Click here for previous

NB: BAS 373OH is 4-(4'-fluorophenyl)-2-methyltetrahydro-1,2,4-oxadiazin-3,5-dione (BASF) HER 52.112 is 2-amino-6-chloro-pyrimidine (Sandoz), SAN 9789 is norflurazon, U 27.267 is N,N-dimethyl-2-(3,4,5tribromopyrazol-1-yl)propionamide (Upjohn)

.

SPECIES

WHEAT 1)

BARLEY 2)

DAT 3

PER RYGR

4)

ONION

DWF BEAN 9)

FLD BEAN

W CLOVER

12)

(15)

SWEDE

17

CARROT

18

LEFTUCE

20)

SUG BEET

21

KALE

(10)

8

METFLURAZONE 0.33 kg/ha

	METFLURAZONE 1.00 kg/ha	
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METFLURAZONE 3.00 kg/ha

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SPECIES

AVE FATU (26)

ALO MYOS

POA ANN (28)

SEN VUIG (34)

 $\frac{\text{POL AVIC}}{(36)}$

GAL APAR (38)

CHEN ALB (39)

STEL MED (40)

 $\frac{AG REPEN}{(47)}$

ALL VIN (49)

CIRS ARV (50)

TUS FARF (51)

CONV ARV (52)

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METFLURAZONE 0.33 kg/ha

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	000000000000000000000000000000000000000
69 36	000000000000000000000000000000000000000
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150 57	200000000000000000000000000000000000000
	200000000000000000000000000000000000000
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4336	000000000000000000000000000000000000000
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100 71	000000000000000000000000000000000000000
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METFLURAZONE 1.00 kg/ha

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METFLURAZONE 3.00 kg/ha

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27

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SPECIES
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RUM ACET
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1 22 1
MAIZE
(58)
SORGHUM
(59)
RICE
(60)
1001
AND THE AD ADDING TO ADD STREET
GRADNUT
(64)
COTTON
(66)
KENAF
(68)
FIRI TND
$\frac{\text{ELEU IND}}{(74)}$
(14)
ECH CRUS
(75)
ROT EXAL
(76)
DIG SANG
DIG SANG (77)
ABRATO OFATE
AMAR RET (78)
(10)
CYP ROIU (86)
(86)

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METFLURAZONE 0.33 kg/ha

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75 50	000000000000000000000000000000000000000	
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METFLURAZONE 1.00 kg/ha

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METFLURAZONE 3.00 kg/ha

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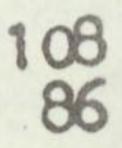
200

SPECIES

CXAL LAT (87)

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METFLURAZONE 0.33 kg/ha



METFLURAZONE 1.00 kg/ha

100 64

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METFLURAZONE 3.00 kg/ha

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29

SAN 9789 (Experiment 1)

- 30 -

Code number

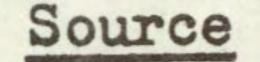
SAN 9789 (HER 52.143)

Chemical name

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

Trade name

-



Sandoz Ltd, 3090 Agro Research, CH-4002 Basle, Switzerland

Information available and suggested uses

Information received from the manufacturer reported activity against a broad spectrum of weed species, especially annuals, after pre-emergence application. Field trials, particularly in cotton, but also in a range of plantation crops, soyabean and established alfalfa are suggested.

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

Doses

0.33, 1.00, 3.00 kg a.i./ha (0.30, 0.89 and 2.68 lb a.i./ac)

Spray volume 338 1/ha (30.1 gal/ac)

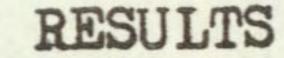
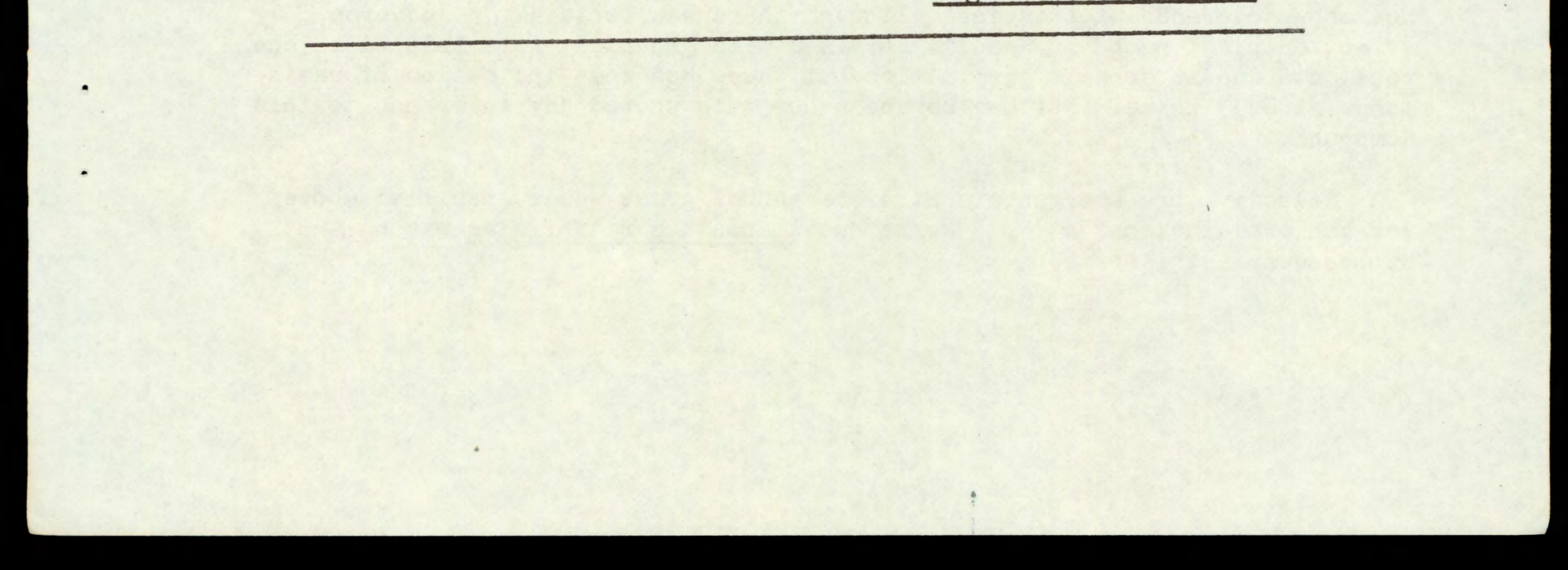


