A1v

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Code: HW 278/P/84
Cat. No: 1525

Title: Plant cane phytotoxicity at Shakaskraal

1. Particulars of the project:

This crop: Plant cane
Site: Shakaskraal
Region: N. Coast Coastal
Soil system: Umzinto Coast Lowlands
Soil form/series: Longlands/ Waldene
Design: Random blocks
Variety: NCo376

| Fertilizer: | N | P | K |
|---|---|---|---|
| Top-dressing | 141 | - | 141 |
| In furrow | 10 | 30 | |
| Total | 151 | 30 | 141 |

Soil analysis: Date: 15.10.84

| pH | O.M.% | CEC | Clay% | Silt% | Sand% |
|---|---|---|---|---|---|
| 5,4 | 1,40 | 3,2 | 14 | 14 | 72 |

ppm

| P | K | Ca | Mg | Zn |
|---|---|---|---|---|
| 20 | 57 | 424 | 109 | 1,2 |

Age: 17,6 months Dates: 10.12.84-27.5.86
Irrigation: Irrigated when needed

Weather condition at spraying

| Date | 10.12.84 | 8.1.85 |
|---|---|---|
| General | Overcast & warm | Overcast & warm |
| Rainfall: On day of spray (m.m.) | 0 | 0 |
| No. days to 1st rain | 2 | 3 |
| No. m.m. at 1st rain | 5,9 | 3,0 |
| Sunshine hrs | 1,0 | 0 |
| Dew | Nil | Nil |
| Wind | very slight | Mild |
| Temperature (°C): 8 a.m. | 22,0 | 22,9 |
| : 2 p.m. | 25,5 | 24,0 |
| Relative humidity (%): 8 a.m. | 70 | 61 |
| : 2 p.m. | 55 | 69 |

2. Objectives:

To evaluate herbicide treatments for their phytotoxic effects on plant cane.

3. Treatments:

3.1 Rates and Timing

| Chemicals | Timing | Rate kg or ℓ prod.ha$^{-1}$ |
|---|---|---|
| 1. Control (unsprayed) | - | - |
| 2. Lasso + atrazine | Pre | 6 + 2 |
| 3. Lasso + diuron | Pre | 6 + 3 |
| 4. Lasso + diuron + paraquat | E-Post | 6 + 3 + 1,5 |
| 5. Mon 097 + diuron | Pre | 3 + 3 |
| 6. Mon 097 + diuron + paraquat | E-Post | 3 + 3 + 1,5 |
| 7. Butisan S + diuron | Pre | 1,7 + 3 |
| 8. Butisan S + diuron + paraquat | E-Post | 1,7 + 3 + 1,5 |

3.2 Active Ingredient and Formulation of Products used

| Product | Active Ingredient | | Formulation |
|---|---|---|---|
| Lasso | alachlor | 384g/ℓ | ec |
| Atrazine | atrazine | 500g/ℓ | sc |
| Diuron | diuron | 800g/ℓ | sc |
| Gramoxone | paraquat | 200g/ℓ | soln |
| Mon 097 | acetochlor | 960g/ℓ | ec |
| Butisan S | metazachlor | 500g/ℓ | sc |

4. Experimental

Plots were 6 rows x 8 m x 1,4 m gross and 4 rows x 6 m x 1,4 m net in size. Six replications were used.

Conditions and application details

| Treatment | Pre-emergent | Post-emergent |
|---|---|---|
| Date | 10.12.84 | 8.1.85 |
| Time | 13:35 - 14:25 | 08:15 - 08:50 |
| Applicator | $CP_3$ | $CP_3$ |
| Nozzle | APM Green floodjet | APM Green floodjet |
| Output | 260 ℓ/ha | 248 ℓ/ha |
| Pressure | 1,8 bars | 1,5 - 2 bars |
| Method | Over planted row | Over cane row |
| Cane growth | Pre-emergence | + 40cm leaf height |
| Stalk length | - | + 10 cm |
| No. leaves/shoot | - | 6 |
| Soil moisture (surface) | Dry | Dry |
| Soil moisture (subsurface) | Dry | Moist |

5. Results

(a) Foliar scorch ratings (% leaf scorch) taken 10 days after the post-emergence treatment.

