

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Cat No : 1704
Project No :
Code No : HW 329/88

Title : Pre-emergence phytotoxicity in trays

Objectives: To evaluate new herbicides for their phytotoxicity as pre-emergent herbicides on sand and clay soils.

1. Particulars of project

		Soil analysis				Date: 04.02.87	
Site	: Tray site Mount Edgcombe	pH	OM %	Clay%	CEC	Silt%	F Sand%
		Clay: 7.8	0.5	35	27.3	13	28
Region	: North Coast Coastal	Sand: 8.6	0.4	10	3.9	4	65
Soil system	: Umzinto Coast Lowlands						
Soil form/series:	Longlands/Waldene Fernwood	ppm					
		P	K	Ca	Mg		
Variety	: NCo376	Clay: 51	80	>1800	>220		
This crop	: Plant	Sand: 54	64	>1800	46		
Irrigation	: Daily drip irrigation						
Dates	: 4/2/88 - 17/4/88						

2. Design

Design : Randomised blocks x 6 replications for clay and sand
Plot size : Tray volume = 300 x 300 x 100 mm²

3. Experimental :

114 trays were half filled with the sandy soil and 114 trays were half filled with the clay soil. 12 single eyed setts were placed into each tray, watered and covered with black plastic to pre-germinate the cane. After 4 days the trays were filled with the appropriate soil type.

Fertilizer as 5.1.5 (45) was applied to each tray at a rate of 9 gm at planting. The sandy soil treatments were treated with 0,018 gm of Temik per tray just prior to planting.

Treatments were sprayed 5 days after planting.

4. Treatments

See results.

5. Herbicide Formulations used

Trade name	Formulations	Active ingredient
Lasso	384 g/l ec	Alachlor
Atrazine	500 g/l	Atrazine
DPXM		
Command		
Sencor	480 g/l sc	Metribuzin
SC 0179		
Classic		
MBSA 1997		
AC499	250 g/l SOLN	Imazathapyr
Pree	400 g/l sc	Metazachlor
Butisan S	500 g/l sc	Metazachlor
Harness	900 g/l ec	Acetochlor

6. Application details

Date of application: 09/02/1988
Applicator : Gas
Nozzle : 8004
Pressure : $\pm 1,8$ bars
Output : 247 l ha⁻¹
Time : $\pm 09:00 - 15:00$
Method : over the row

6.1 Conditions at spray

Temperature °C 08h00 : 20.8
 14h00 : 22.6
Relative humidity % 08h00 : 98
 14h00 : 93
Sunshine hours : 0,2
Soil surface : Moist
Wind : Slight
General : Overcast and cool
Rainfall (mm)
 Day of spray : 3,0
 Days to 1st rain : 5
 Amount of 1st rain : 0,7
 Total in two weeks : 43,9

7. Results:

Table 1 : Visual ratings of % leaf scorch and stunting 24 days and 40 days after spraying

Treatments	Rate Kg or ℓ Product ha ⁻¹	% Leaf scorch				Stunting			
		Clay		Sand		Clay		Sand	
		24	40	24	40	24	40	24	40
T 1 Lasso + Atrazine	6 + 2	5.3	15.3	4.8	14.5	4.4	4.8	4.9	1.7
T 2 DPXM	0.2	5.8	-	17.7	-	4.4	-	4.6	-
T 3 DPXM	0.4	4.5	-	12.2	-	4.7	-	4.1	-
T 4 Command	2	9.3	16.5	8.2	14.0	4.5	5.2	4.8	2.5
T 5 Command	4	38.0	12.2	36.7	11.5	4.0	1.7	4.6	3.0
T 6 Command + Sencor	4 + 2	32.0	12.3	58.3	9.5	4.3	1.2	4.5	1.8
T 7 SC 0179	2	65.0	-	92.0	-	3.3	-	3.9	-
T 8 SC 0179	4	85.0	-	100.0	-	3.1	-	3.9	-
T 9 Classic	0.140	1.8	-	14.2	-	4.5	-	4.2	-
T10 Classic	0.280	5.8	-	18.0	-	4.6	-	4.4	-
T11 MBSA 1997	1.5	4.5	-	3.3	-	4.6	-	4.7	-
T12 MBSA 1997	3	3.2	-	7.0	-	4.8	-	4.2	-
T13 AC 499	3	9.5	-	9.7	-	4.0	-	1.9	-
T14 AC 499	6	9.3	-	10.0	-	3.8	-	2.1	-
	Clay Sand								
T15 PREE	5.8 3.8	5.0	-	8.3	-	4.2	-	4.2	-
T16 Butisan S	3.0 4.0	8.2	-	10.7	-	3.9	-	4.0	-
T17 Harness + Atrazine	4 + 4	4.3	-	11.2	-	4.7	-	4.3	-
T18 Lasso + Atrazine	12 + 4	3.8	16.0	7.2	12.2	4.8	3.0	4.6	1.3
T19 Control		3.0	15.7	2.8	11.7	4.5	3.8	4.6	2.2