Table of selectivities

DOSE kg/ha	CROP: vigour reduced by less than 15%	WEEDS: number or vigour reduced by more than 70%
3.00	none	none listed as no crops tolerant
0.33	carrot kenaf	Avena fatua Alopecurus myosuroides Poa annua Polygonum aviculare Chenopodium album Stellaria media Eleusine indica Echinochloa crus-galli Digitaria sanguinalis



Comments on results

<u>General</u> The mode of action, symptoms exhibited and selectivities of this compound were very similar to metflurazone but the activity was rather greater. Little difference was observed between grass and broadleaf susceptibility.

- 31 -

Temperate weeds and crops

Six weed species were controlled at 0.33 kg/ha, notably <u>Avena fatua</u> and <u>Polygonum aviculare</u> which was completely killed. <u>Galium aparine</u>, <u>Allium</u> <u>vineale</u> and <u>Agropyron repens</u> were severely affected but not controlled at this rate. Metflurazone appeared marginally superior in controlling these latter species but like SAN 9789, 1.00 kg/ha was required for the criteria of control to be satisfied.

Carrot was the most tolerant crop species but was only resistant at 0.33 kg/ha compared with metflurazone at 1.00 kg/ha. Wheat was found to be the most susceptible crop species, being killed at 0.33 kg/ha.

Selective control of certain difficult weed species was achieved in carrot i.e. Avena fatua and Polygonum aviculare.

Tropical weeds and crops

The three annual grass species, Eleusine indica, Echinochloa crus-galli and Digitaria sanguinalis were all controlled at 0.33 kg/ha, the latter being completely killed. Rottboellia exaltata exhibited resistance at the lower rates. Amaranthus retroflexus showed greater resistance to this compound than to metflurazone. Cyperus esculentus showed a 57% reduction in vigour at 0.33 and 3.00 kg/ha (1.00 kg/ha missing) but was not kept for a later assessment. Symptoms and activity of SAN 9789 on Cyperus rotundus closely paralleled metflurazone with more severe effects developing with time. Six weeks after treatment slight to severe chlorosis was apparent but no death was observed. 1.00 kg/ha caused reduction of foliage greater than 70% five months after treatment but new rhizome development was beginning. Metflurazone had slightly greater activity than SAN 9789 at this dose. At the remaining two doses no difference was observed between the two compounds i.e. plants had completely recovered from 0.33 kg/ha and the foliage was killed with up to 50% soft or rotten tubers at 3.00 kg/ha. Oxalis latifolia was somewhat variable but essentially results two months after treatment were similar to those at the main assessment. Little or no difference was observed between SAN 9789 and metflurazone activity against this species.

Despite variations in response of kenaf leading to death of some plants, the surviving 69% were tolerant at 0.33 kg/ha. Cotton, surprisingly, did not show tolerance at this dose although there was certainly no adverse effect on plant number. Results obtained with groundnut were reduced to one replicate due to erratic germination but there was some indication of resistance at 0.33 kg/ha. Neither soyabean nor jute showed any tolerance to this compound.

Selective pre-emergence control of annual grass weeds specified above was achieved in kenaf at 0.33 kg/ha but <u>Amaranthus retroflexus</u> was only suppressed at this rate.

