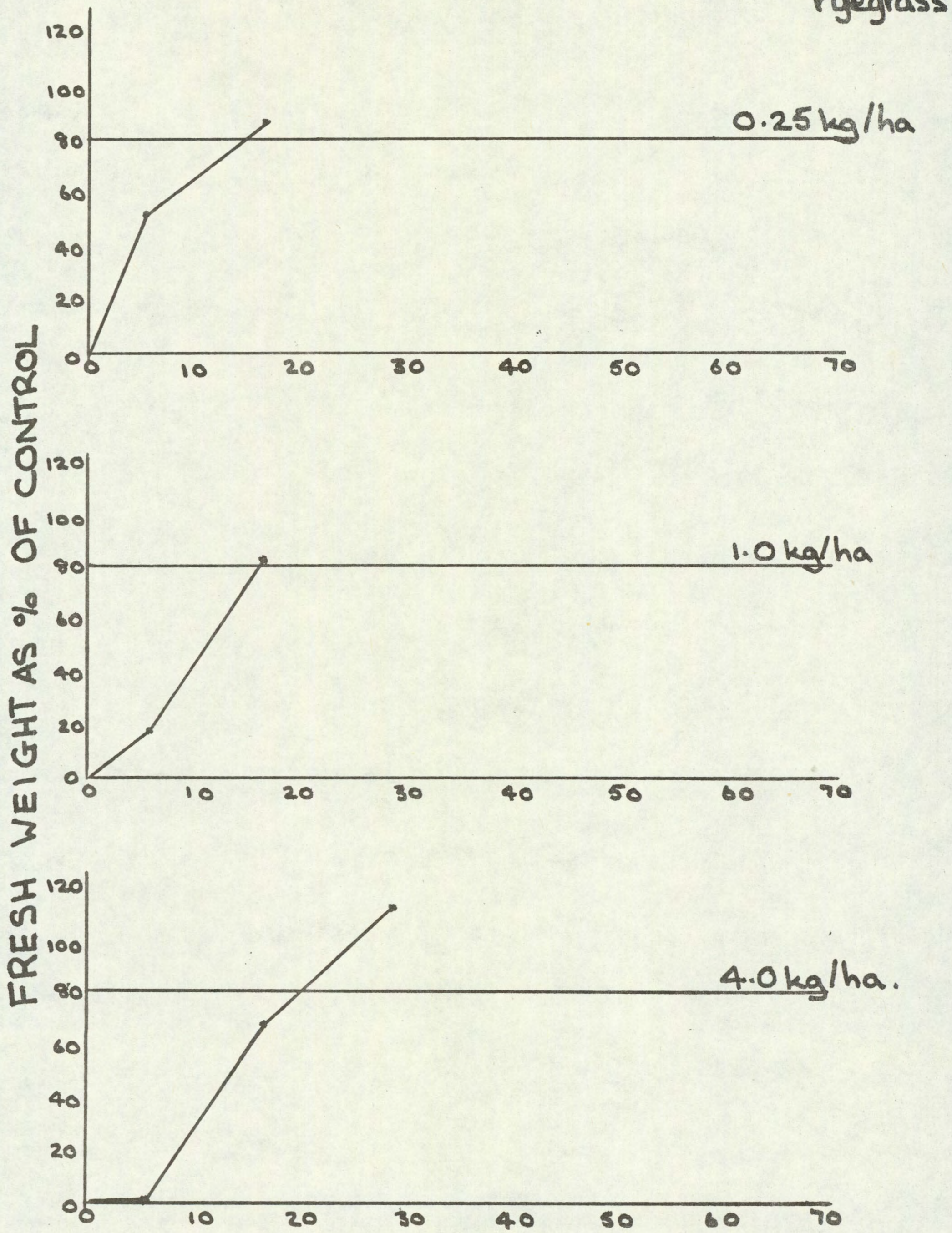
PRE-EMERGENCE SELECTIVITY EXPERIMENT

ALLOXYDIM-SODIUM

SPECIES		0.25 kg/ha		1.00 kg/ha		4.00 kg/ha
DIG SANG	109	xxxxxxxxxxxxxxxxxxx+	25	xxxxx	4	x
(77)	36	xxxxxxx	29	xxxxxx	7	x
AMAR RET	120	xxxxxxxxxxxxxxxxxxx+	120	xxxxxxxxxxxxxxxxxxx+	200	xxxxxxxxxxxxxxxxxxx+
(78)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
SOL NIG	76	xxxxxxxxxxxxxxx	67	xxxxxxxxxxxxx	94	xxxxxxxxxxxxxxxxxx
(81)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
PHAL MIN	90	xxxxxxxxxxxxxxxxx	13	xxx	3	x
(84)	29	xxxxxx	21	xxxx	14	xxx
CYP ROTU	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(86)	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx

