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# INSTITUTE OF ARABLE CROPS RESEARCH

## Long Ashton Research Station

## WEED RESEARCH DEPARTMENT

UNIVERSITY OF BRISTOL

# TECHNICAL REPORT No.100

# THE POST-EMERGENCE SELECTIVITY IN WARM-CLIMATE SPECIES OF SOME RECENTLY DEVELOPED HERBICIDES: AC 263499, BAS 514, CGA 131036, DPX L5300 AND DPX A7881.

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl

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CONTENTS



NOTE

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl



# THE POST EMERGENCE SELECTIVITY IN WARM-CLIMATE SPECIES OF SOME RECENTLY DEVELOPED HERBICIDES; AC 263499, BAS 514 00H, CGA 131036, DPX-L5300 AND DPX-A7881

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SUMMARY

Five herbicides were evaluated as overhead post-emergence treatments in a glasshouse pot experiment on 38 crop and weed species of tropical or warm temperate regions. Maize was included in two sets, one of which was treated with a seed dressing of the safener 1,8-naphthalic anhydride (NA). Chromolaena odorata was also included in two sets, one of seedlings and one of more mature plants.

AC 263499 was tolerated by cowpea and pigeon pea at the highest dose of 0.40 kg ai/ha to give a very wide spectrum of weed control which included the perennial weeds Cyperus rotundus, C. esculentus, Oxalis latifolia and Cynodon dactylon. The annual weeds controlled included many grasses, amongst them Rottboellia cochinchinensis, Bromus pectinatus, Phalaris minor and Pennisetum setosum; together with several broad-leaved weeds including Euphorbia heterophylla and Chromolaena odorata. The lowest dose of 0.025 kg ai/ha was tolerated by groundnuts, soyabeans, mungbean and maize + safener to give a good range of weed control.

BAS 514 00H gave very clear cut control of Echinochloa crus-galli at the middle and highest doses of 1.6 and 0.4 kg ai/ha. Several cereal crops, including rice, were tolerant of both these doses giving very useful selectivity in these crops of this difficult annual grass weed.

CGA 131036 controlled a small range of weeds, including Mimosa pigra, Commelina diffusa, Pennisetum setosum and Amaranthus hybridus at the middle and highest doses of 0.05 and 0.01 kg ai/ha. Teff and rice were the only crops tolerant of these doses, with maize + safener tolerant at the middle dose, giving a very limited range of weed control in these crops.

DPX-L5300 controlled very few species at 0.005 to 0.08 kg ai/ha and is of doubtful value as a post-emergence treatment on warm climate species.

DPX-A7881 controlled a broader spectrum of weeds than DPX-L5300, including Amaranthus hybridus and several annual grasses in teff and pigeon pea at 0.04 and 0.16 kg ai/ha, but not Rottboellia cochinchinensis. The control of the annual grasses Bromus pectinatus Phalaris minor and Snowdenia polystachya in teff will be of interest in Ethiopia.

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl



## INTRODUCTION

This report covers the first herbicide evaluation to be conducted by the Tropical Weeds Unit at Long Ashton Research Station in Bristol. The evaluation was set up jointly with the Herbicide Performance Group, and this report of the results continues the series of Technical Reports first published at The Weed Research Organisation, Oxford. The results of the temperate species will be published separately in the same series of reports. The relevant report is West (1987).

The objectives of the work published here are exactly as indicated in previous reports in this series, i.e. to provide a guide to the potential usefulness of new compounds in the crops tested. Owing to the relatively artificial conditions of glasshouse pot experiments it must be emphasized that the results are to be regarded only as a guide, and that further field testing is essential to confirm any of the interesting leads revealed. This report gives post-emergence selectivity data for five new herbicides.

## METHODS AND MATERIALS

Techniques were as described by Richardson and Parker (1977), all herbicides being applied as foliar treatments. Plants were raised in 9 cm diameter plastic pots in a silt loam soil taken from Green Ore on the Mendips near Bristol. Planting dates were staggered so that the majority of the species would reach a pre-determined stage (2-4 leaves) by the time of spraying. All species were raised in the tropical glasshouse. Species were sown as detailed in Appendix 1, each being replicated twice for each treatment and their growth stage at spraying was recorded. Soil and environmental details are given in Table 1. Pre-planting treatments to improve germination included the storage of Cyperus esculentus and Oxalis latifolia tubers at 4°C for two weeks before planting. Pennisetum setosum and Chromolaena odorata were exposed to light during germination under a thin covering of sand.

To protect against soil-borne pathogens, most seeds were pre-treated with thiram. Some seeds had been pre-dressed with unknown compounds.