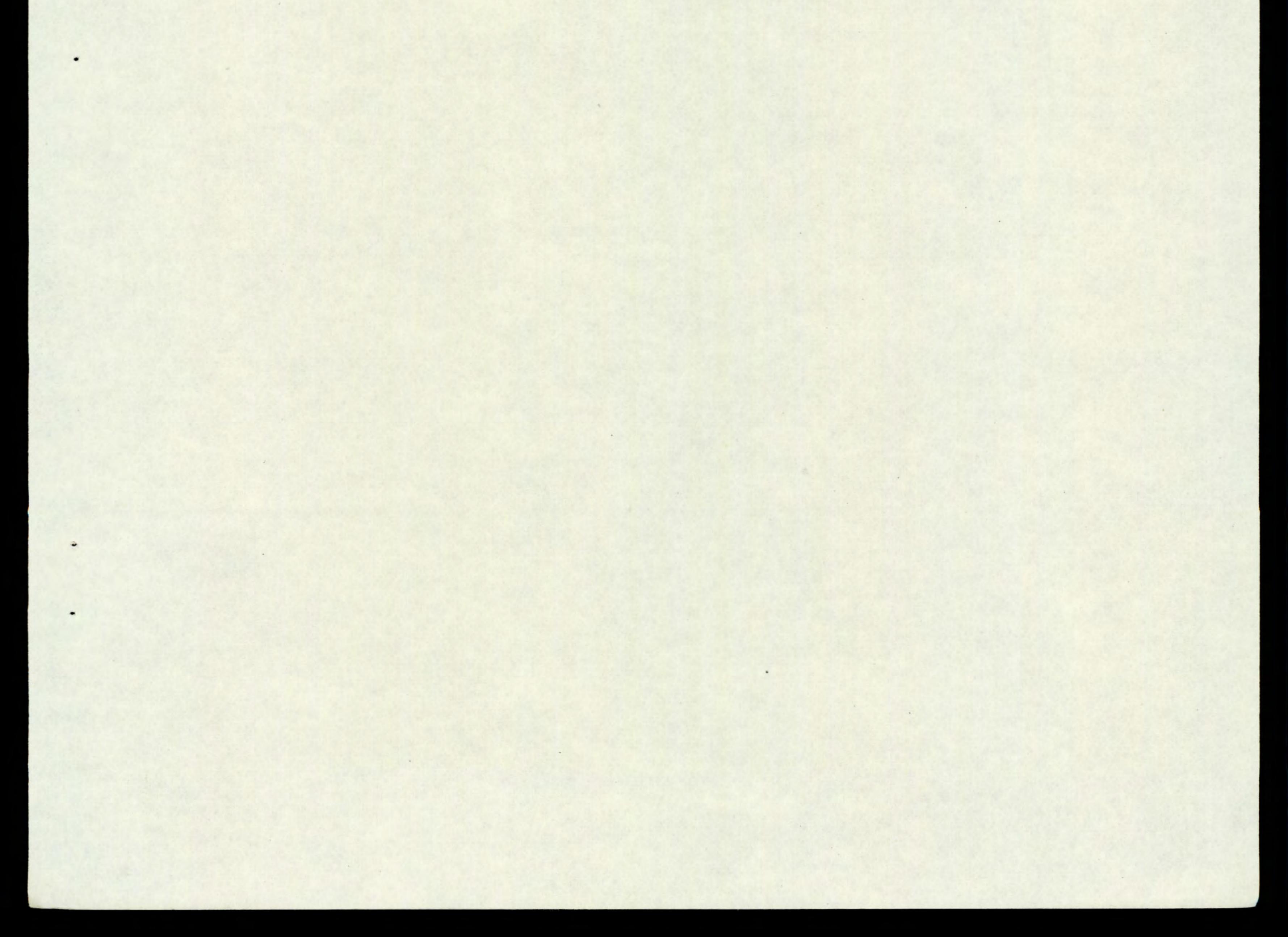
Soil persistence

Using turnip as the sensitive test species regular sampling showed that the compound persisted for at least one year after application. At this time recovery was 22% of control from the 0.33 kg/ha dose, but was less than 2% at 1.00 kg/ha and zero at 3.00 kg/ha, all results based on fresh weights. There was, however, evidence of plant development to the cotyledon stage at the higher rates before death. These results were similar to those for metflurazone but slightly more severe in effect.

- 32 -

Possible uses and further testing

The tolerance observed in carrot was not outstanding and the range of weeds controlled offered no particular advantages over present treatments. Kenaf and particularly cotton exhibited only marginal tolerance of this compound but further testing, especially against Cyperus spp., may be worthwhile. The outstanding length of soil persistence, even at lower doses, could prove to be unacceptable in these situations but could prove a distinct advantage if used as a pre-emergence total herbicide where, in view of the fact that 91% of species tested were controlled at 3.00 kg/ha, further work may be justified.



SPECIES WHEAT 4 BARLEY 2 DAT 3 PER RYGI (4) (8) DWF BEAD (9) FID BEAD (10) W CLOVED (12) KALE (15) SWEDE (17) CARROT (18) LETTUCE (20) SUG BEE (21)

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$\frac{AVE FATU}{(26)}$
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$\frac{POA ANN}{(28)}$
$\frac{\text{SEN VULG}}{(34)}$
$\frac{\text{POL AVIC}}{(36)}$
GAL APAR (38)
$\frac{\text{CHEN ALB}}{(39)}$
STEL MED (40)
$\frac{AG}{47}$
$\frac{ALL VIN}{(49)}$
CIRS ARV (50)
TUS FARE (51)
$\frac{\text{CONV} ARV}{(52)}$
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SAN 9789 0.33 kg/ha

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3 ٠ SPECIES <u>RUM ACET</u> (53) MAIZE (58) SORGHUM (59) RICE (60) GRNDNUT (64) COTTON (66) KENAF (68) ELEU IND (74) ECH CRUS 75 $\frac{ROT EXAL}{(76)}$ DIG SANG (77) AMAR RET (78) CYP ROTU (86)

SAN	9789
0.33	kg/ha

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- 14 XXXX
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SAN 9789 3.00 kg/ha

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SPECIES

OXAL LAT (87)

