SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Code: HW 240/82/P

Cat. No.: 1409

TITLE: Phytotoxicity trial. Plant cane post-emergence.

1. Particulars of the project

This crop: Plant cane
Site : Pongola F. Stn.
Region: Northern Area
Soil system: Komatipoort
Soil form/series: Hutton/Shorrocks
Design: Random blocks
Variety: NCo 376

| Fertilizer: | N | P | K |
|---|---|---|---|
| In furrow : | 27 | 85 | - |
| Top-dressing | 92 | | 92 |
| Total | 119 | 85 | 92 |

Soil analysis: Date: 8.10.82

| pH | OM% | Clay% | P:D.I. |
|---|---|---|---|
| 6,5 | - | >30 | |

ppm

| P | K | Ca | Mg | Zn | Al |
|---|---|---|---|---|---|
| 13 | 140 | 770 | >220 | 0,76 | |

Age: 11,4 mths Dates: 4.10.82-15.9.83

Rainfall: 411 mm L.T.M.: 593 mm

Irrigation: 854 mm

Total 1 265 mm

No. days TAM <0 = 17

2. Objectives: To test herbicides for their effect on plant cane.

3. Treatments:

| | Chemicals | Rate in kg or ℓ ae or ai/ha | Rate in kg or ℓ prod/ha |
|---|---|---|---|
| 1. | Control (unsprayed) | - | - |
| 2. | Lasso + ametryne (pre-emergence) | 3,84 + 3,0 | 10 + 6 |
| 3. | Dual + Gardomil (pre-emergence) | 2,52 + 6,0 | 3,5 + 12,0 |
| 4. | Diuron + Sencor (post-emergence) | 3,2 + 2,8 | 4 + 4 |
| 5. | Diuron + Sencor + Actril DS " | 6 + 1,4 + 0,7 | 2 + 2 + 1 |
| 6. | Diuron + Sencor + Actril DS " | 3,2 + 2,8 + 1,4 | 4 + 4 + 2 |
| 7. | Diuron + Sencor + paraquat " | 1,6 + 1,4 + 0,2 | 2 + 2 + 1 |
| 8. | Diuron + Sencor + paraquat " | 3,2 + 2,8 + 0,4 | 4 + 4 + 2 |

## 4. Experimental

Cane was chopped and dipped in Benlate before planting. Plot size was six rows eight metres long and with a 1,4 m spacing. Two outer rows and one metre from each end of each row were disregarded for measurement of crop growth and yield.

Herbicide treatments were applied by lever-operated knapsack sprayer fitted with a green Albuz APM floodjet nozzle. Output was 253 ℓ/ha. Pre-emergence treatments were applied two days after planting and post-emergence treatments 42 days after planting. These were applied directly over the cane rows. Details of weather conditions at spraying are:-

| | | 6.10.82 (pre-emergence) | 17.11.82 (post-emergence |
|---|---|---|---|
| Temperature (°C) | 8 am : | 20,8 | 19,4 |
| | 2 pm : | 33,6 | 25,0 |
| Rel. humidity (%) | 8 am : | 77 | 79 |
| | 2 pm : | 25 | 51 |
| Sunshine hours | : | 10 | 5,9 |
| Rainfall (mm) | : | 0 | 0 |
| Days to first rain | : | 3 | 2 |
| Amount of first rain | : | 1,0 | 1,0 |

Plots which did not receive a pre-emergence herbicide treatment were sprayed with paraquat before the cane germinated to control all emerging weeds.

Crop growth stage at application of post-emergence treatments was:

| | |
|---|---|
| Leaf height | 28 cm |
| Stalk height | 8 cm |
| Leaves per shoot | 4 |

Visual ratings of leaf scorch were made soon after spraying and crop growth measurements taken regularly throughout the crop growth period.

Results:

1. Visual ratings of leaf scorch and stunting taken 9 days after spraying post-emergence treatments are presented in Table 1.

2. Crop growth measurements taken prior to post-emergence treatment spraying and two and four months after spraying (3,5 and 5,5 months of age) are also presented in Table 1.