Maize was the only crop to be included with and without herbicide safener. Before sowing the seeds were shaken with a quantity of technical 1,8-naphthalic anhydride (NA) equivalent to 0.5% of seed weight.

Before spraying, each species was thinned to a constant number per pot.

Herbicides were applied using a laboratory sprayer fitted with an 80015 Spraying system Tee Jet operating at a pressure of 207 kpa (30lb/in$^2$) and moving at 0.54 m/sec 30 cm above the soil. All doses of AC 263499 were applied with 1% Agral 90.

Table 1. Soil and environmental conditions

| | |
|---|---|
| Dates of spraying | 11, 14 and 16.7.86 |
| Main assessment completed | 4 - 8.8.86 |
| Soil: | Mendip silt loam |
| pH | 6.0 |
| Particle analysis | % |
| Coarse sand | 1.8 |
| Medium sand | 3.3 |
| Fine sand | 6.5 |
| Silt | 58.0 |
| Clay content | 30.4 |
| Organic matter | 5.4 |
| Fertiliser added | |
| Vitax Q4 | 3.3 g/l |
| contains | % |
| N | 5.3 |
| P | 7.5 |
| K | 10.0 |
| Mg | 3.0 |
| Fritted trace elements | 0.2 |
| Temperature (°C) | |
| Mean | 24 |
| Maximum | 31 |
| Minimum | 14 |
| Relative humidity (%) | |
| Mean | 68 |
| Maximum | 86 |
| Minimum | 26 |

## Assessment and processing of results

Results were processed as described by Richardson and Dean (1973). Surviving plants were counted and scored for vigour on a 0-7 scale where 0 = dead and 7 = no different from the untreated control.

Pairs of histograms are presented for each treatment, the upper representing the plant survival and the lower the vigour score, both calculated as percentages of the untreated controls. Each 'x' indicates a value of 5%. '+' indicates a value in excess of 100%.

A table of observed selectivities, using the criteria specified, is presented for each herbicide along with comments to highlight salient points.

The perennial species Cyperus spp., Oxalis latifolia and Cynodon dactylon, together with Mimosa pigra Commelina diffusa Chromolaena odorata and Pennisetum setosum were kept for an extra period to observe later effects and/or recovery from injury.

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl



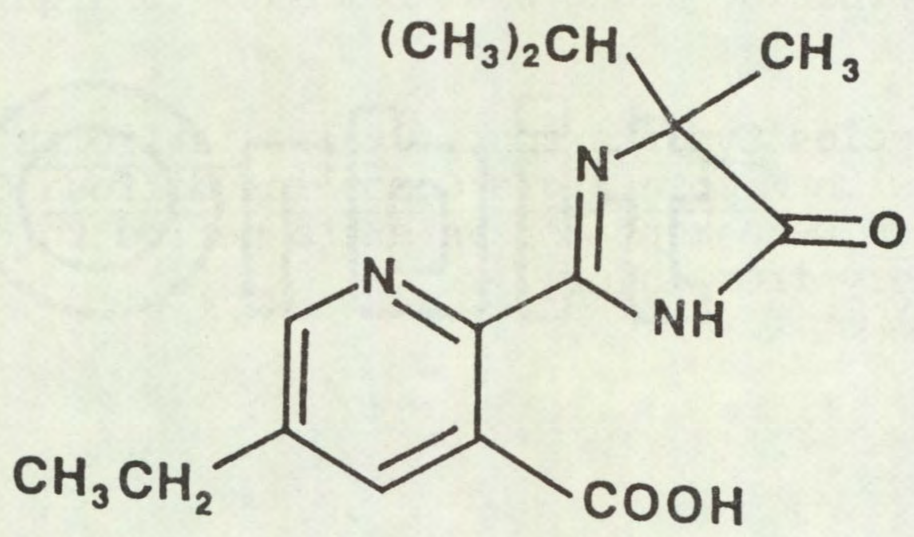
Code number AC 263499
CL 263499

Trade name Pursuit/Pivot

Common name imazethapyr (approved BSI, ISO and ANSI)

Chemical name (RS)-5-ethyl-2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl) nicotinic acid

Structure




Source

Cyanamid International Limited
Fareham Road
Gosport
Hants PO13 OAS, UK.

Information available and suggested uses

Annual grass and broad-leaved control in soyabeans, several other leguminous crops, tobacco, coffee and established tree crops, pre- and/or post-emergence at doses ranging from 0.07 to 0.84 kg a.i./ha.

Formulation used Aqueous concentrate 24.2% ai

Spray volume 312 l/ha

RESULTS

Full results are given in the histograms on pages 9 - 12 and potential selectivities are summarised in the following tables.

