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THE PRE-EMERGENCE SELECTIVITY OF SOME RECENTLY DEVELOPED HERBICIDES IN JUTE, KENAF AND SESAMUM; AND THEIR ACTIVITY AGAINST OXALIS LATIFOLIA

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THE PRE-EMERGENCE SELECTIVITY OF SOME RECENTLY DEVELOPED HERBICIDES IN JUTE, KENAF, AND SESAMUM; AND THEIR ACTIVITY AGAINST OXALIS LATIFOLIA

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SUMMARY

The results of a single pot experiment are reported. Of 16 herbicides tested on jute, the most promising, showing selectivity against the two weed species included, Amaranthus retroflexus and Eleusine indica, were MON 097, alachlor, prynachlor and vernolate. Chlorthal-dimethyl and USB 3584 showed selectivity against Eleusine only.

Of 18 herbicides tested on kenaf, outstanding selectivity was obtained with fluorodifen. Nitrofen, MON 097, alachlor, prynachlor, R 7465 were also selective against both weed species, while trifluralin, USB 3584, chlorthal-dimethyl and vernolate were selective against Eleusine only.

Of 22 herbicides tested on sesamum, MON 097, alachlor and vernolate controlled both weeds selectively, terbacil and VCS 438 controlled Amaranthus only and prynachlor, chlorthal-dimethyl, USB 3584, R 7465 and trifluralin controlled Eleusine only.

Of 20 herbicides tested on Oxalis latifolia, RP 17623 was outstanding, while nitrofen, trifluralin, PP 65-25, VCS 438 and terbacil also showed potentially useful activity.

INTRODUCTION

For many years the Overseas and Herbicide Evaluation Sections of the Weed Research Organization have investigated the selectivity of new herbicides which are in the process of commercial development by industry (Holly and Wilson 1967, Richardson et al. 1971). This has involved application, both pre-emergence and post-emergence, to a wide range of crop and weed species grown in pots. The objectives have been to discover selectivities additional to those pinpointed by the originating firm, to obtain experience of the type of effects produced by the chemical, and to provide a source of information on the persistence of the compounds and the relative susceptibility of crop species to small residues in the soil.

These selectivity experiments now include up to 60 crop and weed species. Of these 40 are temperate and the number of tropical and sub-tropical species has recently been increased to 20. The newly-added species include three important tropical crops, jute (Corchorus capsularis), kenaf (Hibiscus cannabinus) and sesamum (Sesamum indicum) for which there is relatively little published information on herbicide selectivities. As they have only been included in the experiments since 1970, there were many relatively new compounds which had not been tested on these crops but were of potential interest. Hence this 'back-log' evaluation was conducted with 20 compounds on one or more of each of these crops together with two common weed species Amaranthus retroflexus and Eleusine indica to give some index of selectivity.

One further weed species Oxalis latifolia was included in this experiment for convenience and not because of any association between this weed and the above crop species. Herbicides have been evaluated on O. latifolia at WRO in the past but not on a regular basis and many of the same 20 compounds plus a few more deserved evaluation for this specific problem.

Attention is drawn particularly to the fact that the experiment described here is only a preliminary guide to the relative resistance or susceptibility of the species included. Pot experiments of this sort are not a reliable guide to the dose levels needed to produce the same effects in the field.

It is therefore emphasized that the data reported should be regarded primarily as a source of ideas for further work.

METHODS AND MATERIALS

Treatment procedure

The techniques used resembled those in previous pre-emergence selectivity experiments (Richardson et al. 1971). Twenty-four herbicides were evaluated, each being applied at three doses. Details of their source and formulation are given in Table 1.

Twenty-one of these were incorporated into the soil before planting, as follows. Painted metal containers 19.0 x 13.7 x 7.6 cm deep were filled to a depth of 6.5 cm with a sandy loam topsoil from a field at Begbroke Hill, having an organic matter content of 2.8% and a clay content of 15.2%. John Innes base fertilizer (3 g/litre of soil) and DDT insecticide (1 g 5% dust/litre) were incorporated into this soil. The herbicides were used in the formulation supplied by the manufacturer and were sprayed on to the soil surface using a laboratory sprayer embodying a 'Teejet' fan nozzle moving at constant speed along a track over a spray bench. Shortly after spraying, the soil in each container was passed six times through a large polythene funnel to incorporate the herbicide evenly throughout the soil. The treated soil was then used to fill a series of 8.9 cm diameter disposable plastic pots in which the plants were subsequently grown. The soil depth in the pots was also approximately 6.5 cm.

The remaining three herbicides nitrofen, fluorodifen, CP 53619 together with a second series of RP 17623 treatments were sprayed on the soil surface immediately after sowing.

Pots were allocated to individual species and a specified number of seeds sown at the appropriate depth (see Table 2). All pots were replicated twice.

The spraying of the soil, its subsequent transfer to pots and planting of the latter with the various species took place on 12th May 1971. The pots were then placed in aluminium foil dishes in the glasshouse and initial watering until emergence was from overhead using a boom with fan nozzles to give uniform treatment to all pots. After emergence of the majority of the species, pots were watered individually from overhead, according to need, using a small rose with trigger control and avoiding contact with the plants as far as possible.

Glasshouse temperatures ranged from 19-31°C with mean 25°C and relative humidity ranged from 28-100% with mean 60%.

