

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Code No : HW 376/89/P
Cat No : 1739

Title : Phytotoxicity of new pre-emergent herbicides on plant N14

1. Particulars of the project

This crop : Plant
Site : Pongola Farm
Block 322
Region : Northern area
Soil system : Komatipoort
Soil form/series: Hutton/Shorrocks
Design : Randomised block
Variety : N14
Fertilizer (kg/ha) **N** **P** **K**
 99 61 -

Soil analysis						Date: 04/08/1989
pH	OM %	Clay %	PDI			
6,3	-	< 29	-			
ppm						
P	K	Ca	Mg	Zn	Al	
69	198	763	300	-	-	
Age		: 12,2 months				
Dates		: 2/10/89 - 9/10/90				
Rainfall		: 870 mm				
Irrigation:		305 mm				
Total		: 1175 mm				

2. Objective: To assess the tolerance of N14 to new pre-emergent herbicides.

3. Treatments:

Product	Rates (Kg or ℓ product/ha)
T1 Control	Handweeded
T2 Sencor + diuron	3 + 2
T3 Sencor + diuron	6 + 4
T4 Pivot + Harness + atrazine	1,5 + 2,8 + 4
T5 Pivot + Harness + atrazine	3 + 5,6 + 8
T6 ICIA 0179	1
T7 ICIA 0179	1,2
T8 ICIA 0179	2

4. Chemical formulations used

Product	Formulation	Active ingredients
Sencor	480 g/ℓ (sc)	metribuzin
Diuron	800 g/ℓ (sc)	diuron
Pivot	100 g/ℓ	imazathapyr
Harness	900 g/ℓ (ec)	acetochlor
Atrazine	500 g/ℓ (sc)	atrazine
ICIA 0179	500 g/ℓ	-

5. Design

Design	: Randomised block
Replication	: 6
Whole plot size	: 6 rows x 8m x 1,4m = 67,2 m ²
Net plot size	: 4 rows + 6m x 1,4m = 33,6 m ²
Row spacing	: 1,4m

6. Application details

Treatment date	: 4/10/1989
Time of application	: 3.10 pm - 5.20 pm
Applicator	: CP3
Nozzle	: APM (green)
Pressure	: 150 kPa
Method	: Over the row
Cane growth stage	: Pre-emergence

7. Weather conditions at time of spraying

General	: Clear
Dew	: Nil
Soil surface	: Damp
Wind	: Gusty (from north)
Sunshine hours	: 10,5
Temperature (°C)	
08h00	: 18,4
14h00	: 25,6
Relative humidity (%)	
08h00	: 62
14h00	: 36
Rainfall (mm)	
On day of spraying	: Nil
Days to first rain	: 5
Total at first rain	: 7,5
Total in first 14 days	: 11,5
Total for trial	: 870

7. Results

Table 1 : Visual ratings of percentage leaf scorch and stunting (where 1 = very poor and 5 = no stunting) recorded at 36, 63 and 112 days after spraying

Treatments	Rates (ℓ/ha)	% leaf scorch		
		36	63	112
T 1 Control	-	0	4,2	3,6
T 2 Sencor + diuron	3 + 2	1,3	4,7	4,7
T 3 Sencor + diuron	6 + 4	1,3	4,8	4,5
T 4 Pivot + Harness + atrazine	1,5 + 2,8 + 4	2,7	4,5	4,4
T 4 Pivot + Harness + atrazine	3 + 5,6 + 8	1,8	4,3	3,9
T 6 ICIA 0179	1	0,8	4,9	4,7
T 7 ICIA 0179	1,2	2,3	4,5	4,2
T 8 ICIA 0179	2	2,5	4,5	4,4

Table 2 : Effects of treatments on stalk heights and populations recorded at 76, 163 and 216 days after spraying

Treatments	Rates (ℓ/ha)	Populations x 1000/ha			Heights cm to TVD		
		76	163	216	76	163	216
T 1 Control	-	208	182	137	22	152	247
T 2 Sencor + diuron	3 + 2	208	188	144	24	156	243
T 3 Sencor + diuron	6 + 4	183	183	127	22	158	242
T 4 Pivot + Harness + atrazine	1,5 + 2,8 + 4	205	177	151	23	156	242
T 4 Pivot + Harness + atrazine	3 + 5,6 + 8	223	174	154	26	155	244
T 6 ICIA 0179	1	190	181	132	25	158	241
T 7 ICIA 0179	1,2	193	176	160	22	167	244
T 8 ICIA 0179	2	189	186	137	24	160	240

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

Treatments	Rates (ℓ/ha)	Cane (tons/ha)	Sucrose % cane	Sucrose (tons/ha)
T 1 Control	-	145	12,0	17,3
T 2 Sencor + diuron	3 + 2	161	11,8	19,0
T 3 Sencor + diuron	6 + 4	162	12,4	20,2
T 4 Pivot + Harness + atrazine	1,5 + 2,8 + 4	170	11,6	19,6
T 4 Pivot + Harness + atrazine	3 + 5,6 + 8	156	11,8	18,4
T 6 ICIA 0179	1	175	12,1	21,1
T 7 ICIA 0179	1,2	173	11,8	20,4
T 8 ICIA 0179	2	160	11,9	19,0
CV %		5,9	6,7	8,8
SE treatment means (±)		3,9	0,3	0,7
LSD (0,05)		11	0,9	2,0
(0,01)		15	1,2	2,7

9. Comments

All treatments were tested at the recommended and twice the recommended rates. The suppression in cane yield of the control was the result of excessive weed competition due to delayed handweeding for this treatment.

Sencor + Diuron

The standard treatment resulted in minimal leaf scorch and stunting and did not appear to increase significantly at the higher rate. This observation was confirmed by the stalk height measurements which were very similar. Cane and sucrose yields were significantly greater than the control for the higher rate of the treatment.

Pivot + Harness + atrazine

The higher of the two rates of this mixture appeared to cause stunting (Table 1) but growth measurements indicated only minor effects. The increase in cane and sucrose yield for this treatment is again attributed to poor weed control in the unsprayed plots.

ICIA 0179

Leaf scorch was generally insignificant but was slightly more noticeable at the two higher rates. There is evidence that the highest rate suppressed yields compared to the two lower rates.

Conclusion

Yield comparisons between the herbicide treatments and the control are masked by weed competition effects. It may be concluded however that significant yield reductions due to herbicide phytotoxicity would have been unlikely judging by the high yields attained from the chemically treated plots and comparisons with the standard treatment diuron + Sencor.