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl



AC 263499 POST-EMERGENCE

| Dose (kg ai/ha) | Crops: Vigour reduced by less than 15% | Weeds: Number or vigour reduced by more than 70% |
|---|---|---|
| 0.40 | pigeon pea<br>cowpea | Cyperus esculentus<br>Cyperus rotundus<br>+ species below |
| 0.10 | crops as above | Eleusine indica<br>Rottboellia cochinchinensis<br>Digitaria sanguinalis<br>Oxalis latifolia<br>Cynodon dactylon<br>Chromolaena odorata<br>+ species below |
| 0.025 | crops above +<br>groundnut<br>soyabean<br>mungbean<br>maize + S | Echinochloa crus-galli<br>Amaranthus hybridus<br>Bromus pectinatus<br>Snowdenia polystachya<br>Phalaris minor<br>Euphorbia heterophylla<br>Oryza barthii<br>Pennisetum setosum |

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl



AC 263499 POST-EMERGENCE

COMMENTS ON RESULTS

The large-seeded legumes showed good tolerance of AC 263499 applied as a post-emergence spray. Pigeon pea and cowpea were outstanding and tolerated the top two doses of 0.4 and 0.1 kg ai/ha but the margin of safety for groundnut, soyabean and mungbean was limited to the lowest dose of 0.025 kg ai/ha. However the spectrum of weeds controlled at this dose was good and included the annual grass weeds Snowdenia polystachya Pennisetum setosum Bromus pectinatus and Phalaris minor, as well as the two broad-leaved species, Euphorbia heterophylla and Amaranthus hybridus.

Rottboellia cochinchinensis, one of the most difficult annual grasses to control, was susceptible to the middle dose of 0.10 kg ai/ha together with the two perennial species Cynodon dactylon and Oxalis latifolia. At the top dose of 0.4 kg ai/ha, both perennial sedges Cyperus rotundus and Cyperus esculentus were controlled and there was no recovery 5 months after spraying. Oxalis latifolia although initially controlled at the middle and top doses of 0.025 and 0.10 kg ai/ha was making vigorous regrowth 5 months after spraying. Cynodon dactylon was apparently controlled at the middle and top doses, as there was no regrowth after 5 months.

This compound gave selective control of a broad spectrum of weeds, including several perennial grasses, in large-seeded legumes and deserves further testing in the field.

The smaller-seeded cereals were badly damaged by post-emergence application of this chemical although there was a pronounced safening effect from NA on maize at the lowest dose of 0.025 kg ai/ha, giving good control of some annual grass weeds but not R. cochinchinensis, a major weed of maize in many parts of the world.

Tobacco was fairly sensitive to all three doses, as were cotton, jute, kenaf, sesamum and tomato. Post-emergence applications of AC 263499 gave greater crop safety and controlled a broader spectrum of weeds than pre-emergence applications, notably Cynodon dactylon and Chromolaena odorata at 0.10 kg ai/ha and Pennisetum setosum Oryza barthii and Euphorbia heterophylla at the lowest dose of 0.025 kg ai/ha.

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl

TRIAL NUMBER 1

AC-263499

| SPECIES | 0.025 kg/ha | | 0.100 kg/ha | | 0.400 kg/ha | |
|---|---|---|---|---|---|---|
| MILLET | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 0 | |
| ( 57 ) | 50 | xxxxxxxxxx | 14 | xxx | 0 | |
| MAIZE+S | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 0 | |
| ( 58 ) | 86 | xxxxxxxxxxxxxxxx | 14 | xxx | 0 | |
| MAIZE | 100 | xxxxxxxxxxxxxxxxxxx | 0 | | 0 | |
| ( 59 ) | 14 | xxx | 0 | | 0 | |
| SORGHUM | 0 | | 0 | | 0 | |
| ( 61 ) | 0 | | 0 | | 0 | |
| TOMATO | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 62 ) | 21 | xxxx | 29 | xxxxxx | 7 | x |
| PIGEON P | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 63 ) | 100 | xxxxxxxxxxxxxxxxxxx | 93 | xxxxxxxxxxxxxxxxxx | 93 | xxxxxxxxxxxxxxxxxx |
| COWPEA | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 64 ) | 93 | xxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx |
| CHICKPEA | 90 | xxxxxxxxxxxxxxxxx | 0 | | 0 | |
| ( 65 ) | 71 | xxxxxxxxxxxxxx | 0 | | 0 | |
| GRNDNUT | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 66 ) | 86 | xxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx | 57 | xxxxxxxxxx |
| SOYABEAN | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 67 ) | 86 | xxxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxx |
| COTTON | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 68 ) | 71 | xxxxxxxxxxxxxx | 57 | xxxxxxxxxx | 50 | xxxxxxxxx |
| JUTE | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 69 ) | 43 | xxxxxxxxx | 36 | xxxxxx | 14 | xxx |
| KENAF | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 70 ) | 57 | xxxxxxxxxx | 43 | xxxxxxxxx | 29 | xxxxxx |

