

**SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION**

Cat No : 1815
Project No.. 3889
Code No : HW 395/90/P

Title: Phytotoxicity of certain pre-emergence herbicides on N14 established as transplants.

1. Particulars of project

<p>This crop : Plant Site : Pongola Block 314 Region : Northern area Soil System : Komatipoort Soil form/series : Hutton/Shorrockes Design : Randomised block Variety : N14 Fertilizer (kg/ha):</p> <table style="margin-left: 20px;"> <tr> <td></td> <td style="text-align: center;">N</td> <td style="text-align: center;">P</td> <td style="text-align: center;">K</td> </tr> <tr> <td>At planting</td> <td style="text-align: center;">-</td> <td style="text-align: center;">42</td> <td style="text-align: center;">-</td> </tr> <tr> <td>Top dress</td> <td style="text-align: center;">155</td> <td style="text-align: center;">31</td> <td style="text-align: center;">155</td> </tr> <tr> <td>TOTAL</td> <td style="text-align: center;">155</td> <td style="text-align: center;">73</td> <td style="text-align: center;">155</td> </tr> </table>		N	P	K	At planting	-	42	-	Top dress	155	31	155	TOTAL	155	73	155	<p>Soil analysis No samples taken</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">pH</th> <th style="text-align: left;">O.M.%</th> <th style="text-align: left;">Clay%</th> <th style="text-align: left;">P.D.I.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">>30</td> <td style="text-align: center;">-</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="6" style="text-align: center;">ppm</th> </tr> <tr> <th style="text-align: left;">P</th> <th style="text-align: left;">K</th> <th style="text-align: left;">Ca</th> <th style="text-align: left;">Mg</th> <th style="text-align: left;">Zn</th> <th style="text-align: left;">Al</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> </tbody> </table> <p>Age : 12,3 months Dates : 4/10/90 - 15/10/91 Rainfall : 859 mm Irrigation : 915 mm Total : 1774 mm</p>	pH	O.M.%	Clay%	P.D.I.	-	-	>30	-	ppm						P	K	Ca	Mg	Zn	Al	-	-	-	-	-	-
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2. Objectives:

To assess the phytotoxicity of some pre-emergence herbicides when applied to N14 transplants at the stage of planting out into the field.

3. Treatments:

	<u>Rates (1 product/ha)</u>
T1 Control	Handweeded
T2 Lasso + atrazine	5 + 2
T3 Lasso + atrazine	10 + 4
T4 Sencor + diuron	3 + 2
T5 Sencor + diuron	6 + 4
T6 Hammer + Harness + atrazine	1 + 2 + 3,25
T7 Hammer + Harness + atrazine	2 + 4 + 6,5
T8 ICIA 0179	1

NOTE: All transplants were trimmed back prior to planting.

4. Design:

Design : Randomised block
No. replications : 5
Whole plot size : 6 rows x 8 m x 1,4 m = 67,2 m²
Net plot size : 4 rows x 6 m x 1,4 m = 33,6 m²
Row spacing : 1,4 m (0,75 cm between transplants in the row)

5. Chemical formulations used:

<u>Product</u>	<u>Formulation</u>	<u>Active ingredient</u>
Sencor	480 g/l (SC)	metribuzin
Diuron	800 g/l (SC)	diuron
Lasso	348 g/l (EC)	alachlor
Atrazine	500 g/l (SC)	atrazine
Hammer	100 g/l	imazethapyr
Harness	900 g/l (EC)	acetochlor
ICIA 0179	500 g/l	(coded product)

6. Application details:

Treatment date : 4/10/90
Time : 4.10 - 5.30 pm
Applicator : CP3
Nozzle : APM (Green)
Pressure : 150 kPa
Output : 37,96 ml/sec
Output : 27,12 ml/m²
Method : Over the row

7. Weather conditions:

Treatment date : 4/10/90
General : Overcast
Dew : Nil
Soil surface : Dry
Wind : Gusty
Sunshine hours : 3,8
Temperature (°C)
 08h00 : 16,8
 14h00 : 23,0
Relative humidity (%)
 08h00 : 86
 14h00 : 55
Rainfall (mm)
 On day of spray : Nil
 No. days to first rain : 1
 At first rain : 0,8
 In first 14 days : 46,7
 Total for duration of trial : 859

8. Results:

Table 1: Visual ratings of percentage leaf scorch and stunting (where 1 = very poor and 5 = no stunting) recorded at 23 days after spraying