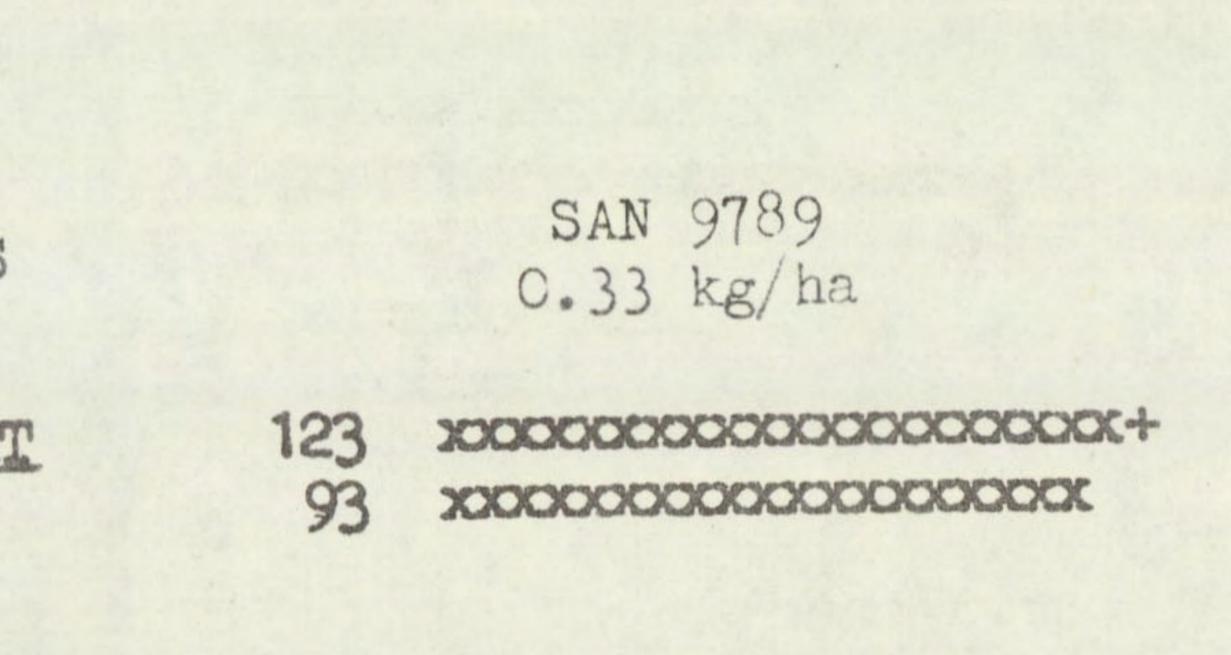
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SAN 9789 1.00 kg/ha

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SAN 9789 3.00 kg/ha

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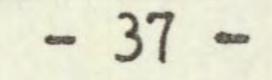
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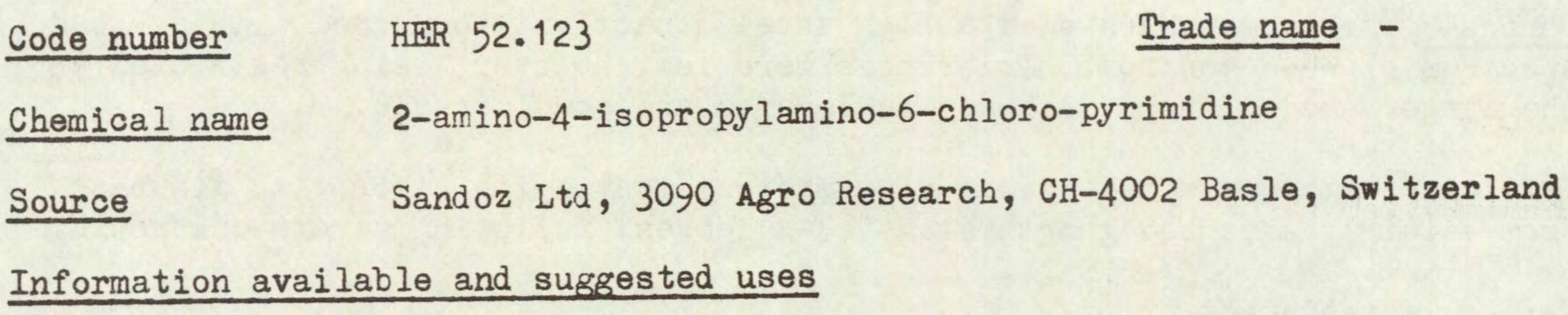
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HER 52.123 (Experiment 2)



Preliminary data sheet coupled with field trials project sheets

received during 1970 suggest pre- and post-emergence activity against a range of mono- and dicotyledonous weed species with promising selectivity in potato.

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

Doses 0.73, 2.22 and 6.66 kg a.i./ha (0.65, 1.98 and 5.95 lb a.i./ac)

Spray volume

384 1/ha (34.2 gal/ac)

RESULTS

.

Table of selectivities

DOSE CROP: vigour reduced by WEEDS: number or vigour kg/ha less than 15% reduced by more than 70%

6.66	none	none listed as no crops tolerant
2.22	dwarf bean field bean maize	Avena fatua Raphanus raphanistrum Tripleurospermum maritimum Galium aparine Agropyron repens Tussilago farfara + species below
0.73	species above + pea sorghum groundnut kenaf	Alopecurus myosuroides <u>Poa annua</u> <u>Sinapis arvensis</u> <u>Senecio vulgaris</u> <u>Polygonum lapathifolium</u> <u>Polygonum aviculare</u> <u>Chenopodium album</u>

Stellaria media Veronica persica Amaranthus retroflexus

Comments on results

<u>General</u> This compound showed a high level of activity combined with a broad spectrum of weed control. Tolerances were few, however, being restricted to the larger-seeded crops such as the legumes and some cereals.

- 38 -

Symptoms Symptoms were typical of a photosynthetic inhibitor with die back from a fairly advanced growth stage (3-4 leaves) following severe chlorosis.

Temperate weeds and crops

Nine weed species were controlled at 0.73 kg/ha and a further six species at 2.22 kg/ha. The wide spectrum of control against both mono- and dicotyledonous weed species was impressive with both annual and perennial species being susceptible. Several of the more important weed families were susceptible e.g. Polygonaceae (notably Polygonum aviculare), Cruciferae and Compositae. Galium aparine and the perennials Agropyron repens and Tussilago farfara were controlled at 2.22 kg/ha. The two latter species were completely killed eventually at this dose.