TRIAL NUMBER 1

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl

AC-263499

| SPECIES | 0.025 kg/ha | | 0.100 kg/ha | | 0.400 kg/ha | |
|---|---|---|---|---|---|---|
| TOBACCO | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 71 ) | 71 | xxxxxxxxxxxxxx | 50 | xxxxxxxxxx | 43 | xxxxxxxxx |
| SESAMUM | 87 | xxxxxxxxxxxxxxxxx | 0 | | 0 | |
| ( 72 ) | 21 | xxxx | 0 | | 0 | |
| RICE | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 74 ) | 29 | xxxxxx | 29 | xxxxxx | 29 | xxxxxx |
| ELEU IND | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 76 ) | 86 | xxxxxxxxxxxxxxxxx | 29 | xxxxxx | 7 | x |
| ECH CRUS | 92 | xxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 77 ) | 14 | xxx | 14 | xxx | 14 | xxx |
| ROT COCH | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 78 ) | 43 | xxxxxxxxx | 29 | xxxxxx | 21 | xxxx |
| DIG SANG | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 0 | |
| ( 79 ) | 50 | xxxxxxxxxx | 14 | xxx | 0 | |
| AMAR HYB | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 92 | xxxxxxxxxxxxxxxxx |
| ( 80 ) | 21 | xxxx | 14 | xxx | 14 | xxx |
| PORT OLE | 90 | xxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 80 | xxxxxxxxxxxxxxx |
| ( 81 ) | 57 | xxxxxxxxxxx | 43 | xxxxxxxxx | 36 | xxxxxxx |
| BROM PEC | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 0 | |
| ( 84 ) | 29 | xxxxxx | 14 | xxx | 0 | |
| SNO POL | 0 | | 0 | | 0 | |
| ( 85 ) | 0 | | 0 | | 0 | |
| PHAL MIN | 0 | | 0 | | 0 | |
| ( 86 ) | 0 | | 0 | | 0 | |
| CYP ESCU | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 87 ) | 43 | xxxxxxxxx | 36 | xxxxxxx | 29 | xxxxxx |

TRIAL NUMBER 1

AC-263499

| SPECIES | 0.025 kg/ha | | 0.100 kg/ha | | 0.400 kg/ha | |
|---|---|---|---|---|---|---|
| CYP ROTU | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 88 ) | 57 | xxxxxxxxxxx | 36 | xxxxxxx | 29 | xxxxxx |
| OXAL LAT | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 89 ) | 71 | xxxxxxxxxxxxxx | 29 | xxxxxx | 21 | xxxx |
| CYN DACT | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 90 ) | 43 | xxxxxxxxx | 21 | xxxx | 29 | xxxxxx |
| AUBGIN | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 91 ) | 43 | xxxxxxxxx | 21 | xxxx | 14 | xxx |
| LENTIL | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 92 ) | 57 | xxxxxxxxxxx | 50 | xxxxxxxxxx | 43 | xxxxxxxxx |
| MUNGB | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 93 ) | 86 | xxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx |
| TEFF | 100 | xxxxxxxxxxxxxxxxxxx | 94 | xxxxxxxxxxxxxxxxxx | 94 | xxxxxxxxxxxxxxxxxx |
| ( 94 ) | 64 | xxxxxxxxxxxx | 43 | xxxxxxxxx | 29 | xxxxxx |
| COMMEL | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 95 ) | 57 | xxxxxxxxxxx | 43 | xxxxxxxxx | 36 | xxxxxxx |
| EUPHOR | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 96 ) | 29 | xxxxxx | 14 | xxx | 7 | x |
| ORY BATH | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 97 ) | 14 | xxx | 14 | xxx | 7 | x |
| MIM PIG | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 98 ) | 71 | xxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx | 43 | xxxxxxxxx |
| PEN SET | 0 | | 0 | | 0 | |
| ( 99 ) | 0 | | 0 | | 0 | |
| CHROM S | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| (100 ) | 43 | xxxxxxxxx | 29 | xxxxxx | 29 | xxxxxx |

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl

TRIAL NUMBER 1

AC-263499

| SPECIES | | 0.025 kg/ha | | 0.100 kg/ha | | 0.400 kg/ha |
|---|---|---|---|---|---|---|
| CHROM | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| (101 ) | 43 | xxxxxxxxx | 29 | xxxxxx | 29 | xxxxxx |