Treatment	Rate (l product/ha)	% leaf scorch	Stunting
T1 Control	Handweeded	2	4,8
T2 Lasso + atrazine	5 + 2	3	4,9
T3 Lasso + atrazine	10 + 4	3	4,4
T4 Sencor + diuron	3 + 2	4	4,2
T5 Sencor + diuron	6 + 4	6	3,6
T6 Hammer + Harness + atrazine	1 + 2 + 3,25	7	4,1
T7 Hammer + Harness + atrazine	2 + 4 + 6,5	10	2,7
T8 ICIA 0179	1	3	4,4

Table 2: Treatment effects on stalk heights (cm to TVD) and populations at 57 and 137 days after spraying and at harvest

Treatment	Rate (l product/ha)	Stalk heights (cm to TVD)			Populations (* 1000/ha)	
		57	137	Har	57	137
T1 Control	Handweeded	15	116	245	40	102
T2 Lasso + atrazine	5 + 2	15	113	236	33	117
T3 Lasso + atrazine	10 + 4	15	102	237	32	100
T4 Sencor + diuron	3 + 2	13	102	242	36	105
T5 Sencor + diuron	6 + 4	11	109	240	32	105
T6 Hammer + Harness + atrazine	1 + 2 + 3,25	13	111	233	39	118
T7 Hammer + Harness + atrazine	2 + 4 + 6,5	12	100	231	26	104
T8 ICIA 0179	1	13	111	231	21	108

(TVD = top visible dewlap)

Table 3: Treatment effects on cane yield (tons/ha) sucrose % cane and sucrose yield (tons/ha)

Treatment	Rate (l product/ha)	Cane (t/ha)	Sample g/st *	Suc % cane	Suc (t/ha)
T1 Control	Handweeded	140	1395	12,4	17,3
T2 Lasso + atrazine	5 + 2	137	1427	12,9	17,8
T3 Lasso + atrazine	10 + 4	136	1322	11,7	15,8
T4 Sencor + diuron	3 + 2	136	1411	12,4	16,8
T5 Sencor + diuron	6 + 4	133	1427	12,1	16,0
T6 Hammer + Harness + atrazine	1 + 2 + 3,25	141	1417	12,5	17,6
T7 Hammer + Harness + atrazine	2 + 4 + 6,5	140	1492	11,4	15,9
T8 ICIA 0179	1	140	1388	12,2	17,1
CV %		7,2	7,8	7,7	11,2
Standard error - Treatment means ±		4,5	49,3	0,4	0,8
LSD (0,05)		13	143	1,2	2,4
LSD (0,01)		17	193	1,6	3,3

* = mass (g) per stalk

9. Comments

All treatments other than the coded product were tested at the recommended and twice the recommended rate. Third leaf analysis showed all nutrients to be adequate with very slight differences between treatments.

Lasso + atrazine

The two rates of this mixture resulted in some growth suppression (Table 2) which was not severe enough to influence yields significantly at harvest (Table 3). The high rate of this mixture suppressed cane quality (NS) which resulted in a sucrose yield depression that approached significance.

Sencor + diuron

Notable leaf scorch and stunting was recorded for the higher rate of this mixture three weeks after spraying. At eight weeks after spraying stalk height measurements were still reduced at the higher rate but this was temporary as growth was normal by the time the crop was harvested. In spite of higher stalk masses for this treatment, cane yield appeared to have been slightly depressed at this rate [(NS) Table 3].

Hammer + Harness + atrazine

Leaf scorch at the recommended rate and leaf scorch and stunting at the higher rate were above average for this mixture. The reduction in growth persisted but this was offset by an improvement in stalk mass (NS) which resulted in cane yields being similar to the unsprayed control at harvest. The higher rate of the mixture may have influenced cane quality negatively but the reduction was not statistically significant (Table 3).

ICIA 0179)

Cane treated with this product did not display obvious visual foliar phytotoxicity symptoms. However, stalk populations appeared to have been suppressed initially and growth stunted up until harvest. Although individual stalk masses were slightly less than the control, both cane and sucrose yields were similar to that of the unsprayed treatment.

10. Conclusion

The trial has once again confirmed the resistance of cane transplants to standard rates of herbicide when spraying is conducted at the planting out stage. This included highly phytotoxic products applied directly over the foliage of sensitive varieties such as N14.