Table 1. Chemicals used: common name, other designations, formulation, chemical name and source.

trifluralin	L 3652	'Treflan	480 g/l e.c.	2,6-dinitro-NN-dipropyl-4-trifluoromethylaniline	Elanco Products Ltd., Broadway House, The Broadway, Wimbledon, London S.W.19.
nitralin	SD 11831	'Planavin'	75% w.p.	4-(methylsulphonyl)-2,6-dinitro-NN-dipropylaniline	Shell Research Ltd., Woodstock Agricultural Research Centre, Sittingbourne, Kent.
USB 3584	-		240 g/l e.c.	N,N-diethyl-2,4-dinitro-6-trifluoromethyl-1,3-phenyldiamine	U.S. Borax Chemical Corporation, 2075 Wilshire Boulevard, Los Angeles, California 90005, USA.
alachlor	CP 50144	'Lasso'	480 g/l e.c.	2-chloro-2',6'-diethyl-N-(methoxymethyl)acetanilide	Monsanto Chemicals Ltd., 10-18 Victoria Street, London S.W.1.
MON 097	-		600 g/l e.c.	2-chloro-N-(ethoxymethyl)-6'-ethyl-o-acetotoluidide	Monsanto Chemicals Ltd. (see alachlor)
prynachlor	BAS 2900 H	'Butisan'	500 g/l e.c.	2'-chloro-N-(1-methylprop-2-ynyl)acetanilide	BASF (UK) Ltd., St. Francis Tower, Greyfriars, Ipswich, Suffolk.
chlorthal-dimethyl	DCPA	'Dacthal'	75% w.p.	2,3,5,6-tetrachloroterephthalic acid dimethyl ester	Diamond Alkali Co., International Division, 99 Park Avenue, New York 11016, USA.
pronamide	RH 315	'Kerb'	75% w.p.	3,5-dichloro-N-(1,1-dimethylpropynyl)benzamide	Rohm & Haas Co., Washington Square, Philadelphia 5, Pennsylvania, USA.
R 7465	-		50% w.p.	2(α-naphthoxy)-N,N-diethylpropionamide	Stauffer Chemicals Co., Biological Research Center, P.O. Box 760, Mountain View, California, USA.
VCS 438	-		120 g/l a.c.	2-(3',4'-dichlorophenyl)-4-methyl-3,5-diketo-1,2,4-oxadiazole	Velsicol Chemical Corporation, 341 E. Ohio Street, Chicago, Illinois 60611, USA.
vernolate	R 1607	'Vernam'	720 g/l e.c.	S-propyl NN-dipropyl(thiocarbamate)	Stauffer Chemicals Co. (see R 7465
nitrofen	FW 925	'TOK E 25'	240 g/l e.c.	2,4-dichlorophenyl 4-nitrophenyl ether	Murphy Chemical Co., Wheathampstead, St. Albans, Herts.

fluorodifen	C 6989 'Preforan' 4-nitrophenyl 2-nitro-4-trifluoromethylphenyl ether Ciba-Geigy (UK) Ltd., Agrochemical Division, Whittlesford, Cambridge CB2 4QT.		300 g/l e.c.
noruron	H 7531 'Herban' N'-(hexahydro-4,7-methanoindan-5-yl)-NN-dimethylurea Hercules Powder Co., Agricultural Chemicals, Synthetics Department, Wilmington, Delaware 19899, USA.		80% w.p.
PP 65-25	- 'Benzomarc' N-benzoyl-N-(3,4-dichlorophenyl)-N',N'-dimethylurea Pechiney-Progil, 74 Lyon-Terreaux, 15-21 Rue Pierre Baizet, Lyon 9e, France.		25% w.p.
aziprotryne	C 7019 'Brasoran', 'Pemate', 'Mesoranil' 2-azido-4-isopropylamino-6-methylthio-1,3,5-triazine Ciba-Geigy (UK) Ltd. (see fluorodifen)		50% w.p.
WL 19805	SD 15418 DW 3418 'Bladex' 2-(4-chloro-6-ethylamino-s-triazine-2-ylamino)-2-methylpropionitrile Shell Research Ltd. (see nitralin)		50% w.p.
prometryne	G 34161 'Gesagard' 4,6-bisisopropylamino-2-methylthio-1,3,5-triazine Ciba-Geigy (UK) Ltd. (see fluorodifen)		50% w.p.
terbacil	DuPont 732 'Sinbar' 5-chloro-6-methyl-3-t-butyluracil DuPont (UK) Ltd., DuPont House, 18 Bream's Building, Fetter Lane, London E.C.4.		80% w.p.
Orga 3045	TFP sodium-2,2,3,3-tetrafluoropropionate Orgachemia Ltd., Boseind, Boxtel, Netherlands.		808 g/l a.c.
HZ 52,112	H 722 3-(2-methylphenoxy)pyridazine Sandoz Ltd., 3090 Agro Research, CH-4002 Basle, Switzerland.		80% w.p.
carbetamide	11,561 RP 'Legurame' D-N-ethyl-2-(phenylcarbamoyloxy)propionamide May & Baker Ltd., Ongar Research Station, Fyfield Road, Ongar, Essex.		70% w.p.
CP 53619	- 'Machete' 2-chloro-2',6'-diethyl-N-(butoxymethyl)acetanilide Monsanto Chemicals Ltd.,		600 g/l e.c.
RP 17623	Vt 2569 'Ronstar' 2-t-butyl-4-(2,4-dichloro-5-isopropoxyphenyl)-1,3,4-oxadiazolin-5-one May & Baker Ltd.,		400 g/l e.c.

Note: e.c. = emulsifiable concentrate
w.p. = wettable powder
a.c. = aqueous concentrate
all concentrations and doses are expressed in terms of active ingredient.