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl

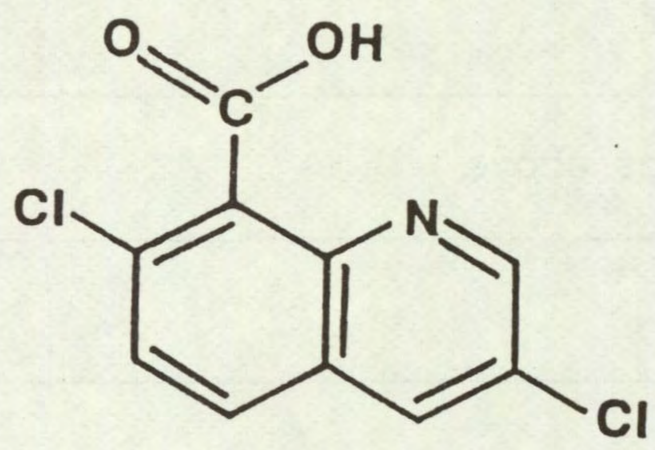


Code number BAS 514 OOH Trade name Facet (proposed)

Common name quinclorac

Chemical name 3,7-dichloro-8-quinoline carboxylic acid

Structure




Source

BASF Aktiengesellschaft
Agricultural Research Station
D-6703 Limburgerhof
APE/IW
W. Germany

Information available and suggested uses

Annual grass, in particular Echinochloa spp., and broad-leaved weed control in rice pre- or post-emergence at doses ranging from 0.15 - 0.75 kg ai/ha. Other uses may include pre- or post-emergence applications at doses ranging from 0.25 - 2.0 kg ai/ha in lawns, oilseed rape, sugar beet and soyabeans for annual grass and broad-leaved weed control

Formulation used Wettable powder 50% ai

Spray volume 312 l/ha

RESULTS

Full results are given in the histograms on pages 16 - 19 and potential selectivities are summarised in the following table.

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl



BAS 514 00H POST-EMERGENCE

| Dose kg ai/ha | Crops: vigour reduced by less than 15% | Weeds: number or vigour reduced by more than 70% |
|---|---|---|
| 1.60 | millet<br>maize + S<br>sorghum<br>rice<br>teff | Digitaria sanguinalis<br>Amaranthus hybridus<br>Euphorbia heterophylla<br>Chromolaena odorata<br>+ species below |
| 0.40 | crops above | Echinochloa crus-galli |
| 0.10 | | no weeds controlled |

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl



BAS 514 00H POST-EMERGENCE

COMMENTS ON RESULTS

BAS 514 00H gave very good control of Echinochloa crus-galli in several of the cereal crops, including rice at the middle dose of 0.4 kg ai/ha. Other annual grass weeds, including Eleusine indica Rottboellia cochinchinensis Bromus pectinatus Phalaris minor and Oryza barthii were very resistant to this dose, as were all the broad-leaf weeds included in the experiment. At the highest dose of 1.60 kg ai/ha, good tolerance of BAS 514 00H was shown by the same cereals as were tolerant of 0.4 kg ai/ha but the spectrum of weeds controlled was widened to include Digitaria sanguinalis and the broad-leaved weeds Amaranthus hybridus, Euphorbia heterophylla and Chromolaena odorata. The perennial weeds Cyperus rotundus, Cyperus esculentus, Cynodon dactylon and Oxalis latifolia were all very resistant to BAS 514 00H.

Jute and sesame, two of the most sensitive broad-leaved crops, were very damaged by even the lowest dose of 0.10 kg ai/ha and the tolerance of the legumes was very variable. Lentils, chickpea and groundnut were damaged by the lowest dose but mungbean, cowpea, pigeon pea and soyabean were less sensitive, especially at the lowest dose of 0.1 kg ai/ha, although no weeds were controlled at this dose.

BAS 514 00H is very specific in its control of Echinochloa crus-galli in cereal crops at 0.4 kg ai/ha. The additional control of Digitaria sanguinalis, another common annual grass weed of rice in S.E. Asia, at the highest dose of 1.6 kg ai/ha suggests this chemical warrants further testing in the field as it could prove a useful addition in herbicide mixtures where these annual grasses are a particular problem.