PERSISTENCE OF ALLOXYDIM - SODIUM (incorporated)

Species Perennial ryegrass

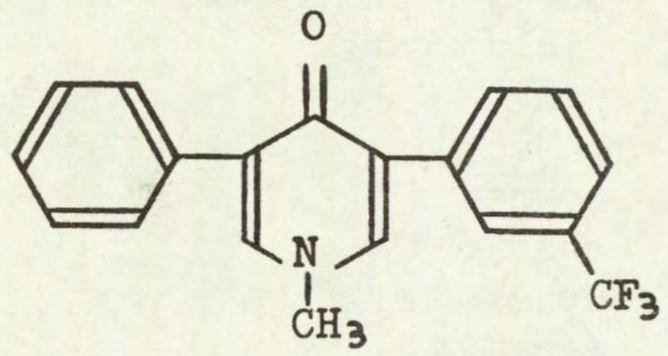


FLURIDONE

Code number EL 171

Chemical name 1-methyl-3-phenyl-5-[3-(trifluoromethyl) phenyl]-4 (IH)-pyridinone

Structure



Source Lilly Research Centre Ltd.,
Erl Wood Manor,
Windlesham,
Surrey.

Information available and suggested uses

A broad-spectrum pre-emergence (surface applied or incorporated) herbicide with true physiological tolerance shown by cotton. Established trees, vines and sugar cane have exhibited tolerance, while moderate tolerance to surface applications have been shown by groundnut, safflower, sunflower, wheat, barley and transplanted rice due to depth protection. Application rates vary depending on soil type from 0.2 to 0.8 kg a.i./ha for annual weeds, and 0.4 to 1.6 kg a.i./ha incorporated is suggested for trials with perennial weeds (Technical Report on EL 171, 1978).

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

Spray volume 366 l/ha

RESULTS

Full results are given in the histograms on pages 48 - 54 and potential selectivities are summarized 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
2.50	None	None listed as no crops tolerant
0.50	cotton	Avena fatua Alopecurus myosuroides Poa annua Poa trivialis Raphanus raphanistrum Senecio vulgaris Polygonum aviculare Galium aparine Rumex obtusifolius Holcus lanatus Allium vineale Convolvulus arvensis Oryza punctata Eleusine indica Rottboellia exaltata Phalaris minor + species below

Table cont.

RATE (kg a.i./ha)	CROPS: vigour reduced by 15% or less	WEEDS: number or vigour reduced by 70% or more
0.10	species above + field bean pea carrot cowpea chickpea* kenaf sesamum	Sinapis arvensis Polygonum lapathifolium Stellaria media Veronica persica Echinochloa crus-galli Digitaria sanguinalis Amaranthus retroflexus Solanum nigrum

* some stand reduction, not due to herbicide.

Comments on results

Activity experiment (see page 48)

Fluridone was particularly active via the soil treatments. Annual species were more susceptible than perennials. The foliar spray caused symptoms on all species but, although these were more severe on broad-leaved than on grass species, no lethal effects were observed. In the soil treatments, pre-emergence applications were generally as effective as post-emergence soil drenches. Surface or incorporated pre-emergence treatments exhibited a similar degree of activity, although perennial ryegrass and Polygonum amphibium were marginally more sensitive to the surface spray, while dwarf bean, kale, Avena fatua and Agropyron repens were more sensitive when the herbicide was incorporated. This should be borne in mind when considering the results of the pre-emergence selectivity test, where treatments were incorporated.

Symptoms

The most striking feature with fluridone was a pronounced albinism of affected species. This was seen either post- or pre-emergence, and although rather slow to develop, it eventually affected even petioles and stems of broad-leaved species. Pigmentation effects were seen in certain species (a pinkish coloration of Agropyron leaves and purplish with Cirsium, Convolvulus and kale). The albinism persisted for a considerable period of time before either recovery by new growth or necrosis and death of the plant. Germination was unaffected in the pre-emergence treatments while the foliar spray caused only a minor scorch. Thus the symptoms are very similar to those caused by amino-triazole, metflurazone or norflurazon. Waldrep and Taylor, 1976, have stated that treated plants appear to be unable to direct the synthesis of chlorophyll.