Table 2. Details of species used

Species	Cultivar/ source	No. of seeds/pot	Depth of planting	Stage of growth at assessment
Jute	Trinidad 1968	20	0.6 cm	2-5 leaves (50-150 mm)
Kenaf	Thai Native 1968	10	0.6 cm	2-3 leaves (170-250 mm)
Sesamum	Addis Ababa 1970	10	0.6 cm	4 leaves (60-95 mm)
Eleusine indica	S. Africa	15	0.6 cm	4-5 leaves (200-280 mm)
Amaranthus retroflexus	Shell	15	0.3 cm	6-8 leaves (50-100 mm)
Oxalis latifolia	Cornwall (clone 'B')	7	12. cm	6-8 trifoliates (50-90 mm)

N.B. Since the preparation of this report a recalibration of the sprayer nozzle has shown that the doses applied were 15% greater than those indicated in this report.

Assessment and processing of results

The major assessment was carried out on 7th June 1971, 26 days after commencement of the experiment.

The number of survivors for each treatment and their vigour expressed on a 0-7 subjective scoring scale were recorded. Scale points were defined as follows;

0 = completely dead;
1 = moribund but not all tissue dead;
2 = alive, with some green tissue, but unlikely to make further growth;
3 = very stunted, but apparently still making some growth;
4 = considerable inhibition of growth;
5 = readily distinguishable inhibition of growth;
6 = some detectable adverse effect as compared with control - colour difference, morphological abnormality, epinasty or very slight reduction in growth;
7 = indistinguishable from control.

Treatment totals from the two replicates for both vigour and number of survivors were calculated. The vigour and number of survivors were calculated as a percentage of those in untreated controls and histograms drawn up from these figures. The upper figure for each species on the histogram represents mean plant survival % and the lower, mean vigour %. These percentages are diagrammatically represented by a row of 'x's each 'x' being a 5% increment. M denotes a missing treatment and R denotes results based on one replicate only. These histograms are presented as an Appendix.

Tables 3, 4 and 5 summarize the apparent selectivities in jute, sesamum and kenaf, respectively, the criterion of selectivity being arbitrarily chosen as weed vigour or number reduced by at least 70%, crop vigour not reduced more than 15%.

After the main assessment the five annual species were discarded but O. latifolia was kept for further observations and scoring two months and four months after treatment. The more promising treatments on O. latifolia are listed in Table 6.

RESULTS AND DISCUSSION

Jute

Jute has generally proved very sensitive to herbicides and only five compounds in this test showed clear selectivity. Amaranthus was susceptible to three of them but they are all to be regarded more as annual grass killers than complete herbicides at the doses concerned.

Table 3. Compounds showing selectivity in jute

Chemical	Safe dose kg/ha	Amaranthus controlled kg/ha	Eleusine controlled kg/ha
MON 097	0.25	0.25	0.25
alachlor	0.25	(1.0)	0.25
prynachlor	4.0	4.0	1.0
vernolate	0.5	0.5	0.25
USB 3584	0.11	(0.33)	0.11
chlorthal-dimethyl	6.0	(>12.0)	6.0

Note: The figure in brackets represents the non-selective dose at which the species is controlled.

Herbicides of the amide group particularly deserve further testing. It is not possible to say which of the three - alachlor, MON 097 or prynachlor - is the most selective. MON 097 was by far the most active but there were some symptoms of chlorosis on the jute at 0.25 kg/ha and it would need to be used with great care. Alachlor at 1.0 kg/ha was virtually equivalent to MON 097 at 0.25 kg/ha. Prynachlor was still less active. Even 4 kg/ha allowed healthy recovery of some Amaranthus seedlings and 5 or 6 kg/ha might be regarded as the equivalent of alachlor at 1.0 kg/ha. The related CP 53619 had been tested previously and showed only partial selectivity at 0.5 kg/ha.

No previous results are available for these compounds on jute, but Kasasian (1971) has reported that the related propachlor showed some promise in pot tests in Trinidad.

It should be emphasized that these results were obtained with the herbicides incorporated into the soil before planting. Selectivity could be somewhat different with surface application and it is intended to look into this in future pot experiments.

Vernolate was the only thiolcarbamate included in the experiment. The degree of selectivity shown suggests that it is worth testing in the field in comparison with other available relatives such as EPTC, pebulate and butylate, but the low dose tolerated is not likely to permit selective control of many weeds other than annual grasses, and the need for immediate incorporation may make it less attractive than some of the other compounds.

USB 3584 is a new compound of the aniline group and is distinctly interesting in showing almost three times as much activity as trifluralin on the two weeds and only marginally more activity on the jute. Although trifluralin did not show clear selectivity here there have been indications of selectivity from other reports (Kasasian 1971) and both these compounds deserve further testing. It is not clear at present whether incorporation is essential for USB 3584. Nitralin showed negligible selectivity and seems unlikely to be of interest in the field.

Chlorthal-dimethyl showed moderately good selectivity against Eleusine and is worth further testing.

Orga 3045 while not showing a clear selectivity, was well tolerated at 1 kg/ha and not too damaging at 4 kg/ha, at which dose Eleusine was completely controlled. It warrants comparison in the field with dalapon, which is the one herbicide to have shown some promise in India (Jain et al. 1966). Orga 3045 differs from dalapon in depending almost entirely on root uptake for its effect and in being much more resistant to breakdown in the soil.

Of the other compounds tested on jute in this experiment none showed any potential selectivity. The substituted urea, triazine and uracil compounds are particularly toxic and non-selective. Compounds which have been included in this experiment but not tested on jute, are those which have already been tested in other experiments at WRO and will be reported separately in due course. None, however, have shown any greater selectivity than the compounds listed above.

