SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Cat No : 1728
Project No:
Code No : HW389/90/P

Title: Post-emergence phytotoxicity trial in pots.

Objectives:

To evaluate new products and mixtures for their phytotoxicity on plant cane grown in pots sprayed post-emergence.

1. Particulars of project

This crop	: Plant
Site	: Tray site Mount Edgecombe
Region	: North coast-coastal
Soil system	: Berea
Soil form/series:	Hutton/Shorrocks and Clansthal
Variety	: NCo376
Age (mths)	: 2,6
Dates	: 10.1.90-30.3.90
Irrigation	: Daily with drippers

Soil analysis Date: 10/1/1990

	pH (water)	Clay (%)	O.M. (%)
Sand	8,3	8	1,03
Clay	7,3	16	1,23

	ppm			
	P	K	Ca	Mg
Sand	>80	58	1581	40
Clay	>80	135	4180	1170

	Fertilizer (kg/ha)		
	N	P	K
Sand	653	130	653
Clay	582	116	582

2. Design:

Design : Randomised blocks
Replication : 6 sandy loam and 6 clay loam
Pot size : 27 cm x 30 cm

3. Application details

Date : Sprayed 22.2.90
Applicator : CP3
Nozzle : APM (green)
Pressure : 150 Kpa
Time : 7.45 am - 9.55 am
Output : 35,7 ml/sec
Output : 25,5 ml/m^2
Method : One swath over each plot.

4. Conditions at spraying

Temperature (°C)
- 08h00 : 18,9
- 14h00 : 21,3

Relative humidity (%)
- 08h00 : 74
- 14h00 : 56

Wind : Nil

Soil surface : Very damp

Dew : Nil

General : Very overcast

Sunshine hours : 1,7

Rainfall (mm)
- On day of spray : Nil
- Days to 1st rain : 2
- Amount of 1st rain : 0,1 mm
- Total in 2 weeks : 54,5 mm

5. Chemical formulations used

Product	Formulation	Active ingredient
Sencor	480g/l (sc)	Metribuzin
Diuron	800g/l (sc)	diuron
Oxytril	200g/l + 200g/l (ec)	ioxynil + bromoxynil
MCPA	400g/l (sol)	MCPA
Gesapax	500g/l (sc)	ametryn
Falcon	960g/l (ec)	metolachlor
Gramoxone	200g/l (sol)	paraquat
ICIA 0179	500g/l	-
ICIA 0051	300g/l	-
Atrazine	500g/l (sc)	atrazine
Mamba II	367g/l + 390g/l (sc)	MSMA + diuron
Extrazine	167g/l + 333g/l (sc)	cyanazine + atrazine
Lasso	384g/l (ec)	alachlor
Agriseel	-	surfactant
MSMA	720g/l (sol	monosodium methylarsonate

6. Results

Table 1: Visual ratings of percent leaf scorch and of stunting (1-5 where 1 = very poor and 5 = very good) taken 15 and 38 days after spraying

Treatments	Rate kg or l/ha	Leaf scorch %				Stunting	
		Clay		Sand		Clay	Sand
		15	38	15	38	15	15
T1 Control	-	0	5	0	3	5,0	5,0
T2 Sencor + diuron	3 + 2	9	7	10	6	4,7	4,5
T3 Oxytril + diuron + MCPA	0,5 + 2,5 + 3	6	6	5	4	4,3	4,7
T4 Oxytril + diuron + MCPA	1 + 5 + 6	6	7	7	5	4,5	4,1
T5 Oxytril + ametryn + MCPA	0,5 + 4 + 3	11	7	7	4	4,6	4,3
T6 Oxytril + ametryn + MCPA	1 + 8 + 6	13	8	15	8	3,9	3,9
T7 Falcon + diuron + paraquat	1,15 + 1,79 + 1,5	31	15	38	16	3,8	3,8
T8 Falcon + Sencor + paraquat	1,15 + 2 + 1,5	29	16	33	18	3,8	3,8
T9 Falcon + Sencor + MCPA	1,15 + 1,79 + 3,5	10	6	6	4	4,8	4,4
T10 ICIA 0179	1	11	5	4	2	5,0	4,8
T11 ICIA 0179	2	15	4	5	3	5,0	4,9
T12 ICIA 0051 (with atrazine)	8	11	5	7	9	4,8	4,8
T13 ICIA 0051 + diuron	1,67 + 1,25	9	7	10	7	4,5	4,3
T14 ICIA 0051 + diuron	3,34 + 2,5	13	10	14	9	4,3	4,0
T15 Mamba II	6	18	12	19	15	4,1	4,3
T16 MSMA + diuron	3,06 + 2,93	16	10	21	12	4,2	4,0
T17 Extrazine + alachlor	4 + 6	12	7	7	4	4,8	4,6
T18 Extrazine + alachlor + paraquat	3 + 5 + 0,5	25	13	28	13	4,2	3,8
T19 Extrazine + alachlor + paraquat	4 + 6 + 1,5	32	17	36	19	3,6	3,6
T20 Agriseel + diuron	1,5 + 2,5	5	3	6	5	4,8	4,8
T21 Diuron	2,5	7	4	5	5	5,0	4,5