Soil persistence (see graph on page 54)

Using the very sensitive sugar beet as the test species, a long period of persistence in the soil is indicated. The dose of 0.1 kg/ha was barely detectable 49 weeks after spraying but the higher doses were still lethal to plants at this time.

Pre-emergence selectivity among temperate species

An impressive spectrum of weed control exists with fluridone. Thus all weeds, except two perennials (Agropyron repens and Tussilago farfara) and

two composites (Chrysanthemum segetum and Tripleurospermum maritimum) were controlled by 0.5 kg/ha. At the lowest dose of 0.1 kg/ha five annual broad-leaved weeds were controlled while many more were severely affected, as were most of the annual grasses.

No crop tolerated a dose greater than 0.1 kg/ha. Carrot, field bean and pea were the only species which showed any resistance to the latter dose, pea being reduced in number and vigour by only 29% at 0.5 kg/ha. In fact the recovery shown by peas to this dose instigated further pot testing on peas with surface and incorporated treatments and at varying sowing depths. Although recovery from the early symptoms is remarkable, the intense albinism is certainly too striking to be acceptable.

The high level of activity, limited selectivity and prolonged persistence of fluridone suggest that it could be useful as a total herbicide in temperate situations. Even here, the resistance of certain composite weeds could prove a serious limitation.

Pre-emergence selectivity among tropical species

This compound proved to have very high activity on most small-seeded grass and broad-leaved species, while the remarkable tolerance of cotton was confirmed with only mild symptoms at the high dose of 2.5 kg/ha. Cyperus rotundus was eventually killed completely at 0.5 kg/ha and the selectivity against this serious weed of cotton appears greater with this compound than with any previously tested at WRO. The prolonged persistence of the compound may, unfortunately, limit its usefulness but further work will be worthwhile to determine the importance of the depths of sprouting of the Cyperus tubers in relation to the placement of the herbicide on or in the soil. Cyperus esculentus and Oxalis latifolia were also killed by 0.5 kg/ha.

Other crops with some potentially useful tolerance included kenaf, cow-pea and sesamum, but margins of selectivity are likely to be small.

ACTIVITY EXPERIMENT

FLURIDONE

		0.1 kg/ha	0.6 kg/ha	3.6 kg/ha
DWARF BEAN	F	xxxxxxxxxxxxxxx xxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxxx xx
	S	xxxxxxxxxxxxxxx xxx	xxxxxxxxxxx xx	xxxxxxxxxxxxxxx xx
	P	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxx xxxxx	o o
	I	xxxxxxxxxxxxx xxxxxxxxx	xx xx	o o
KALE	F	xxxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxxx xxxx
	S	xxxxxxxxxxxxxxx xxxx	xxxxxxxxxxxxxxx xxx	xxxxxxxxxxxxx xx
	P	xxxx xxx	o o	o o
	I	x x	o o	o o
POLYGONUM AMPHIBIUM	F	xxxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxxx xxxx
	P	xxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxx	xxxxxxxxxxxxx xxx
	I	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxx	xxxxxxxxxxxxxxx + xxxxxx
PERENNIAL RYEGRASS	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxx
	S	xxxxxxxxxxxxxx xxxxxxx	xxxxxxxxxxxxxxx xxx	xxxxxxxxxxxxx xx
	P	xxxxxx xxxxxxx	o o	o o
	I	xxxxxxxxxxxxxxx + xxxxxxxxx	o o	o o
AVENA FATUA	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxx	xxxxxxxxxxxxxxx xxxx	xxxxxxxxxxxxxxx xx
	P	xxxxxxxxxxxxxxx + xxxxxxxxxxx	xxxxxxx xxxx	xx x
	I	xxxxxxxxxxxxxxx xxxxxxxxxx	x x	o o
AGROPYRON REPENS	F	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxxxxxxx
	S	xxxxxxxxxxxxxxx xxxxxxxxxxx	xxxxxxxxxxxxxxx xxxxxx	xxxxxxxxxxxxxxx xxxx
	P	xxxxxxxxxxxxxx xxxxxxxxxx	xxxxxxxxxxxxxx + xxxxxx	xxxxxxxxxxx xxx
	I	xxxxxxxxxxxxx xxxxxxxxxxxxxx	xxxxxxxxxxxxx xxx	xxxxxxxxxx xx