Kenaf

Kenaf shows rather more tolerance to herbicides than jute, and there are much more promising possibilities for selective control of some broad-leaved weeds as well as annual grasses.

Table 4. Compounds showing selectivity in kenaf

Chemical	Safe dose kg/ha	Amaranthus controlled kg/ha	Eleusine controlled kg/ha
fluorodifen	4.0	1.0	1.0
nitrofen	1.0	1.0	1.0
MON 097	0.25	0.25	0.25
alachlor	1.0	1.0	0.25
prynachlor	4.0	4.0	4.0
R 7465	1.0	1.0	0.25
USB 3584	0.33	(1.0)	0.11
trifluralin	0.33	(1.0)	0.33
chlorthal-dimethyl	12.0	(>12.0)	6.0
vernolate	0.25	(0.5)	0.25

Note: The figure in brackets represents the non-selective dose at which the species is controlled.

The most striking selectivity of all was achieved with the substituted ethers, especially fluorodifen, as pre-emergence applications to the soil surface. The kenaf was affected only very mildly by fluorodifen at 4 kg/ha while both weeds were killed at 1 kg/ha. Nitrofen applied in the same way gave very nearly complete control of the weeds and no crop damage at 1 kg/ha but caused some scorch at 2 kg/ha and more severe damage at 4 kg/ha. Application to the surface under almost continuously moist conditions probably contributed to optimal weed control performance. In the field, weed control may not be so spectacular but the tolerance of the crop should still hold good, and both compounds deserve immediate testing. (RP 17623 which is unrelated chemically but has apparently similar mode of action to the ethers was tested in an earlier experiment and failed to show selectivity.)

As in jute the amide group of herbicides shows promise, with MON 097 showing excellent selectivity at 0.25 kg/ha, alachlor at 1.0 kg/ha, and prynachlor giving not quite such good results even at 4 kg/ha. The related CP 53619 had previously shown good selectivity at 1.5 kg/ha against both weeds. R 7465, a somewhat different type of amide, also showed excellent selectivity at 1 kg/ha. As in jute, selectivity might be affected by method of application but all these amides are worth further testing.

In the aniline group of herbicides, USB 3584 again shows a potential superiority over trifluralin. Both compounds were equally safe on the crop at 0.33 kg/ha but control of the weed species was very much better with USB 3584. As trifluralin has already been found promising in the field (Burnside and Williams 1968) USB 3584 is well worth further comparison. Nitralin has been reported as promising as a surface pre-emergence treatment (Teerawatsakul and Sigafus 1969) but showed no clear selectivity as a pre-sowing incorporated treatment in this test.

Chlorthal-dimethyl was well tolerated by kenaf at 12 kg/ha. Reliable control of annual grasses should therefore be possible with this compound, together with some suppression of <u>Amaranthus</u>. Good field results have already been reported by Nazirov <u>et al</u>. (1971) and by Lev and Usmanaliev (1971).

Vernolate gave selective control of <u>Eleusine</u> at 0.25 kg/ha but the safety margin is very small and the thiolcarbamate group would not appear to have any advantage over the ether or amide groups.

No other compounds gave clear selectivity against either weed but the results suggest that aziprotryne and prometryne could be selective against <u>Amaranthus</u> at doses just below 1 kg/ha. It has previously been observed at WRO that prometryne is moderately well tolerated. Lev and Usmanaliev (1971) report useful field results with prometryne and with fluometuron. Noruron might also be selective at about 2 kg/ha.

<u>Sesamum</u>

Sesamum appears intermediate between jute and kenaf in its susceptibility to herbicides. Most selectivity is again obtained from the predominantly grass-controlling herbicide groups, but a few further compounds are of interest. In general, however, selectivity is not great.

The amide group was well tolerated and the margin of safety with MON 097 and alachlor was even greater than in kenaf or jute. Good field results with alachlor have already been reported by Fischer (1971) and Lyubenov and Kostadinov (1970). Prynachlor on the other hand was a little more damaging at 4 kg/ha than on the other two crops and selectivity was only achieved against Eleusine at 1 kg/ha. R 7465 showed selectivity against Eleusine at a low dose of 0.25 kg/ha and a somewhat higher dose would probably be tolerated by the crop.

Table 5. Compounds showing selectivity in sesamum

Chemical	Safe dose kg/ha	Amaranthus controlled kg/ha	Eleusine controlled kg/ha
MON 097	1.0	0.25	0.25
alachlor	1.0	1.0	0.25
prynachlor	1.0	(4.0)	1.0
R 7465	0.25	(1.0)	0.25
chlorthal-dimethyl	12.0	(>12.0)	6.0
vernolate	0.5	0.5	0.25
USB 3584	0.11	(1.0)	0.11
trifluralin	0.33	(1.0)	0.33
VCS 438	1.0	1.0	(4.0)
terbacil	0.05	0.05	(0.2)

Note: The figure in brackets represents the non-selective dose at which the species is controlled.

Unlike the above amides, CP 53619 was applied as a surface pre-emergence treatment. It showed very high activity and, although not quite safe on the crop at 0.5 kg/ha, both weeds were completely killed at this dose and some selectivity is indicated.

Chlorthal-dimethyl was well tolerated and could be considered for annual grass control if economic considerations permit.

Vernolate was tolerated at 0.5 kg/ha and deserves comparison with EPTC and other thiolcarbamates in situations where immediate incorporation is practicable.