Temperate crops tolerant to this compound were the large-seeded legumes. Dwarf bean and field bean exhibited no symptoms at 2.22 kg/ha while pea was tolerant to 0.73 kg/ha. White clover was killed at this lower rate and no other crops (cereals or broadleaved) showed any degree of tolerance.

Notable pre-emergence selectivity was achieved against <u>Polygonum</u> <u>aviculare</u> (and <u>P. lapathifolium</u>) in the large-seeded legumes, dwarf bean, field bean and more particularly pea. The perennials <u>Agropyron repens</u> and <u>Tussilago farfara</u> were also selectively controlled in dwarf beans and field bean as was Galium aparine and a range of other grass and broadleaved species.

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Tropical weeds and crops

<u>Amaranthus retroflexus</u> was the only tropical weed controlled at 0.73 kg/ha. The annual grasses, <u>Eleusine indica</u>, <u>Digitaria sanguinalis</u> and <u>Echinochloa crus-galli</u> were all severely suppressed at this rate and killed at 6.66 kg/ha but no results are available for the 2.22 kg/ha dose. However, comparison with similar temperate species suggests that these grasses may well have been controlled at this rate. Of the perennial species <u>Cyperus</u> <u>esculentus</u> was the most susceptible initially but no effect was observed on this species, <u>C. rotundus</u> or <u>Oxalis latifolia</u> three months after treatment at any dose.

Four crops exhibited tolerance, most notably maize at 2.22 kg/ha. This was only moderately reduced in vigour at 6.66 kg/ha while the smaller seeded sorghum was only tolerant at 0.73 kg/ha and rice showed no tolerance. Kenaf tolerated 0.73 kg/ha and was only marginally affected at 2.22 kg/ha. Of the legumes groundnut was the more tolerant (0.73 kg/ha) while soyabean was marginally affected at this dose (vigour reduced 21%).

Amaranthus retroflexus was the only weed selectively controlled in the above crop species. However, there would appear to be some useful suppression of other species at marginal levels of selectivity.

Soil persistence

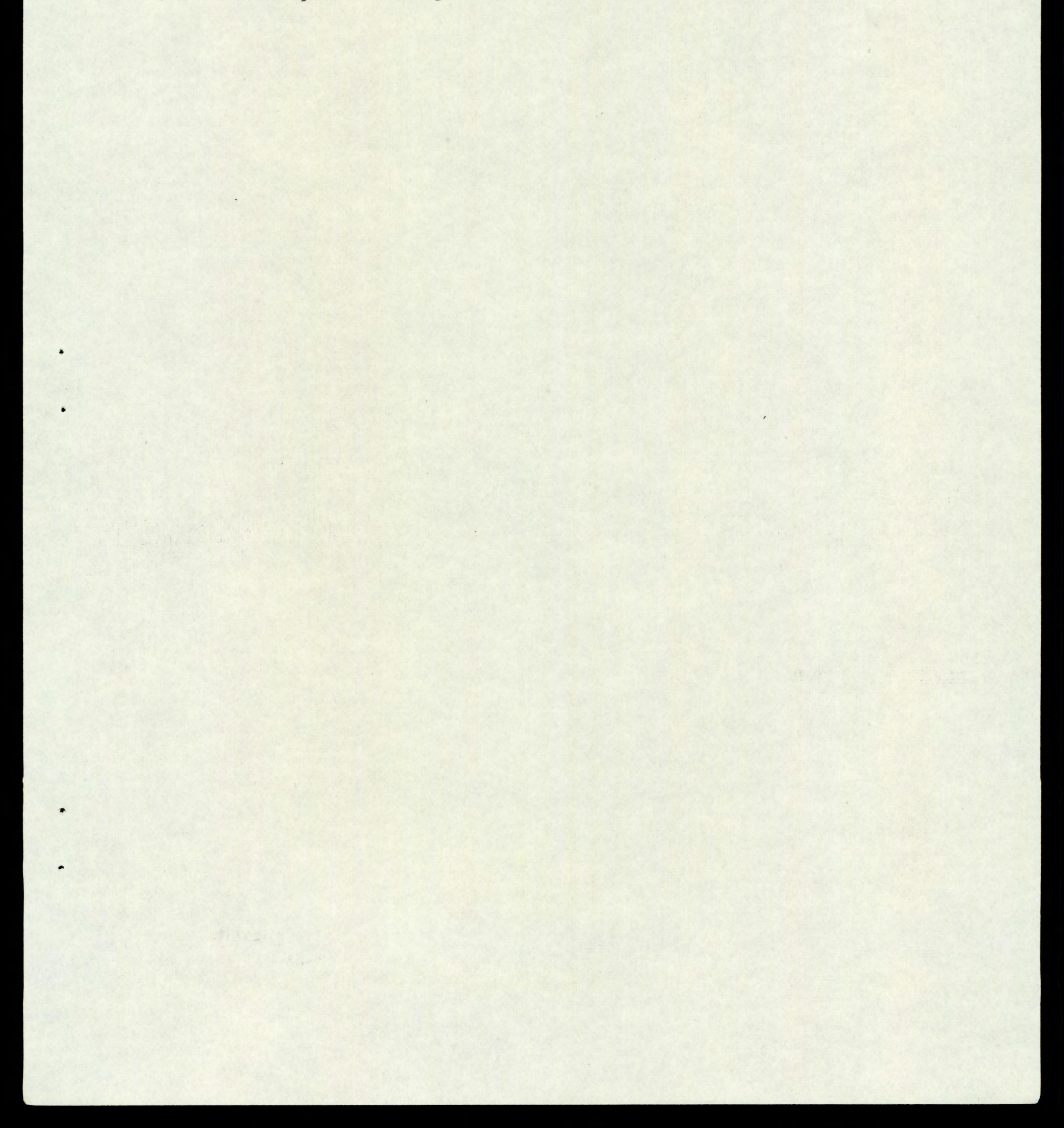
Using turnip as a sensitive test species, residues were undetected 6, 20 and 40 weeks after treatment for the 0.73, 2.22 and 6.66 kg/ha doses

respectively. These results would appear to show a reasonable length of persistence for satisfactory weed control in the most resistant crops without the risk of residue damage to following crops.