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

FLURIDONE

SPECIES		0.1 kg/ha		0.5 kg/ha		2.5 kg/ha
WHEAT	93	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(1)	64	xxxxxxxxxxxxx	29	xxxxxx	14	xxx
BARLEY	87	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(2)	57	xxxxxxxxxxx	21	xxxx	14	xxx
OAT	102	xxxxxxxxxxxxxxxxxxx+	96	xxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxx
(3)	71	xxxxxxxxxxxxxx	14	xxx	14	xxx
PER RYGR	119	xxxxxxxxxxxxxxxxxxx+	66	xxxxxxxxxxxxx	53	xxxxxxxxxx
(4)	57	xxxxxxxxxxx	14	xxx	14	xxx
ONION	43	xxxxxxxxx	0		0	
(8)	14	xxx	0		0	
DWF BEAN	94	xxxxxxxxxxxxxxxxxx	112	xxxxxxxxxxxxxxxxxx+	112	xxxxxxxxxxxxxxxxxx+
(9)	57	xxxxxxxxxxx	36	xxxxxxx	21	xxxx
FLD BEAN	82	xxxxxxxxxxxxxxx	82	xxxxxxxxxxxxxxx	109	xxxxxxxxxxxxxxxxxx+
(10)	93	xxxxxxxxxxxxxxxxx	29	xxxxxx	14	xxx
PEA	71	xxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	43	xxxxxxxxx
(11)	93	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	21	xxxx
W CLOVER	36	xxxxxxx	0		0	
(12)	50	xxxxxxxxxx	0		0	
RAPE	96	xxxxxxxxxxxxxxxxx	3	x	0	
(14)	36	xxxxxxx	7	x	0	
KALE	87	xxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxx	99	xxxxxxxxxxxxxxxxxx
(15)	29	xxxxxx	14	xxx	14	xxx
CARROT	117	xxxxxxxxxxxxxxxxxx+	59	xxxxxxxxxxx	0	
(18)	93	xxxxxxxxxxxxxxxxx	21	xxxx	0	

PRE-EMERGENCE SELECTIVITY EXPERIMENT

FLURIDONE

SPECIES		0.1 kg/ha		0.5 kg/ha		2.5 kg/ha	
LETTUCE	90	xxxxxxxxxxxxxxxxxx	0		0		
(20)	57	xxxxxxxxxxx	0		0		
SUG BEET	0		0		0		
(21)	0		0		0		
AVE FATU	75	xxxxxxxxxxxxxxx	56	xxxxxxxxxxx	81	xxxxxxxxxxxxxxxx	
(26)	57	xxxxxxxxxxx	14	xxx	14	xxx	
ALO MYOS	97	xxxxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxxx	116	xxxxxxxxxxxxxxxxxxx	
(27)	43	xxxxxxxxx	14	xxx	14	xxx	
POA ANN	92	xxxxxxxxxxxxxxxxxx	66	xxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	
(28)	36	xxxxxxx	14	xxx	14	xxx	
POA TRIV	82	xxxxxxxxxxxxxxxx	0		0		
(29)	43	xxxxxxxxx	0		0		
SIN ARV	16	xxx	5	x	0		
(30)	14	xxx	7	x	0		
RAPH RAP	93	xxxxxxxxxxxxxxxxxx	16	xxx	0		
(31)	71	xxxxxxxxxxxxxx	14	xxx	0		
CHRY SEG	98	xxxxxxxxxxxxxxxxxxx	160	xxxxxxxxxxxxxxxxxxx+	14	xxx	
(32)	100	xxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	14	xxx	
TRIP MAR	130	xxxxxxxxxxxxxxxxxxx+	81	xxxxxxxxxxxxxxxx	33	xxxxxxx	
(33)	93	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	21	xxxx	
SEN VULG	41	xxxxxxxx	0		0		
(34)	50	xxxxxxxxxx	0		0		
POL LAPA	27	xxxxx	41	xxxxxxxx	27	xxxxx	
(35)	43	xxxxxxxxx	14	xxx	14	xxx	
POL AVIC	56	xxxxxxxxxx	0		0		
(36)	36	xxxxxxx	0		0		