Unlike the other two crop species, sesamum shared the weeds' tendency to be more susceptible to USB 3584 than to trifluralin. Consequently USB 3584 had no greater selectivity than trifluralin in this crop, but its greater activity makes it well worth further study. Again nitralin showed no useful selectivity in contrast to published reports from Thailand (Teerawatsukul and Sigafus 1969).

VCS 438 killed more than 70% of the Amaranthus at 1 kg/ha but the survivors made vigorous recovery, and the selectivity is extremely marginal.

Terbacil shows clear selectivity against Amaranthus at 0.05 kg/ha. This may be partly a reflection of the extreme sensitivity of Amaranthus but comparison with the other crops suggests sesamum may have some useful tolerance. This and other substituted uracil herbicides therefore deserve further testing.

Noruron did not show clear selectivity in this test but a dose of 2 kg/ha might be expected to give useful results, in accordance with previous reports by Kasasian (1971), Fischer (1971) and others. The other substituted urea in the test, PP 65-25, also showed some selectivity against Amaranthus at 1 kg/ha.

The ether group was not tolerated at all by sesamum, both fluorodifen and nitrofen causing complete kill at 1 kg/ha. Of other compounds only Orga 3045 and prometryne showed some partial selectivity.

Oxalis latifolia

Table 6 lists the compounds with potentially useful activity on O. latifolia.

The outstanding compound in this test was undoubtedly RP 17623. As a surface application the lowest dose of 0.5 kg/ha caused complete suppression for two months and only a few were beginning to recover after four months. No emergence occurred at 1.5 or 4.5 kg/ha. Some bulbs were found to have rotted after four months but others were still sound and could perhaps have been viable, even at the higher doses. It is therefore suitable for prolonged suppression rather than eradication. Incorporation into the soil resulted in a considerable loss of activity. Successful results in the field have already been reported by Mongelard and McIntyre (1969).

Nitrofen probably acts in a similar way and also gave excellent suppression as a treatment to the soil surface. The effect was less persistent and a few plants were recovering from 4 kg/ha after four months, but this compound could prove very useful for short term suppression, especially as it is more immediately available than RP 17623. The related fluorodifen has been observed to give control in the field on occasion (P.J. Terry, personal communication) but it did not perform nearly as well as nitrofen in this test. The lack of published results for nitrofen may mean that it is not always so successful in the field but it clearly deserves further trial, together with fluorodifen.

Table 6. Control of Oxalis latifolia. herbicides causing at least 70% suppression of numbers and/or vigour.

Chemical	Dose kg/ha		
	Days after treatment		
	26	56	119
RP 17623 (surface)	0.5	0.5	0.5
RP 17623 (incorporated)	1.5	4.5	4.5
nitrofen (surface)	1.0	2.0	4.0
fluorodifen (surface)	4.0	4.0	>4.0
trifluralin (incorporated)	0.33	1.0	1.0
VCS 438 "	2.0	2.0	2.0
PP 65-25 "	3.0	1.0	1.0
MON 097 "	4.0	>4.0	>4.0
terbacil "	>0.8	0.2	0.2

Trifluralin was even more active than expected from previous work (Parker 1966) providing effective control at 1 kg/ha for four months. Nitralin and USB 3584 each caused some retardation at 1 kg/ha but did not approach trifluralin in activity. Benfluralin has also been shown to have less activity than trifluralin (WRO unpublished).

VCS 438 was slow to act but eventually caused complete kill of bulbs at 2 and 4 kg/ha with the exception of just one plant which recovered from 2 kg/ha. It is not possible to say whether VCS 438 has any particular advantage over other herbicides which inhibit photosynthesis but it is worth considering in crop situations where this herbicide is well tolerated (e.g. potatoes, cotton, onions and various large-seeded legumes).

PP 65-25 was also slow to act but gave good control at 1 kg/ha. Kill was complete at this dose but curiously there was some weak survival at 3 kg/ha. The selective potential of this compound is unfortunately not yet very well known but some further testing should be worthwhile.

Terbacil caused complete kill at 0.2 kg/ha, and although there was again some unexpected survival at the higher dose of 0.8 kg/ha, this compound can be regarded as having the potential for eradicating O. latifolia in non-selective situations and in tolerant crops such as citrus and apples.

MON 097 had only a transient effect at the high dose of 4 kg/ha and is not likely to be of practical value unless it proves much more active as a treatment to the soil surface.

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TRIFLURALIN

	0.11 kg/ha	0.33 kg/ha	1 kg/ha
JUTE	86 xxxxxxxxxxxxxxxxx	94 xxxxxxxxxxxxxxxxxxx	94 xxxxxxxxxxxxxxxxxxx
	100 xxxxxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx	50 xxxxxxxxxx
KENAF	100 xxxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxxx
	100 xxxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx
SESAMUM	133 xxxxxxxxxxxxxxxxxxxx+	133 xxxxxxxxxxxxxxxxxxxx+	92 xxxxxxxxxxxxxxxxxx
	100 xxxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxxx
OXALIS	100 xxxxxxxxxxxxxxxxxxxx	25 xxxxx	0
	93 xxxxxxxxxxxxxxxxxxx	57 xxxxxxxxxxx	0
ELEUSINE	92 xxxxxxxxxxxxxxxxxx	0	0
	86 xxxxxxxxxxxxxxxxx	0	0
AMARANTHUS	112 xxxxxxxxxxxxxxxxxxxx+	127 xxxxxxxxxxxxxxxxxxxx+	46 xxxxxxxxx
	100 xxxxxxxxxxxxxxxxxxxx	64 xxxxxxxxxxxxx	14 xxx