3. Field data at harvest are presented in Table 2.

Table 1. Visual ratings of leaf scorch and stunting and crop growth measurements

| Treatments (X1 or X2 of standard rate) | | Leaf scorch % T + 9D Chl | Leaf scorch % T + 9D Nec | Stalk length (m) T-1D | Stalk length (m) T+2m | Stalk length (m) T+4m | Stalk popln(1000/ha) T-1D | Stalk popln(1000/ha) T + 2m | Stalk popln(1000/ha) T + 4m |
|---|---|---|---|---|---|---|---|---|---|
| Unsprayed control | | 1,2 | 0,8 | 0,18 | 0,40 | 1,44 | 44 | 179 | 148 |
| Lasso + ametryne | Pre- | 0,5 | 0 | 0,20 | 0,39 | 1,37 | 44 | 194 | 158 |
| Dual + Gardomil | Pre- | 2,2 | 2,8 | 0,17 | 0,38 | 1,35 | 43 | 175 | 143 |
| Diuron + Sencor | Post- | 11,2 | 1,5 | 0,17 | 0,36 | 1,32 | 40 | 177 | 151 |
| Diuron + Sencor + Actril DS X1 | Post- | 9,8 | 3,3 | 0,18 | 0,34 | 1,32 | 49 | 185 | 150 |
| Diuron + Sencor + Actril DS X2 | Post- | 13,5 | 7,7 | 0,16 | 0,35 | 1,29 | 55 | 181 | 150 |
| Diuron + Sencor + paraquat X1 | Post- | 6,3 | 20 | 0,18 | 0,37 | 1,32 | 46 | 185 | 151 |
| Diuron + Sencor + paraquat X2 | Post- | 8,2 | 23 | 0,17 | 0,30 | 1,22 | 45 | 190 | 154 |

N.B. T + 9D = 9 days after treatment
T + 2m = 2 months after treatment
T-1D = 1 day before treatment
Chl = Chlorosis
Nec = Necrosis

Table 2. Yield and crop measurements at harvest

| Treatments | | Yield: Cane t/ha | Yield: Sucrose % cane | Yield: Sucrose t/ha | Stalk length (m) | Stalk popln (1000/ha) |
|---|---|---|---|---|---|---|
| Control (unsprayed) | | 139,7 | 11,20 | 15,6 | 2,66 | 153 |
| Lasso + ametryne | X2 | 137,4 | 11,55 | 15,9 | 2,67 | 156 |
| Dual + Gardomil | X2 | 130,2* | 11,29 | 14,7 | 2,68 | 146 |
| Diuron + Sencor | X2 | 133,4 | 11,19 | 14,9 | 2,69 | 144 |
| Diuron + Sencor + Actril DS | X1 | 134,0 | 10,84 | 14,5 | 2,64 | 149 |
| Diuron + Sencor + Actril DS | X2 | 137,0 | 11,11 | 15,2 | 2,67 | 147 |
| Diuron + Sencor + paraquat | X1 | 134,7 | 11,23 | 15,1 | 2,68 | 158 |
| Diuron + Sencor + paraquat | X2 | 129,3** | 11,27 | 14,6 | 2,46** | 150 |
| C.V.% | | 4,8 | 4,3 | 6,9 | 4,1 | 8,5 |
| L.S.D. (0,05) * | | 7,592 | 0,5687 | 1,217 | 0,1280 | 15,0 |
| L.S.D. (0,01) ** | | 10,19 | 0,7630 | 1,632 | 0,1718 | 20,13 |

Comments:

Visual ratings

1. Only treatments with Actril DS or paraquat added caused leaf necrosis and paraquat was far worse than Actril DS.

2. Chlorosis was similar for all post-emergence treatments including diuron + Sencor which was applied at twice recommended rates.

Measurements:

1. All treatments appeared to cause slight stunting of cane even after four months. Post-emergence treatments were worse than pre-emergence treatments and the treatment with paraquat at double rates was markedly worse than all others.

2. Stalk populations during crop growth showed little variation except that Dual + Gardomil plots had slightly lower populations and Lasso + ametryne plots slightly higher populations than unsprayed control.

Yield data at harvest

Cane (t/ha)

1. Dual + Gardomil and diuron + Sencor + paraquat (X2) caused statistically significant yield reductions due to fewer stalks from the former and shorter stalks from the latter treatments. Population differences were not statistically significant but stalk length reduction did reach a level of statistical significance (1%).

PETT/SN
30 March 1984