FLURIDONE

SPECIES		0.1 kg/ha		0.5 kg/ha		2.5 kg/ha
GAL APAR	89	xxxxxxxxxxxxxxxxxx	67	xxxxxxxxxxxxx	117	xxxxxxxxxxxxxxxxxxx+
(38)	86	xxxxxxxxxxxxxxxxx	14	xxx	14	xxx
STEL MED	0		0		0	
(40)	0		0		0	
VER PERS	0		0		0	
(42)	0		0		0	
RUM OBTU	71	xxxxxxxxxxxxxx	0		0	
(44)	36	xxxxxxx	0		0	
HOLC LAN	109	xxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxx+	109	xxxxxxxxxxxxxxxxxxx+
(45)	57	xxxxxxxxxxx	29	xxxxxx	14	xxx
AG REPEN	100	xxxxxxxxxxxxxxxxxxx	92	xxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxx
(47)	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
ALL VIN	130	xxxxxxxxxxxxxxxxxxx+	26	xxxxx	0	
(49)	57	xxxxxxxxxxx	14	xxx	0	
TUS FARF	111	xxxxxxxxxxxxxxxxxxx+	95	xxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxx
(51)	71	xxxxxxxxxxxxx	36	xxxxxxx	14	xxx
CONV ARV	108	xxxxxxxxxxxxxxxxxxx+	24	xxxxx	72	xxxxxxxxxxxxx
(52)	100	xxxxxxxxxxxxxxxxxx	21	xxxx	14	xxx
MILLET	56	xxxxxxxxxx	0		0	
(57)	36	xxxxxxx	0		0	
MAIZE	100	xxxxxxxxxxxxxxxxxx	58	xxxxxxxxxxx	25	xxxxx
(58)	50	xxxxxxxxx	21	xxxx	14	xxx
SORGHUM	108	xxxxxxxxxxxxxxxxxx+	15	xxx	0	
(59)	57	xxxxxxxxxx	14	xxx	0	
RICE	102	xxxxxxxxxxxxxxxxxx+	102	xxxxxxxxxxxxxxxxxx+	112	xxxxxxxxxxxxxxxxxx+
(60)	64	xxxxxxxxxxxx	29	xxxxxx	14	xxx