Table 2 : Main shoot length, tiller counts and fresh mass expressed as a percent of unsprayed control values at harvest and primary shoot counts at harvest

Treatments	Rate (Kg or l) Product ha ⁻¹	Clay				Sand			
		Length	Number shoots /tray	Tillers	Fresh mass	Length	Number shoots /tray	Tillers	Fresh mass
T 1 Lasso + Atrazine	6 + 2	102	7	149	96	121	7	62	154
T 2 DPXM	0.2	107	6	67	93	114	8	52	130
T 3 DPXM	0.4	109	8	107	113	91	6	103	86
T 4 Command	2	103	7	162	108	117	8	79	145
T 5 Command	4	83	7	104	71	96	7	110	9
T 6 Command + Sencor	4 + 2	89	7	82	70	90	7	127	79
T 7 SC 0179	2	53	7	49	26	62	6	30	24
T 8 SC 0179	4	35	7	29	10	47	5	27	10
T 9 Classic	0.140	104	7	138	108	84	6	55	68
T10 Classic	0.280	102	7	133	116	97	7	41	93
T11 MBSA 1997	1.5	116	8	184	137	98	6	93	111
T12 MBSA 1997	3	114	7	171	127	85	4	75	58
T13 AC 499	3	97	8	207	95	62	5	181	34
T14 AC 499	6	67	7	140	49	37	3	68	10
	Clay Sand								
T15 PREE	5.8 3.8	102	6	140	90	111	7	41	113
T16 Butisan S	3.0 4.0	69	7	107	58	84	6	48	56
T17 Harness + Atrazine	4 + 4	115	8	149	132	90	7	75	87
T18 Lasso + Atrazine	12 + 4	108	7	82	111	107	7	52	115
T19 Control	-	100	6.5	100	100	100	6.3	100	100
T19 Control actual figures		*19.3	6.5	**4.5	195g	*18.2	6.3	**7.3	118g
*** C.V. %		12.7	14.5	45.0	24.9	15.4	22.0	62.3	30
*** S.E.D. ±		1.3	0.58	1.4	25.1	1.4	0.83	1.9	17.2
*** L.S.D. (0.05)		2.6	1.2	2.8	49.9	2.9	1.64	3.91	34.2

* cms ** tiller number/tray *** relates to actual data not percentages

8. Comments

New and unregistered coded products were tested at the recommended, and twice the recommended rate.

DPXM:

This product resulted in leaf scorch which was more severe on the sandy soil, reducing fresh mass yield at the higher rate at harvest.

Command and Command + Sencor

The higher rate of this product alone and in combination with Sencor caused very severe leaf scorch three weeks after spraying. This led to extreme stunting and fresh mass yield reductions particularly at the higher rate on the clay soil. Command at 2ℓ/ha did not have a detrimental effect on yield.

SC 0179

This product produced very severe leaf scorch which was complete for cane treated with 4 ℓ of product/ha on the sandy soil. Tiller numbers, stalk heights and yield of fresh mass were significantly reduced for both rates on both soil types, but appeared more extreme on the sand.

Classic

Both the standard and double the standard rate of Classic resulted in some noteworthy leaf scorch for cane grown in the sandy soil. Stalk lengths, tiller numbers and yield of fresh mass were reduced for cane in the lighter soil and seemed more so at the standard rate.

MBSA

This product appeared to be non-phytotoxic on cane in the clay soil. In sandy soil conditions tillering and growth were suppressed at the 3ℓ/ha rate which resulted in a significant fresh mass yield reduction.

AC 499

The degree of leaf scorch and stunting was greater on the sandy soil which resulted in a drastic yield reduction at harvest, especially at double the standard rate. Although yield reductions on the clay soils were less dramatic, they were nevertheless significantly affected. The standard rate of this product appeared to promote tillering on both soil mediums.

Pree

Pree appeared to be only mildly phytotoxic at the rates tested although there was a reduction of tillers for cane in the sandy soil.

Butisan S

Butisan S at 3ℓ/ha on the clay soil and 4ℓ/ha on the sandy soil resulted in greater reductions in stalk length and fresh mass than Pree, despite the lower level of active ingredient of the former on the clay soil. The reduction in yield for both rates of Butisan S was similar.

Harness + Atrazine

This mixture resulted in notable leaf scorch in the sandy soil which attributed to a reduction in fresh mass yield at harvest. On the clay soil stalk lengths appeared to have been stimulated and fresh mass yield was significantly greater than the unsprayed control.

Lasso + Atrazine

Despite severe cane stunting recorded 6 weeks after spraying, growth at harvest appeared normal and yields were unaffected by the treatments. Tillering, however, appeared to be depressed particularly for cane grown on the sandy soil.

NBL/cvp