TRIAL NUMBER 1

BAS-514 00H

| SPECIES | 0.100 kg/ha | | 0.400 kg/ha | | 1.600 kg/ha | |
|---|---|---|---|---|---|---|
| MILLET | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 57 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx |
| MAIZE+S | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 58 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx |
| MAIZE | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 59 ) | 86 | xxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx |
| SORGHUM | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 61 ) | 93 | xxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxxx |
| TOMATO | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 0 | |
| ( 62 ) | 64 | xxxxxxxxxxxxx | 21 | xxxx | 0 | |
| PIGEON P | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 0 | |
| ( 63 ) | 71 | xxxxxxxxxxxxxx | 57 | xxxxxxxxxxx | 0 | |
| COWPEA | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 64 ) | 79 | xxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxx | 7 | x |
| CHICKPEA | 100 | xxxxxxxxxxxxxxxxxxx | 0 | | 0 | |
| ( 65 ) | 50 | xxxxxxxxxx | 0 | | 0 | |
| GRNDNUT | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 66 ) | 57 | xxxxxxxxxxx | 57 | xxxxxxxxxxx | 43 | xxxxxxxxx |
| SOYABEAN | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 67 ) | 100 | xxxxxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxxx | 43 | xxxxxxxxx |
| COTTON | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 68 ) | 79 | xxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxxx |
| JUTE | 100 | xxxxxxxxxxxxxxxxxxx | 0 | | 0 | |
| ( 69 ) | 14 | xxx | 0 | | 0 | |
| KENAF | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 70 ) | 71 | xxxxxxxxxxxxxx | 57 | xxxxxxxxxxx | 43 | xxxxxxxxx |

TRIAL NUMBER 1

BAS-514 00H

| SPECIES | 0.100 kg/ha | | 0.400 kg/ha | | 1.600 kg/ha | |
|---|---|---|---|---|---|---|
| TOBACCO | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 71 ) | 64 | xxxxxxxxxxxxx | 50 | xxxxxxxxxx | 36 | xxxxxxx |
| SESAMUM | 100 | xxxxxxxxxxxxxxxxxxx | 0 | | 0 | |
| ( 72 ) | 43 | xxxxxxxxx | 0 | | 0 | |
| RICE | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 74 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 93 | xxxxxxxxxxxxxxxxxx |
| ELEU IND | 94 | xxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 76 ) | 86 | xxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx |
| ECH CRUS | 100 | xxxxxxxxxxxxxxxxxxx | 83 | xxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 77 ) | 93 | xxxxxxxxxxxxxxxxxx | 14 | xxx | 7 | x |
| ROT COCH | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 78 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx |
| DIG SANG | 100 | xxxxxxxxxxxxxxxxxxx | 75 | xxxxxxxxxxxxxx | 0 | |
| ( 79 ) | 100 | xxxxxxxxxxxxxxxxxxx | 43 | xxxxxxxxx | 0 | |
| AMAR HYB | 100 | xxxxxxxxxxxxxxxxxxx | 108 | xxxxxxxxxxxxxxxxxxx+ | 108 | xxxxxxxxxxxxxxxxxxx+ |
| ( 80 ) | 86 | xxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx | 21 | xxxx |
| PORT OLE | 100 | xxxxxxxxxxxxxxxxxxx | 110 | xxxxxxxxxxxxxxxxxxx+ | 110 | xxxxxxxxxxxxxxxxxxx+ |
| ( 81 ) | 93 | xxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx |
| BROM PEC | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 84 ) | 100 | xxxxxxxxxxxxxxxxxxx | 93 | xxxxxxxxxxxxxxxxxx | 57 | xxxxxxxxxx |
| SNO POL | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxx | 94 | xxxxxxxxxxxxxxxxxx |
| ( 85 ) | 86 | xxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx | 43 | xxxxxxxxx |
| PHAL MIN | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 86 ) | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxxx | 57 | xxxxxxxxxx |
| CYP ESCU | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 87 ) | 100 | xxxxxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxxx |

TRIAL NUMBER 1

BAS-514 00H

| SPECIES | 0.100 kg/ha | | 0.400 kg/ha | | 1.600 kg/ha | |
|---|---|---|---|---|---|---|
| CYP ROTU | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 88 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx |
| OXAL LAT | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 89 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| CYN DACT | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 90 ) | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxx |
| AUBGIN | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 91 ) | 71 | xxxxxxxxxxxxx | 57 | xxxxxxxxxx | 43 | xxxxxxxxx |
| LENTIL | 100 | xxxxxxxxxxxxxxxxxxx | 0 | | 0 | |
| ( 92 ) | 21 | xxxx | 0 | | 0 | |
| MUNGB | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 93 ) | 79 | xxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx | 57 | xxxxxxxxxx |
| TEFF | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 94 ) | 100 | xxxxxxxxxxxxxxxxxxx | 93 | xxxxxxxxxxxxxxxxx | 93 | xxxxxxxxxxxxxxxxx |
| COMMEL | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 95 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx |
| EUPHOR | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 0 | |
| ( 96 ) | 86 | xxxxxxxxxxxxxxxx | 50 | xxxxxxxxxx | 0 | |
| ORY BATH | 92 | xxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 97 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| MIM PIG | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 98 ) | 71 | xxxxxxxxxxxxx | 43 | xxxxxxxxx | 36 | xxxxxxx |
| PEN SET | 100 | xxxxxxxxxxxxxxxxxxx | 50 | xxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 99 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxx |
| CHROM S | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| (100 ) | 57 | xxxxxxxxxxx | 36 | xxxxxxx | 21 | xxxx |