FLURIDONE

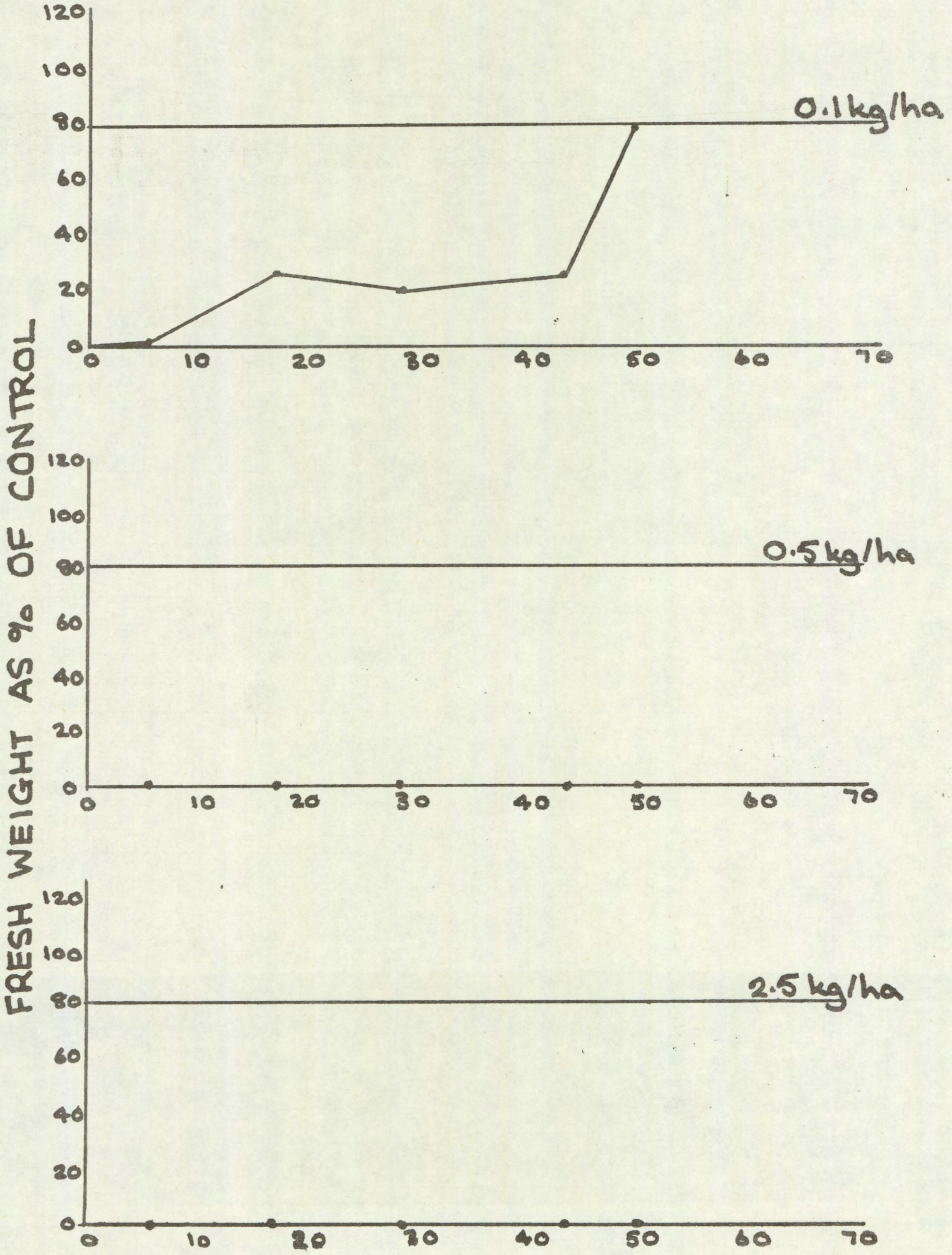
SPECIES		0.1 kg/ha		0.5 kg/ha		2.5 kg/ha
PIGEON P	10	xx	72	xxxxxxxxxxxxxx	41	xxxxxxxx
(61)	36	xxxxxxx	71	xxxxxxxxxxxxxx	21	xxxx
COWPEA	106	xxxxxxxxxxxxxxxxxxxx+	116	xxxxxxxxxxxxxxxxxxx+	29	xxxxxx
(62)	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	7	x
CHICKPEA	48	xxxxxxxxxx	87	xxxxxxxxxxxxxxxx.	106	xxxxxxxxxxxxxxxxxxx+
(63)	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	21	xxxx
SOYABEAN	135	xxxxxxxxxxxxxxxxxx+	48	xxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx
(65)	64	xxxxxxxxxxxxx .	29	xxxxxx	21	xxxx
COTTON	87	xxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxx+
(66)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
JUTE	107	xxxxxxxxxxxxxxxxxx+	0		0	
(67)	21	xxxx	0		0	
KENAF	257	xxxxxxxxxxxxxxxxxx+	29	xxxxxx	0	
(68)	86	xxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	0	
SESAMUM	136	xxxxxxxxxxxxxxxxxx+	0		0	
(70)	86	xxxxxxxxxxxxxxxx	0		0	
TOMATO	0		0		0	
(71)	0		0		0	
OR PUNCT	97	xxxxxxxxxxxxxxxxx	65	xxxxxxxxxxxx	83	xxxxxxxxxxxxxxxx
(73)	36	xxxxxxx	29	xxxxxx	14	xxx
ELEU IND	153	xxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxx	0	
(74)	64	xxxxxxxxxxxx	29	xxxxxx	0	
ECH CRUS	95	xxxxxxxxxxxxxxxxx	32	xxxxxx	0	
(75)	29	xxxxxx	21	xxxx	0	

FLURIDONE

SPECIES		0.1 kg/ha		0.5 kg/ha		2.5 kg/ha	
ROTT EXA	110	xxxxxxxxxxxxxxxxxxxx+	35	xxxxxxx	0		
(76)	57	xxxxxxxxxxx	29	xxxxxx	0		
DIG SANG	141	xxxxxxxxxxxxxxxxxxxx+	21	xxxx	0		
(77)	29	xxxxxx	14	xxx	0		
AMAR RET	20	xxxx	0		0		
(78)	21	xxxx	0		0		
SOL NIG	9	xx	0		0		
(81)	29	xxxxxx	0		0		
PHAL MIN	83	xxxxxxxxxxxxxxxx	7	x	0		
(84)	71	xxxxxxxxxxxxxx	29	xxxxxx	0		
CYP ROTU	90	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	
(86)	64	xxxxxxxxxxxxx	36	xxxxxxx	29	xxxxxx	