- 39 -

Possible uses and further testing

This compound would appear to show some promise as a pre-emergence treatment in both temperate and tropical legumes. Large-seeded tropical cereals also appear to exhibit some degree of tolerance and it may be that control of tropical annual grass weeds may be achieved in these crops.



SPECIES WHEAT (1) BARLEY (2) DAT 3) PER RYGR 4) ONION (8) DWF BEAN 91 FLD BEAN (10) PEA (11) W CLOVER 12) KALE (15) SWEDE (17) CARROT (18) LETTUCE (20)

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HER 52.123 0.73 kg/ha

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HER 52.123 2.22 kg/ha

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HER 52.123 6.66 kg/ha

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NB: BAS 373OH is 4-(4'-fluorophenyl)-2-methyltetrahydro-1,2,4-oxalliazin-3,5-dione (BASF) HER 52.112 is 2-amino-4-isopropylamino-6-chloro-pyrimidine (Sandoz), SAN 9789 is norflurazon, U 27.267 is N,N-dimethyl-2-(3,4,5-tribromopyrazol-1-yl)propionamide (Upjohn)

SUG BEET (21)
AVE FATU (26)
ALO MYOS (27)
POA ANN (28)
<u>SIN ARV</u> (30)
RAPH RAP (31)
TRIP MAR (33)
SEN VULG (34)
$\frac{POL}{35}$
$\frac{\text{POL AVIC}}{(36)}$
GAL APAR (38)
CHEN ALB (39)
STEL MED (40)

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HER 52.123 2.22 kg/ha

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HER 52.123 6.66 kg/ha

- 41 -

SERIES VER PERS (42) $\frac{AG REPEN}{(47)}$ <u>AIL VIN</u> (49) CIRS ARV 50) TUS FARF 51) CONV ARV 52) MAIZE 58, SORGHUM (59) RICE 60 GRNDNUT (64) SOYABEAN (65) COTTON (66) JUTE (67)

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HER 52.123 0.73 kg/ha .

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HER 52.123 6.66 kg/ha

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- 42 -

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SPECIES

KERAP (68) SESAMUM (70) <u>ELEU IND</u> (74) ECH CRUS (75) ROT EXAL (76) DI SANG (77) AMAR RET (78) $\frac{CYP ESCU}{(85)}$ CYP ROTU (86) (87)

HER 52.123 0.73 kg/ha

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2.22 kg/ha 0 0 0 0 0 0 0 0 7 x XXXXXXXXXXXXXXXXX 21 XXXX XXXXXXXXXXXX 0 0 0 0 90 xxxxxxxxxxxxxxxxxxxxx 57 93 106 XXXXXXXXXXXX 100 XXXXXXXXXXXXXXXXXXXXXXX

HER 52.123

HER 52.123 6.66 kg/ha

43

XXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXX

U 27,267 (Experiment 1)

- 44 -

Code numberU 27,267Trade name -Chemical name2,N,N-trimethyl-2-(3,4,5-tribromopyrazol-1-yl) acetamideSourceThe Upjohn Co., Agricultural Division, Kalamazoo,

Information available and suggested uses

Michigan 49001

Technical data sheets from the manufacturer suggested tolerance in groundnut, cotton, sugar beet, tobacco and a range of cereal, vegetable and orchard crops.

Activity has been reported against a range of annual broadleaved and grass species and against perennial species such as <u>Cyperus</u> spp. and <u>Agropyron repens</u>. Members of the Convolvulaceae and some Solanaceae with a few other species have been found to be tolerant.

Formulation used 75% w/w a.i. wettable powder

Doses

0.33, 1.00 and 3.00 kg a.i./ha (0.30, 0.89 and 2.68 lb a.i./ac)

338 1/ha (30.1 gal/ac)

3

RESULTS

Spray volume

Table of selectivities

DOSE kg/ha	CROP: vigour reduced by less than 15%	WEEDS: number or vigour reduced by more than 70%
3.00	none	none listed as no crops tolerant
1.00	groundnut	Eleusine indica Echinochloa crus-galli Rottboellia exaltata Digitaria sanguinalis Avena fatua
		Alopecurus myosuroides Poa annua Senecio vulgaris

Polygonum aviculare + species below

0.33 species above + dwarf bean sugar beet maize sorghum kenaf Rumex acetosella Chenopodium album Stellaria media

NB: BAS 373OH is 4-(4'-fluorophenyl)-2-methyltetrahydro-1,2,4-oxadiazin-3,5-dione (BASF) HER 52.112 is 2-amino-4-isopropylamino-6-chloro-pyrimidine (Sandoz), SAN 9789 is norflurazon, U 27.267 is N,N-dimethyl-2-(3,4,5-tribromopyrazol-1-yl)propionamide (Upjohn)

Comments on results

<u>General</u> This compound was found to be moderately active, controlling a range of broadleaf and grass weed species, the latter exhibiting slightly greater susceptibility. The majority of species controlled were of the small seeded annual types.