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl

TRIAL NUMBER 1

BAS-514 OOH

| SPECIES | 0.100 kg/ha | | 0.400 kg/ha | | 1.600 kg/ha | |
|---|---|---|---|---|---|---|
| CHROM | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| (101 ) | 64 | xxxxxxxxxxxxx | 50 | xxxxxxxxxx | 36 | xxxxxxx |

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl

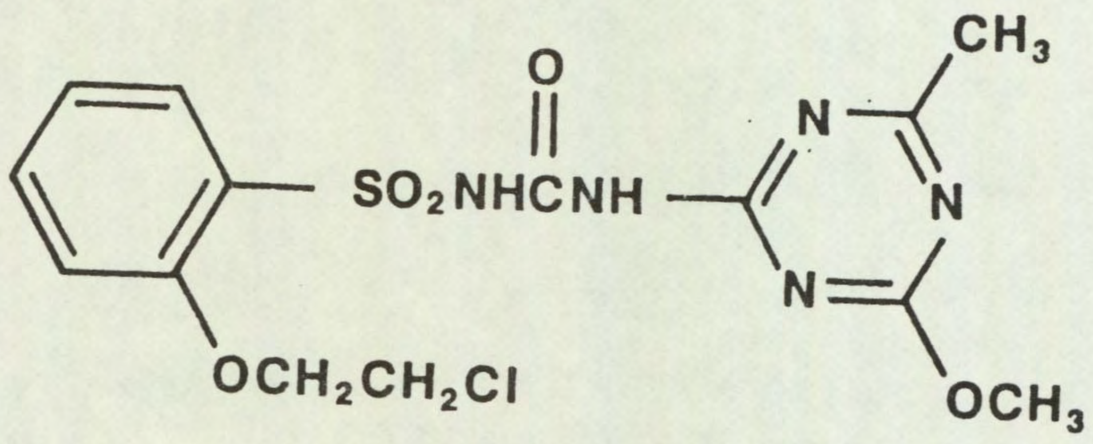


Code number CGA 131036 Trade name Amber/Logran

Common name triasulfuron (approved BSI, proposed ISO)

Chemical name 1-[2-(2-chloroethoxy)phenylsulfonyl]-3-(4-methoxy-6-methyl-1,3,5-triazin-2-yl) urea

Structure




Source

Ciba-Geigy Ltd
Agrochemical Division
Whittlesford
Cambridge CB2 4QT
UK

Information available and suggested uses

Broad-leaved weed control post-emergence in wheat and barley at 5 - 20 g ai/ha.

Formulation used Water dispersible granules 20% ai

Spray volume 312 l/ha

RESULTS

Full results are given in the histograms on pages 23 - 26 and potential selectivities are summarised in the following table.

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl



CGA 131036 POST-EMERGENCE

| Dose kg ai/ha | Crops: vigour reduced by less than 15% | Weeds: number or vigour reduced by more than 70% |
|---|---|---|
| 0.05 | rice<br>teff | Phalaris minor<br>Mimosa pigra<br>+ species below |
| 0.01 | crops above +<br>maize + S | Amaranthus hybridus<br>Commelina diffusa<br>Pennisetum setosum |
| 0.002 | crops above +<br>millet<br>maize<br>pigeon pea | no weeds controlled |

NB: AC 263,499 is imazethapyr, BAS 514 is quinclorac, CGA is 131036 is triasulfuron, DPX L5300 is tribenuron-methyl, DPX A7881 is ethametsulfuron-methyl



## CGA 131036 POST-EMERGENCE

### COMMENTS ON RESULTS

In response to post-emergence applications of CGA 131036, the small-grained cereals were the most tolerant crops with a safening effect of NA on maize at the middle dose of 0.01 kg ai/ha, but the range of weeds controlled was limited.

Rice and teff tolerated the highest dose of 0.05 kg ai/ha and the broad-leaved weeds Mimosa pigra Commelina diffusa and Amaranthus hybridus were controlled at this dose. No weeds were controlled by the lowest dose of 0.002 kg ai/ha although millet, maize without safener and pigeon pea were tolerant of this dose.

The grass weeds were generally resistant to CGA 131036 but this is to be expected with the sulphonyl urea group which usually selectively controls broad-leaved weeds in cereal crops. Phalaris minor and Pennisetum setosum were exceptions and were controlled by the highest and middle doses of 0.05 and 0.10 kg ai/ha.