NITRALIN

	0.11 kg/ha	0.33 kg/ha	1 kg/ha
JUTE	92 xxxxxxxxxxxxxxxxxx	94 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxxx
	100 xxxxxxxxxxxxxxxxxxxx	57 xxxxxxxxxxx	43 xxxxxxxxx
KENAF	100 xxxxxxxxxxxxxxxxxxxx	95 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxxx
	100 xxxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	57 xxxxxxxxxxx
SESAMUM	100 xxxxxxxxxxxxxxxxxxxx	58 xxxxxxxxxxxx	50 xxxxxxxxxx
	100 xxxxxxxxxxxxxxxxxxxx	57 xxxxxxxxxxx	50 xxxxxxxxxx
OXALIS	50 xxxxxxxxxx	50 xxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxxx
	93 xxxxxxxxxxxxxxxxxxx	64 xxxxxxxxxxxxx	57 xxxxxxxxxxx
ELEUSINE	75 xxxxxxxxxxxxxxx	50 xxxxxxxxxx	0
	93 xxxxxxxxxxxxxxxxxxx	43 xxxxxxxxx	0
AMARANTHUS	108 xxxxxxxxxxxxxxxxxxxx+	81 xxxxxxxxxxxxxxxx	112 xxxxxxxxxxxxxxxxxxxx+
	100 xxxxxxxxxxxxxxxxxxxx	43 xxxxxxxxx	43 xxxxxxxxx

USB 3584

	0.11 kg/ha		0.33 kg/ha		1 kg/ha	
JUTE	97	xxxxxxxxxxxxxxxxxxx	97	xxxxxxxxxxxxxxxxxxx	61	xxxxxxxxxxxx
	93	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
KENAF	100	xxxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
SESAMUM	125	xxxxxxxxxxxxxxxxxxxx+	75	xxxxxxxxxxxxxxx	25	xxxxx
	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
OXALIS	75	xxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	50	xxxxxxxxxx
	71	xxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
ELEUSINE	0		0		0	
	0		0		0	
AMARANTHUS	104	xxxxxxxxxxxxxxxxxxxx+	100	xxxxxxxxxxxxxxxxxxxx	46	xxxxxxxxx
	50	xxxxxxxxxx	36	xxxxxxx	14	xxx

ALACHLOR

	0.25 kg/ha		1 kg/ha		4 kg/ha	
JUTE	106	xxxxxxxxxxxxxxxxxxxx+	89	xxxxxxxxxxxxxxxxxx	72	xxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
KENAF	95	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
SESAMUM	142	xxxxxxxxxxxxxxxxxxxx+	M		92	xxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	M		79	xxxxxxxxxxxxxxxx
OXALIS	100	xxxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	113	xxxxxxxxxxxxxxxxxxxx+
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
ELEUSINE	29	xxxxxx	0		0	
	64	xxxxxxxxxxxxx	0		0	
AMARANTHUS	81	xxxxxxxxxxxxxxxx	0		0	
	100	xxxxxxxxxxxxxxxxxxxx	0		0	

MON 097

	0.25 kg/ha		1 kg/ha		4 kg/ha	
JUTE	83	xxxxxxxxxxxxxxxxx	61	xxxxxxxxxxxx	8	xx
	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	14	xxx
KENAF	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	50	xxxxxxxxxx
SESAMUM	108	xxxxxxxxxxxxxxxxxxxx+	125	xxxxxxxxxxxxxxxxxxxx+	M	
	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	M	
OXALIS	88	xxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	25	xxxxx
	93	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx
ELEUSINE	0		0		0	
	0		0		0	
AMARANTHUS	0		0		0	
	0		0		0	

PRYNACHLOR

	0.25 kg/ha		1 kg/ha		4 kg/ha	
JUTE	97	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
KENAF	100	xxxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
SESAMUM	125	xxxxxxxxxxxxxxxxxxxx+	125	xxxxxxxxxxxxxxxxxxxx+	83 R	xxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71 R	xxxxxxxxxxxxxx
OXALIS	88	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
ELEUSINE	121	xxxxxxxxxxxxxxxxxxxx+	75	xxxxxxxxxxxxxxx	8	xx
	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	43	xxxxxxxxx
AMARANTHUS	100	xxxxxxxxxxxxxxxxxxxx	115	xxxxxxxxxxxxxxxxxxxx+	23	xxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx

CHLORTHAL DIMETHYL

	3 kg/ha		6 kg/ha		12 kg/ha	
JUTE	103	xxxxxxxxxxxxxxxxxxxx+	97	xxxxxxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxxxx+
	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
KENAF	90	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
SESAMUM	142	xxxxxxxxxxxxxxxxxxxx+	108	xxxxxxxxxxxxxxxxxxxx+	150	xxxxxxxxxxxxxxxxxxxx+
	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
ELEUSINE	79	xxxxxxxxxxxxxxxx	4	x	4	x
	79	xxxxxxxxxxxxxxxx	29	xxxxxx	21	xxxx
AMARANTHUS	104	xxxxxxxxxxxxxxxxxxxx+	119	xxxxxxxxxxxxxxxxxxxx+	100	xxxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	50	xxxxxxxxxx

PRONAMIDE

	0.25 kg/ha		1 kg/ha		4 kg/ha	
JUTE	83	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	33	xxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	14	xxx
SESAMUM	83	xxxxxxxxxxxxxxxxx	108	xxxxxxxxxxxxxxxxxxxx+	8	xx
	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	29	xxxxxx
OXALIS	50	xxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx
ELEUSINE	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	0	
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	0	
AMARANTHUS	112	xxxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxxx+	31	xxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	14	xxx