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Symptoms At higher rates of application several species failed to emerge while at lower rates, growing points and buds of plants which had emerged were severely inhibited or deformed. Later observation usually showed a marked inhibition of the root systems and symptoms were generally similar to other root inhibitors e.g. chlorfenac and credazine.

Temperate weeds and crops

<u>Stellaria media</u>, <u>Chenopodium album</u> and the perennial <u>Rumex acetosella</u> were the only weeds controlled at 0.33 kg/ha. However, there was useful suppression of several annual weed species including <u>Galium aparine</u> and <u>Polygonum aviculare</u>. Perennial weeds such as <u>Allium vineale</u> and <u>Cirsium</u> <u>arvense</u> were only suppressed at this rate and 3.00 kg/ha was required for control. <u>Tussilago farfara</u> and more notably <u>Convolvulus arvensis</u> were resistant at this rate. <u>Agropyron repens</u> was completely killed at 3.00 kg/ha and initially controlled at 1.00 kg/ha but at the lower rates complete recovery was eventually achieved.

Dwarf bean was tolerant at 0.33 kg/ha and reduced in vigour by only 21% at 1.00 kg/ha. Other temperate legumes and crops were susceptible with the exception of sugar beet where the stand reduction of 21% at 0.33 kg/ha was almost certainly not due to the treatment.

Selectivities observed in dwarf bean and sugar beet were not outstanding although it is interesting to note the selective control of <u>Chenopodium album</u> in the latter.

Tropical weeds and crops

Tropical annual grass species were all controlled at 1.00 kg/ha. <u>Rottboellia exaltata</u> was more resistant and control was only just achieved at this rate. The three remaining species, <u>Digitaria sanguinalis</u>, <u>Echinochloa crus-galli</u> and <u>Eleusine indica</u> were only moderately suppressed at 0.33 kg/ha but useful suppression of <u>Amaranthus retroflexus</u> was observed at this rate. Fresh weight of <u>Cyperus rotundus</u> was still reduced by 50% at 3.00 kg/ha five months after treatment while lower rates had completely recovered. <u>C. esculentus</u> was controlled at 1.00 and 3.00 kg/ha at the initial assessment but further observations were not made and these results are based

on one replicate only. Oxalis latifolia had completely recovered from 3.00 kg/ha five months after treatment.

Among the tropical legumes tested results from soyabean were erratic due to bad germination. At 1.00 and 3.00 kg/ha vigour was reduced by over 50% but no results were obtained at the lower rate. Groundnut was tolerant at 1.00 kg/ha showing only marginal retardation but more severe symptoms were observed at 3.00 kg/ha. Both maize and sorghum were tolerant at 0.33 kg/ha with maize being also marginally tolerant at 1.00 kg/ha where some reduction in root development was apparent. Kenaf showed marginal tolerance at 1.00 kg/ha with more complete tolerance at 0.33 kg/ha but jute exhibited no tolerance at any dose. Although many weed species were suppressed at 0.33 kg/ha no conclusive selectivities were observed in maize, sorghum or kenaf. Selective control of the annual grass species and <u>C. esculentus</u> in groundnut was achieved.

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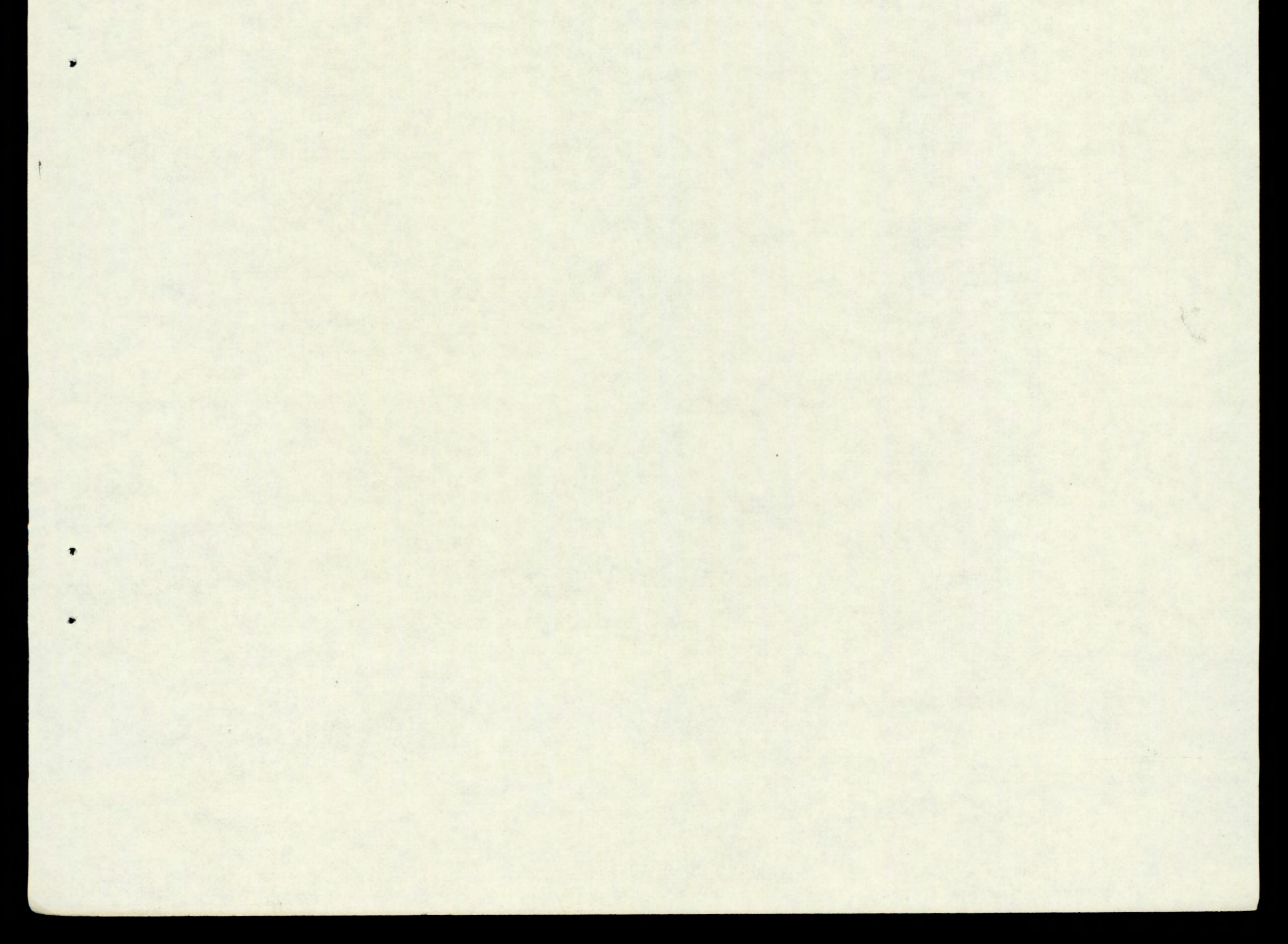
Soil persistence