| Treatments | Rate Prod./ha | % leaf scorch T(post)+10 |
|---|---|---|
| 1. Control (unsprayed) | - | 0 |
| 2. Lasso + atrazine | 6 + 2 | 0 |
| 3. Lasso + diuron | 6 + 3 | 0 |
| 4. Lasso + diuron + paraquat | 6 + 3 + 1,5 | 17 |
| 5. Mon 097 + diuron | 3 + 3 | 0 |
| 6. Mon 097 + diuron + paraquat | 3 + 3 + 1,5 | 18 |
| 7. Butisan S + diuron | 1,7 + 3 | 0 |
| 8. Butisan S + diuron + paraquat | 1,7 + 3 + 1,5 | 18 |

Comments

1. Significant scorch effects occurred, from all paraquat combinations.

(b) Crop measurements taken 1,5; 6 and 13 months after the post-emergence spray application

| Treatments | Rate prod.ha$^{-1}$ | Stalk length (m) | | | Stalk popn ('000/ha) | | |
|---|---|---|---|---|---|---|---|
| | | 1,5 | 6 | 13 | 1,5 | 6 | 13 |
| 1. Control (unsprayed) | - | 0,49 | 0,79 | 1,62 | 188 | 114 | 145 |
| 2. Lasso + atrazine | 6 + 2 | 0,48 | 0,88 | 1,67 | 208 | 127 | 151 |
| 3. Lasso + diuron | 6 + 3 | 0,50 | 0,91 | 1,66 | 209 | 133 | 149 |
| 4. Lasso + diuron + paraquat | 6 + 3 + 1,5 | 0,40 | 0,80 | 1,61 | 183 | 123 | 144 |
| 5. Mon 097 + diuron | 3 + 3 | 0,49 | 0,90 | 1,64 | 204 | 119 | 149 |
| 6. Mon 097 + diuron + paraquat | 3 + 3 + 1,5 | 0,38 | 0,80 | 1,64 | 197 | 127 | 160 |
| 7. Butisan S + diuron | 1,7 + 3 | 0,50 | 0,85 | 1,63 | 206 | 125 | 145 |
| 8. Butisan S + diuron + paraquat | 1,7 + 3 + 1,5 | 0,39 | 0,79 | 1,60 | 190 | 125 | 157 |

Comments

1. Stalk length

All paraquat treatments caused a reduction in stalk length initially. Within 6 months, these effects had disappeared.

2. Stalk population

Stalk populations were increased by all pre-emergence treatments at 1,5 months after the last treatment was applied, but no evidence of this effect was present at 13 months after the post-emergence treatments.

A similar trend was apparent from post-emergence treatments from 6 to 13 months after treatment. This effect had disappeared by the time of harvest.

(c) Yield and crop charasteristics at harvest

| Treatments | Rate prod/ha | Yield | | | Crop measurement | |
|---|---|---|---|---|---|---|
| | | Cane t/ha | Sucrose % cane | Sucrose t/ha | Stalk length (m) | Stalk Pop= (1000/ha |
| 1. Control (unsprayed) | - | 75 | 12,67 | 9,5 | 1,94 | 139 |
| 2. Lasso + atrazine | 6 + 2 | 78 | 12,90 | 10,1 | 1,99 | 144 |
| 3. Lasso + diuron | 6 + 3 | 78 | 13,15 | 10,2 | 1,97 | 141 |
| 4. Lasso + diuron + paraquat | 6 + 3 + 1,5 | 74 | 12,82 | 9,5 | 1,91 | 143 |
| 5. Mon 097 + diuron | 3 + 3 | 76 | 12,71 | 9,6 | 1,95 | 140 |
| 6. Mon 097 + diuron + paraquat | 3 + 3 + 1,5 | 78 | 13,06 | 10,2 | 1,95 | 148 |
| 7. Butisan S + diuron | 1,7 + 3 | 73 | 12,84 | 9,4 | 1,91 | 135 |
| 8. Butisan S + diuron + paraquat | 1,7 + 3 + 1,5 | 72 | 13,57 | 9,8 | 1,92 | 136 |
| C.V.% | | 8,6 | 3,5 | 8,7 | 3,6 | 6,1 |
| LSD (0,01) | | 10,18 | 0,72 | 1,34 | 10,94 | 13,44 |
| LSD (0,05) | | 7,58 | 0,53 | 0,99 | 8,15 | 10,02 |
| SE D | | 3,73 | 0,26 | 0,49 | 4,02 | 4,93 |

Comments

Crop measurements

No effect was apparent on stalk length and stalk population at harvest, although the two Butisan treatments were the only treatments to have a stalk population slightly less than that of control plots.

Yield

No treatment caused significant effects on yield.

6. Conclusions

In spite of early phytotoxic effects from paraquat treatments, there was no apparent yield reduction at harvest.

GW/SN
1 September 1986