R 7465

	0.25 kg/ha		1 kg/ha		4 kg/ha	
JUTE	100	xxxxxxxxxxxxxxxxxxxx	61	xxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx
	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
KENAF	95	xxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
SESAMUM	108	xxxxxxxxxxxxxxxxxxxx+	75	xxxxxxxxxxxxxxx	108	xxxxxxxxxxxxxxxxxxxx+
	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx	57	xxxxxxxxxxx
OXALIS	88	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	63	xxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
ELEUSINE	38	xxxxxxxx	0		0	
	21	xxxx	0		0	
AMARANTHUS	108	xxxxxxxxxxxxxxxxxxxx+	115	xxxxxxxxxxxxxxxxxxxx+	35	xxxxxxx
	50	xxxxxxxxxx	29	xxxxxx	7	x

VCS 438

	1 kg/ha		2 kg/ha		4 kg/ha	
SESAMUM	75	xxxxxxxxxxxxxxx	67	xxxxxxxxxxxxx	8	xx
	100	xxxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	21	xxxx
OXALIS	63	xxxxxxxxxxxxx	50	xxxxxxxxxx	50	xxxxxxxxxx
	71	xxxxxxxxxxxxxx	29	xxxxxx	29	xxxxxx
ELEUSINE	75	xxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
AMARANTHUS	23	xxxxx	0		0	
	79	xxxxxxxxxxxxxxxx	0		0	

VERNOLATE

	0.25 kg/ha		0.5 kg/ha		1 kg/ha	
JUTE	103	xxxxxxxxxxxxxxxxxxxx+	89	xxxxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
KENAF	100	xxxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx
	93	xxxxxxxxxxxxxxxxxxx	71	xxxyxxxxxxxxxx	64	xxxxxxxxxxxxx
SESAMUM	75	xxxxxxxxxxxxxxx	58	xxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
OXALIS	125	xxxxxxxxxxxxxxxxxxxx+	88	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
ELEUSINE	4	x	4	x	0	
	29	xxxxxx	21	xxxx	0	
AMARANTHUS	50	xxxxxxxxxx	0		0	
	86	xxxxxxxxxxxxxxxxx	0		0	

ORGA 3045

	0.25 kg/ha		1 kg/ha		4 kg/ha	
JUTE	111	xxxxxxxxxxxxxxxxxxxx+	72	xxxxxxxxxxxxxx	67	xxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
KENAF	95	xxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
SESAMUM	150	xxxxxxxxxxxxxxxxxxxx+	100	xxxxxxxxxxxxxxxxxxxx	133	xxxxxxxxxxxxxxxxxxxx+
	93	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
OXALIS	75	xxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	38	xxxxxxxx
	993	xxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxxx
ELEUSINE	83	xxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	0	
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	0	
AMARANTHUS	104	xxxxxxxxxxxxxxxxxxxx+	96	xxxxxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx

NITROFEN
(surface applied)

	1 kg/ha		2 kg/ha		4 kg/ha	
JUTE	0		0		0	
	0		0		0	
KENAF	100	xxxxxxxxxxxxxxxxxxxx	70	xxxxxxxxxxxxxx	45	xxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx
SESAMUM	0		0		0	
	0		0		0	
OXALIS	13	xxx	0		0	
	29	xxxxxx	0		0	
ELEUSINE	0		0		0	
	0		0		0	
AMARANTHUS	4	x	0		0	
	36	xxxxxxx	0		0	

FLUORODIFEN
(surface applied)

	1 kg/ha		2 kg/ha		4 kg/ha	
JUTE	0		0		0	
	0		0		0	
KENAF	95	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx
SESAMUM	0		0		0	
	0		0		0	
OXALIS	50	xxxxxxxxxx	63	xxxxxxxxxxxxx	13	xxx
	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	36	xxxxxxx
ELEUSINE	0		0		0	
	0		0		0	
AMARANTHUS	0		0		0	
	0		0		0	

NORURON

	0.33 kg/ha	1 kg/ha	3 kg/ha
JUTE	94 xxxxxxxxxxxxxxxxxxx	8 xx	0
	93 xxxxxxxxxxxxxxxxxxx	14 xxx	0
KENAF	100 xxxxxxxxxxxxxxxxxxxx	95 xxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxxx
	100 xxxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx
SESAMUM	58 xxxxxxxxxxxx	92 xxxxxxxxxxxxxxxxxx	50 xxxxxxxxxx
	86 xxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx
OXALIS	88 xxxxxxxxxxxxxxxxxx	88 xxxxxxxxxxxxxxxxxx	75 xxxxxxxxxxxxxxx
	100 xxxxxxxxxxxxxxxxxxxx	57 xxxxxxxxxxx	36 xxxxxxx
ELEUSINE	71 xxxxxxxxxxxxxx	58 xxxxxxxxxxxx	0
	100 xxxxxxxxxxxxxxxxxxxx	57 xxxxxxxxxxx	0
AMARANTHUS	108 xxxxxxxxxxxxxxxxxxxx+	123 xxxxxxxxxxxxxxxxxxxx+	15 xxx
	93 xxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	14 xxx