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

Treatments	Rate kg or l/ha	Clay				Sand			
		Length	No. shoots	Tillers	Fresh mass	Length	No. shoots	Tillers	Fresh mass
T1 Control	-	100	7	100	100	100	8	100	100
T2 Sencor+diuron	3+2	90	8	107	88	90	8	86	81
T3 Oxytril+diuron+MCPA	0,5+2,5+3	98	7	104	90	99	8	83	97
T4 Oxytril+diuron+MCPA	1+5+6	82	7	93	75	85	8	67	76
T5 Oxytril+ametryn+MCPA	0,5+4+3	98	7	95	95	99	8	71	90
T6 Oxytril+ametryn+MCPA	1+8+6	84	8	89	79	97	8	76	84
T7 Falcon+diuron+paraquat	1,15+1,79+1,5	71	8	83	58	71	8	86	48
T8 Falcon+Sencor+paraquat	1,15+2+1,5	69	8	67	51	76	8	60	50
T9 Falcon+Sencor+MCPA	1,15+1,79+3,5	102	7	116	94	97	8	107	90
T10 ICIA 0179	1	90	8	97	89	100	8	98	96
T11 ICIA 0179	2	94	8	109	99	100	8	92	100
T12 ICIA 0051 (with atrazine)	8	91	7	96	88	94	8	76	85
T13 ICIA 0051+diuron	1,67+1,25	86	7	109	84	82	7	73	67
T14 ICIA 0051+diuron	3,34+2,5	84	7	92	74	82	8	80	65
T15 Mamba II	6	76	7	76	61	77	8	87	60
T16 MSMA+diuron	3,06+2,93	73	8	80	61	78	7	52	57
T17 Extrazine+alachlor	4+6	93	8	114	91	99	8	74	85
T18 Extrazine+alachlor+paraquat	3+5+0,5	82	7	96	69	76	8	81	56
T19 Extrazine+alachlor+paraquat	4+6+1,5	68	8	87	50	75	8	56	50
T20 Agriseel+diuron	1,5+2,5	92	8	101	89	93	8	50	77
T21 Diuron	2,5	90	8	98	84	91	8	86	79
Control (actual values)		27 cm	7	19	388 g	23 cm	8	14	255 g
SED		1,3	0,4	1,8	25	1,1	0,3	2,0	18
LSD (0,05)		2,5	0,8	3,5	50	2,2	0,7	4,0	36
Significance		S	NS	S	S	S	S	S	S

7. Comments

Most of the treatments were applied at the standard and double the standard rate.

Sencor + diuron

The standard rate of this mixture caused some leaf scorch which reduced stalk heights and lowered fresh mass yield in both the sandy and clay soil mediums.

Oxytril + diuron + MCPA

Leaf scorch was minimal for both rates of this mixture while the higher rate suppressed cane growth in both soil types. This resulted in a significant reduction in fresh mass yield for the high rate. Tillering appeared to be effected by the standard rate in the sandy soil.

Oxytril + ametryn + MCPA

This mixture increased leaf scorch and stunting at the higher rate compared to the previous mixture with diuron. Other than an apparent reduction in tiller numbers in the sandy soil, the standard treatment appeared safe. As for the previous treatment, double the standard rate lowered fresh mass yield in both soil conditions.

Falcon + diuron + paraquat

Leaf scorch and suppression of growth was very obvious for this treatment. Primary tiller lengths and fresh mass yield were severely reduced in both sandy and clay soils.

Falcon + Sencor + paraquat

Similar phytotoxicity symptoms to the previous treatment resulted from this mixture. The addition of Sencor appeared to have a greater influence on tiller numbers compared to diuron (Table II) while the overall reduction in fresh mass was similar to the previous treatment.

Falcon + Sencor + MCPA

The replacement of paraquat with MCPA resulted in minimal leaf scorch and stunting. Other measurements were non-significantly affected.

ICIA 0179

This product was relatively safe for cane in both soil mediums, although slightly greater phytotoxic effects occured in the clay soil.

ICIA 0051 (formulated with atrazine) and ICIA 0051 + diuron

This product formulated with atrazine reduced fresh mass yield in both soils. The formulation with diuron was more phytotoxic, the effects of which increased only slightly at double the rates recommended. The mixture with diuron in particular seemed more phytotoxic on the sandier soil. These results however do not correlate with those from field phytotoxicity trials where these treatments had minimal phytotoxic effects on cane.

Mamba II and MSMA + diuron

Both the formulated treatment and the equivalent mixture resulted in leaf scorch, stunting, fresh mass yield reduction and suppression in tillering. Effects generally seemed to be similar on both soils.

Extrazine + alachlor and Extrazine + alachlor + paraquat

The mixture without paraquat had a more severe effect on tillering on sandy soil conditions which led to a greater loss in fresh mass yield for this soil type. The addition of paraquat to the mixture significantly increased leaf scorch and stunting while stalk lengths and fresh mass yields were significantly reduced especially at the higher rate. Tillering was again more reduced on the sandy soil.

Diuron and Agriseel + diuron

Both treatments reduced stalk lengths which resulted in lower fresh mass yields. Poorer tillering under sandy soil conditions also contributed to lower yields. Other than a possible greater influence on tillering for cane on sandy soil conditions, the additon of Agriseel to diuron did not appear to increase the phytotoxicity of diuron.

NBL/1b
21 September 1990