PERSISTENCE OF FLURIDONE

(incorporated) Species Sugar Beet



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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	1.2	5 leaves, some tillering
Barley (Hordeum vulgare)	BARLEY (2)	Maris Mink	8	1.2	5-6 leaves, some tillering
Oat (Avena sativa)	OAT (3)	Peniarth	8	1.2	3½-4½ leaves, some tillering
Perennial ryegrass (Lolium perenne)	PER RYGR (4)	S 23	15	0.6	4-6 leaves, tillering
Onion (Allium cepa)	ONION	Robusta	15	0.6	1½-2½ leaves
Dwarf bean* (Phaseolus vulgaris)	DWF BEAN (9)	The Prince	3	1.8	1½-2 trifoliate leaves
Field bean (Vicia faba)	FLD BEAN (10)	Maris Bead	4	1.8	4½-5 leaves
Pea (Pisum sativum)	PEA (11)	Dark Skinned Perfection	4	1.8	6-7 leaves
White clover (Trifolium repens)	W CLOVER (12)	S 100	20	0.6	2½ trifoliate leaves
Rape (Brassica napus oleifera)	RAPE (14)	Rapora	20	0.6	2½-3 leaves
Kale (Brassica oleracea acephala)	KALE (15)	Green Marrowstem	15	0.6	2½ leaves
Carrot (Daucus carota)	CARROT (18)	Chantenay Red Core	10	0.6	2-2½ leaves
Lettuce (Lactuca sativa)	LETTUCE (20)	Borough Wonder (Unrivalled)	15	0.6	5½-6 leaves
Sugar beet (Beta vulgaris)	SUG BEET (21)	Monotri	15	1.2	2½-3½ leaves

* raised with the tropical species under the higher temperature regime.

Appendix 1. (cont'd)

	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)
Avena fatua	AVE FATU (26)	Farthinghoe	15	1.2	3-5 leaves, some tillering
Alopecurus myosuroides	ALO MYOS (27)	B and S Supplies	30	0.6	3-6 leaves, some tillering
Poa annua	POA ANN (28)	WRO 1974	25	0.6	4-5 leaves
Poa trivialis	POA TRIV (29)	Omega	30	0.6	4-7 leaves, tillering
Sinapis arvensis	SIN ARV (30)	WRO 1971	25	0.6	$3\frac{1}{2}$-$4\frac{1}{2}$ leaves
Raphanus raphanistrum	RAPH RAP (31)	Long Black Spanish	12	0.6	$2\frac{1}{2}$ leaves
Chrysanthemum segetum	CHRY SEG (32)	WRO 1976		surface	4-6 leaves
Tripleurospermum maritium	TRIP MAR (33)	WRO 1975	25	surface	4-8 leaves
Senecio vulgaris	SEN VULG (34)	WRO 1974	35	0.2	$3\frac{1}{2}$-4 leaves
Polygonum lapathifolium	POL LAPA (35)	WRO 1974	15	0.6	$1\frac{1}{2}$-$2\frac{1}{2}$ leaves.
Polygonum aviculare	POL AVIC (36)	B and S Supplies 1976		0.6	2-$2\frac{1}{2}$ leaves
Galium aparine	GAL APAR (38)	B and S Supplies	12	0.6	8 whorls
Chenopodium album	CHEN ALB (39)	WRO 1972	40	0.6	nil germination
Stellaria media	STEL MED (40)	B and S Supplies, 1975	50	0.6	15 leaves
Veronica persica	VER PERS (42)	WRO 1975	25	0.6	4-6 leaves

Appendix 1 (cont'd)

	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)
Soyabean (Glycine max)	SOYABEAN (65)	TK 5	8	1.2	1-2 trifoliate leaves
Cotton (Gossypium hirsutum)	COTTON (66)	S 71	6	1.8	2-3 leaves
Jute (Corchorus olitorius)	JUTE (67)	Trinidad 1975	15	0.6	2-3 leaves
Kenaf (Hibiscus cannabinus)	KENAF (68)	Thai Native	12	0.6	2-3 leaves
Sesamum (Sesamum indicum)	SESAMUM (70)	E 8	10	0.6	2-4 leaves
Tomato (Lycopersicum esculentum)	TOMATO (71)	Ailsa Craig	6	0.6	4 leaves
Oryza punctata	OR PUNCT (73)	Swaziland 1974	25	0.6	2-3 leaves
Eleusine indica	ELEU IND (74)	WRO 1964	15	0.6	2-4½ leaves
Echinochloa crus-galli	ECH CRUS (75)	WRO 1970	15	0.6	4½-5 leaves
Rottboellia exaltata	ROTT EXA (76)	Ex Ciba-Geigy 1974	20	0.6	4½-5 leaves
Digitaria sanguinalis	DIG SANG (77)	WRO 1971	20	0.2	3-4 leaves
Amaranthus retroflexus	AMAR RET (78)	WRO 1970	25	0.3	2-5 leaves
Solanum nigrum	SOL NIG (81)	WRO 1976	15	0.2	6-8 leaves
Snowdenia polystachya	SNO POL (83)	Ethiopia 1974	25	surface	3-6 leaves