PP 65-25

	0.33 kg/ha	1 kg/ha	3 kg/ha
JUTE	36 xxxxxxx	3 x	0
	36 xxxxxxx	14 xxx	0
KENAF	100 xxxxxxxxxxxxxxxxxxxx	0	0
	86 xxxxxxxxxxxxxxxxx	0	0
SESAMUM	92 xxxxxxxxxxxxxxxxxx	117 xxxxxxxxxxxxxxxxxxxx+	17 xxx
	93 xxxxxxxxxxxxxxxxxxx	71 xxxxxxxxxxxxxx	29 xxxxxx
OXALIS	100 xxxxxxxxxxxxxxxxxxxx	50 xxxxxxxxxx	25 xxxxx
	86 xxxxxxxxxxxxxxxxx	36 xxxxxxx	21 xxxx
ELEUSINE	75 xxxxxxxxxxxxxxx	67 xxxxxxxxxxxxx	0
	93 xxxxxxxxxxxxxxxxxxx	50 xxxxxxxxxx	0
AMARANTHUS	62 xxxxxxxxxxxx	0	0
	86 xxxxxxxxxxxxxxxxx	0	0

AZIPROTRYNE

	0.33 kg/ha		1 kg/ha		3 kg/ha	
KENAF	95	xxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	10	xx
	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	29	xxxxxx
SESAMUM	50	xxxxxxxxxx	8	xx	0	
	86	xxxxxxxxxxxxxxxxx	29	xxxxxx	0	
ELEUSINE	75	xxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx	0	
	100	xxxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx	0	
AMARANTHUS	92	xxxxxxxxxxxxxxxxxx	0		0	
	93	xxxxxxxxxxxxxxxxxxx	0		0	

WL 19805

	0.33 kg/ha		1 kg/ha		3 kg/ha	
KENAF	100	xxxxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxx	0	
	100	xxxxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	0	
SESAMUM	92	xxxxxxxxxxxxxxxxxx	17	xxx	0	
	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	0	
ELEUSINE	88	xxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	8	xx
	93	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxxx	29	xxxxxx
AMARANTHUS	104	xxxxxxxxxxxxxxxxxxxx+	M		8	xx
	100	xxxxxxxxxxxxxxxxxxxx	M		21	xxxx

PROMETRYNE

	0.5 kg/ha		1 kg/ha		2 kg/ha	
KENAF	100	xxxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxxx	75	xxxxxxxxxxxxxxx
	86	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx
SESAMUM	92	xxxxxxxxxxxxxxxxxx	58	xxxxxxxxxxxx	8	xx
	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	36	xxxxxxx
ELEUSINE	79	xxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	58	xxxxxxxxxxxx
	100	xxxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
AMARANTHUS	31	xxxxxx	0		0	
	79	xxxxxxxxxxxxxxxx	0		0	

TERBACIL

	0.05 kg/ha		0.2 kg/ha		0.8 kg/ha	
JUTE	0		0		0	
	0		0		0	
KENAF	5	x	0		0	
	21	xxxx	0		0	
SESAMUM	125	xxxxxxxxxxxxxxxxxxxx+	58	xxxxxxxxxxxx	0	
	93	xxxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	0	
OXALIS	75	xxxxxxxxxxxxxxx	38	xxxxxxxx	75	xxxxxxxxxxxxxxx
	64	xxxxxxxxxxxxx	64	xxxxxxxxxxxxx	57	xxxxxxxxxxx
ELEUSINE	83	xxxxxxxxxxxxxxxxx	0		0	
	79	xxxxxxxxxxxxxxxx	0		0	
AMARANTHUS	0		0		0	
	0		0		0	

HZ 52112

	0.25 kg/ha	1 kg/ha	4 kg/ha
OXALIS	75R xxxxxxxxxxxxxxx	138 xxxxxxxxxxxxxxxxxxxx+	113 xxxxxxxxxxxxxxxxxxxx+
	100R xxxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxxx	100 xxxxxxxxxxxxxxxxxxxx

CARBETAMIDE

	1 kg/ha	2 kg/ha	4 kg/ha
OXALIS	75 xxxxxxxxxxxxxxx	113 xxxxxxxxxxxxxxxxxxxx+	75 xxxxxxxxxxxxxxx
	93 xxxxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx

CP 53619
(surface applied)

	0.5 kg/ha	1.5 kg/ha	4.5 kg/ha
SESAMUM	58 xxxxxxxxxxxx	25 xxxxx	0
	71 xxxxxxxxxxxxxx	57 xxxxxxxxxxx	0
OXALIS	50 xxxxxxxxxx	50 xxxxxxxxxx	63 xxxxxxxxxxxxx
	86 xxxxxxxxxxxxxxxxx	79 xxxxxxxxxxxxxxxx	86 xxxxxxxxxxxxxxxxx
ELEUSINE	0	NOT APPLIED	NOT APPLIED
	0		
AMARANTHUS	0	0	0
	0	0	0

RP 17623
(surface applied)

	0.5 kg/ha	1.5 kg/ha	4.5 kg/ha
SESAMUM	0 0	0 0	0 0
OXALIS	0 0	0 0	0 0
ELEUSINE	0 0	0 0	0 0
AMARANTHUS	0 0	0 0	0 0

RP 17623
(incorporated)

	0.5 kg/ha	1.5 kg/ha	4.5 kg/ha
OXALIS	38 xxxxxxxx 43 xxxxxxxxx	0 0	0 0

Key to histograms

100 xxxxxxxxxxxxxxxxxxxx - Number of survivors as % of untreated

100 xxxxxxxxxxxxxxxxxxxx - Vigour of survivors as % of untreated

M denotes missing treatment

R denotes results based on one replicate only

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.

16. Report on a joint survey of the presence of wild oat seeds in cereal seed drills in the United Kingdom during Spring 1970. November, 1970. J.G. Elliott and P.J. Attwood. Price - £0.25.

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.