The selective control of Commelina diffusa in rice and Phalaris minor in teff is of interest and may be worth following up in the field. Further work in pots using safeners on millet, rice, teff and pigeon pea would be valuable to study the possibility of extending the spectrum of weed control in these crops. The control of the difficult weeds Mimosa pigra and Pennisetum setosum is also of interest, as there was no regrowth with either of the doses four months after treatment. There have, however, been problems with persistence in the soil of some sulphonyl urea herbicides and further work may be clearer when this situation in respect to CGA 131036 has been resolved.

TRIAL NUMBER 1

CGA-131036

| SPECIES | | 0.002 kg/ha | | 0.010 kg/ha | | 0.050 kg/ha |
|---|---|---|---|---|---|---|
| MILLET | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 57 ) | 86 | xxxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx |
| MAIZE+S | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 58 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxx |
| MAIZE | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 59 ) | 86 | xxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx |
| SORGHUM | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 61 ) | 71 | xxxxxxxxxxxxxx | 57 | xxxxxxxxxx | 43 | xxxxxxxxx |
| TOMATO | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 62 ) | 57 | xxxxxxxxxx | 43 | xxxxxxxxx | 7 | x |
| PIGEON P | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 63 ) | 93 | xxxxxxxxxxxxxxxxxx | 64 | xxxxxxxxxxxx | 50 | xxxxxxxxxx |
| COWPEA | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 64 ) | 64 | xxxxxxxxxxxx | 43 | xxxxxxxxx | 29 | xxxxxx |
| CHICKPEA | 0 | | 0 | | 0 | |
| ( 65 ) | 0 | | 0 | | 0 | |
| GRNDNUT | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 0 | |
| ( 66 ) | 57 | xxxxxxxxxxx | 29 | xxxxxx | 0 | |
| SOYABEAN | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 67 ) | 57 | xxxxxxxxxxx | 29 | xxxxxx | 29 | xxxxxx |
| COTTON | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 68 ) | 71 | xxxxxxxxxxxxxx | 64 | xxxxxxxxxxxx | 64 | xxxxxxxxxxxxx |
| JUTE | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 69 ) | 79 | xxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxxx | 43 | xxxxxxxxx |
| KENAF | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 70 ) | 71 | xxxxxxxxxxxxxx | 43 | xxxxxxxxx | 14 | xxx |

TRIAL NUMBER 1

CGA-131036

| SPECIES | 0.002 kg/ha | | 0.010 kg/ha | | 0.050 kg/ha | |
|---|---|---|---|---|---|---|
| TOBACCO | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 71 ) | 57 | xxxxxxxxxxx | 50 | xxxxxxxxxx | 36 | xxxxxxx |
| SESAMUM | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 72 ) | 43 | xxxxxxxxx | 29 | xxxxxx | 7 | x |
| RICE | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 74 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxxx |
| ELEU IND | 100 | xxxxxxxxxxxxxxxxxxx | 94 | xxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 76 ) | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 93 | xxxxxxxxxxxxxxxxxx |
| ECH CRUS | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 77 ) | 93 | xxxxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxx | 57 | xxxxxxxxxx |
| ROT COCH | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 78 ) | 86 | xxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx | 64 | xxxxxxxxxxxx |
| DIG SANG | 100 | xxxxxxxxxxxxxxxxxxx | 92 | xxxxxxxxxxxxxxxxx | 92 | xxxxxxxxxxxxxxxxx |
| ( 79 ) | 100 | xxxxxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxx | 57 | xxxxxxxxxx |
| AMAR HYB | 108 | xxxxxxxxxxxxxxxxxxx+ | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 80 ) | 64 | xxxxxxxxxxxxx | 29 | xxxxx | 14 | xxx |
| PORT OLE | 110 | xxxxxxxxxxxxxxxxxxx+ | 110 | xxxxxxxxxxxxxxxxxxx+ | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 81 ) | 86 | xxxxxxxxxxxxxxxx | 57 | xxxxxxxxxx | 43 | xxxxxxxxx |
| BROM PEC | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 84 ) | 100 | xxxxxxxxxxxxxxxxxxx | 93 | xxxxxxxxxxxxxxxxxx | 43 | xxxxxxxxx |
| SNO POL | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 85 ) | 86 | xxxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxxx | 71 | xxxxxxxxxxxxxx |
| PHAL MIN | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 86 ) | 64 | xxxxxxxxxxxxx | 43 | xxxxxxxxx | 21 | xxxx |
| CYP ESCU | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx | 100 | xxxxxxxxxxxxxxxxxxx |
| ( 87 ) | 86 | xxxxxxxxxxxxxxxxx | 86 | xxxxxxxxxxxxxxxxx | 79 | xxxxxxxxxxxxxxxx |



Click here to continue