Appendix 1. (cont'd)

	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)
Rumex obtusifolius	RUM OBTU (44)	B and S Supplies	25	0.2	2-3 leaves
Holcus lanatus	HOLC LAN (45)	WRO 1973	20	0.6	4-6 leaves, tillering
Agropyron repens	AG REPEN (47)	WRO Clone 31	6*	1.2	3-4 leaves
Allium vineale	ALL VIN (49)	WRO 1976	20†	1.2	2½-3 leaves
Cirsium arvense	CIRS ARV (50)	WRO Clone 1	4**	1.2	3-6 leaves
Tussilago farfara	TUS FARF (51)	WRO Clone 1	4*	1.8	2-3 leaves
Convolvulus arvensis	CONV ARV (52)	WRO Clone 1	6**	1.2	5-10 leaves
Tropical species (grown under higher temperature regime)					
Millet (Pennisetum americanum)	MILLET (57)	ICRISAT 1977	15	0.6	4-5½ leaves
Maize (Zea mays)	MAIZE (58)	Julia	6	1.8	4½-5½ leaves
Sorghum (Sorghum vulgare)	SORGHUM (59)	SK5912	8	1.2	4-5 leaves
Rice (Oryza sativa)	RICE (60)	I R 28	10	0.6	3-4 leaves
Pigeon pea (Cajanus cajan)	PIGEON P (61)	ICRISAT 1977	6	1.2	3-4 trifoliate leaves
Cowpea (Vigna unguiculata)	COWPEA (62)	ICRISAT S7 1977	6	1.2	1-2 trifoliate leaves
Chickpea (Cicer arietinum)	CHICKPEA (63)	G 62404	6	1.2	10-12 pinnate leaves
Groundnut (Arachis hypogaea)	GRNDNUT (64)	S 38	5	1.8	5-6 trifoliate leaves

Appendix 1. (cont'd)

	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)
Phalaris minor*	PHAL MIN (84)	Jordan 1977	25	0.2	3-3½ leaves, some tillering
Cyperus esculentus	CYP ESCU (85)	WRO Clone 2 (ex South Africa)	7**	1.8	3-6 leaves/ shoot
Cyperus rotundus	CYP ROTU (86)	WRO Clone 1 (Rhodesia)	5**	1.8	9-12 leaves/ shoot
Oxalis latifolia	OXAL LAT (87)	WRO Clone 2 (Cornwall)	15 bulbs	1.8	1-2 trifoliate leaves

* raised as a temperate species under the lower temperature regime

/ one node rhizome fragments

// 4 cm root fragments

† aerial bulbils

** tubers

ABBREVIATIONS

ångström	Å	freezing point	f.p.
Abstract	Abs.	from summary	F.s.
acid equivalent*	a.e.	gallon	gal
acre	ac	gallons per hour	gal/h
active ingredient*	a.i.	gallons per acre	gal/ac
approximately equal to*	≃	gas liquid chromatography	GLC
aqueous concentrate	a.c.	gramme	g
bibliography	bibl.	hectare	ha
boiling point	b.p.	hectokilogram	hkg
bushel	bu	high volume	HV
centigrade	C	horse power	hp
centimetre*	cm	hour	h
concentrated	concd	hundredweight*	cwt
concentration	concn	hydrogen ion concentration*	pH
concentration x time product	ct	inch	in.
concentration required to kill 50% test animals	LC50	infra red	i.r.
cubic centimetre*	cm^3	kilogramme	kg
cubic foot*	ft^3	kilo ($x10^3$)	k
cubic inch*	in^3	less than	<
cubic metre*	m^3	litre	l.
cubic yard*	yd^3	low volume	LV
cultivar(s)	cv.	maximum	max.
curie*	Ci	median lethal dose	LD50
degree Celsius*	^oC	medium volume	MV
degree centigrade	^oC	melting point	m.p.
degree Fahrenheit*	^oF	metre	m
diameter	diam.	micro ($x10^{-6}$)	µ
diameter at breast height	d.b.h.	microgramme*	µg
divided by*	: or /	micromicro (pico: $x10^{-12}$)*	µµ
dry matter	d.m.	micrometre (micron)*	µm (or µ)
emulsifiable concentrate	e.c.	micron (micrometre)*†	µm (or µ)
equal to*	=	miles per hour*	mile/h
fluid	fl.	milli ($x10^{-3}$)	m
foot	ft	milliequivalent*	m.equiv.
		milligramme	mg
		millilitre	ml

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

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

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

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