Using perennial ryegrass as a sensitive test plant a relatively long persistence period was observed at the highest rate of application. Plant fresh weight was only 20% of control 52 weeks after application at 3.00 kg/ha. At 0.33 and 1.00 kg/ha, however, the herbicide was undetected 6 and 13 weeks

after treatment respectively.

Possible uses and further testing

Useful suppression of many weed species was achieved at rates where a range of crops were tolerant. However, levels of selectivity were generally marginal and those observed in dwarf bean and sugar beet did not show any marked advantage over herbicides already used in these crops. Further testing of the compound as a surface application may increase levels of selectivity compared with these incorporated treatments.



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AMAR RET (78)

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NB: BAS 373OH is 4-(4'-fluorophenyl)-2-methyltetrahydro-1,2,4-oxadiazin-3,5-dione (BASF) HER 52.112 is 2-amino-4-isopropylamino-6-chloro-pyrimidine (Sandoz), SAN 9789 is norflurazon, U 27.267 is N,N-dimethyl-2-(3,4,5-tribromopyrazol-1-yl)propionamide (Upjohn)

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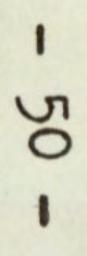
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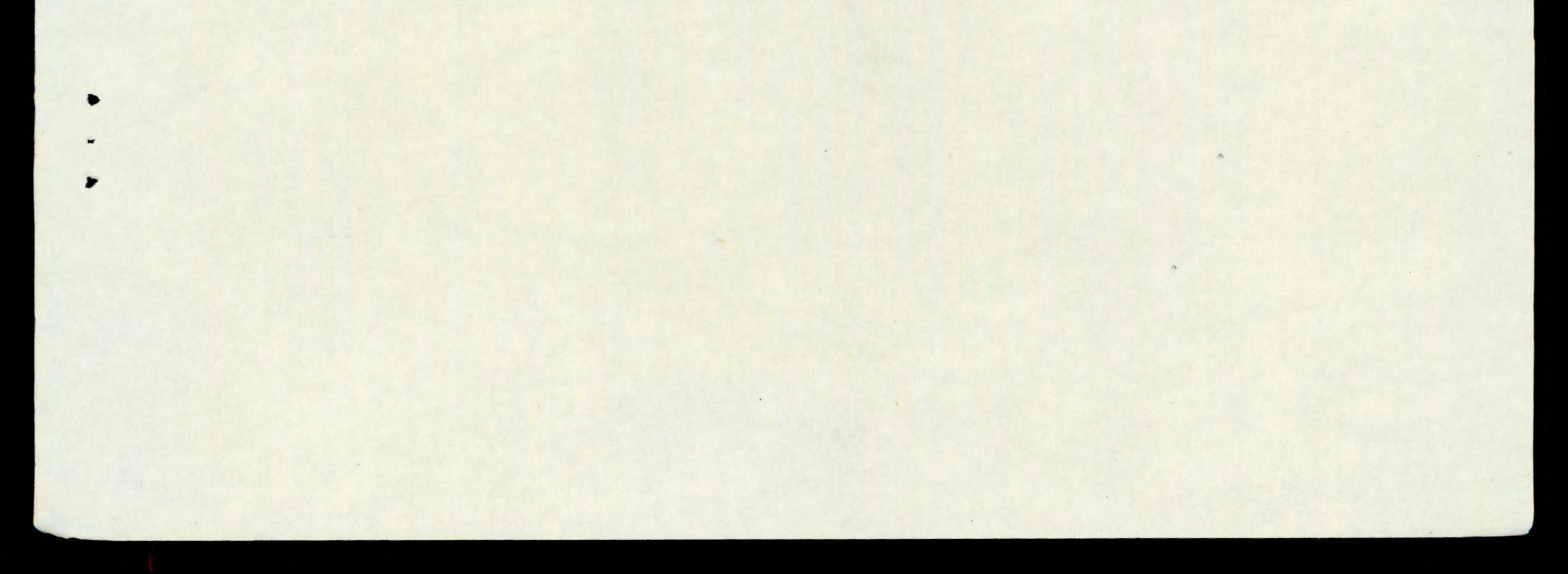
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