SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Code : 1641
Project No : 3532
Cat. No. : HW343/87/R3

Title: Phytotoxicity from post emergent herbicide applications.

Objectives: To evaluate new post emergent herbicides for their phytotoxic effects on ratoon cane grown on lighter soils.

1. PARTICULARS OF THE PROJECT:

This crop	: 3rd Ratoon
Site	: Shakaskraal Field Station
Region	: North Coast Coastal
Soil System	: Umzinto Co. Lowlands
Soil form/series	: Longlands/Waldene
Variety	: NCo376
Age	: 12,8 months
Dates	: 23/7/87 - 16/8/88
Rainfall	: 1 852 mm
Irrigation	: Nil
LTM Rainfall	: 1 032 mm

Soil analysis

pH (water)	O.M %	Clay %
5,45	1	15

P ppm	K ppm	Ca ppm	Mg ppm
27	54	345	88

Fertilizer kg/ha	N	P	K
Top dressing	164	33	164

2. **DESIGN**

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

3. TREATMENTS

	Treatments	Rates or kg product /ha	Time of application	Method
T1	MBSA 1997	1,5 l	Post emergence	Over Row
T2	MBSA 1997	3 l	Post emergence	Over Row
T3	AC 499	1 l	Post emergence	Over Row
T4	AC 499	2 l	Post emergence	Over Row
T5	MBSA + diuron	2,5 l + 5 l	Post emergence	Over Row
T6	Garlon	3 l	Post emergence	Over Row
T7	Sencor + diuron	6 l + 4 l	Post emergence	Over Row
T8	Control	Handweeded	Post emergence	Over Row

4. CHEMICAL FORMULATIONS USED

Product	Formulation	Active ingredient
MBSA 1997	200/200 g/l ec	ioxynil/bromoxynil
AC 499	100 g/l	imazapyr
Diuron	800 g/l sc	diuron
Garlon	480 g/l ec	triclopyr
Sencor	480 g/l sc	metribuzin

5. APPLICATION DETAIL

Treatment dates	23/10/87
Time of application	07h00
Applicator	CP3
Nozzle	APM Green
Pressure	130 kpa
Height of cane (leaf bend)	45 cm
Method	Over the row
Output (ml/s)	30,9
Output (ml/m^2)	22,1

6. WEATHER CONDITIONS AT TIME OF SPRAYING

Treatment dates	23/10/87
General	Clear and Mild
Dew	Slight
Soil surface	Moist (Trash)
Wind	Nil
Sunshine hours	11,0
Temperature (°C)	
08h00	17,5
14h00	27,0
Relative humidity (%)	
08h00	97
14h00	64
Rainfall	
mm On day of spray	0
No of days to 1st rain	3
mm At 1st rain	8
mm In 1st 14 days	88,3

7. RESULTS

Scorch and Stunting

Table 1: Visual phytotoxicity ratings from post emergent herbicides 18 days after treatment

	Treatments	Rates or kg product /ha	Leaf scorch %	Stunting*
T1	MBSA 1997	1,5 l	1	4,8
T2	MBSA 1997	3 l	1,6	5
T3	AC 499	1 l	1,6	4,2
T4	AC 499	2 l	2,1	3,8
T5	MBSA + diuron	2,5 l + 5 l	3,8	4,2
T6	Garlon	3 l	1,4	4,6
T7	Sencor + diuron	6 l + 4 l	1,4	4
T8	Control	Handweeded	0	5

* Stunt Rating : 1 - Severe stunting ; 5 - No stunting

AC 499 caused moderate stunting and slight scorch at double rates.

MBSA 1997 on its own did not cause any significant scorch or stunting. However in combination with diuron some scorch was evident and the level of stunting was moderate.

Sencor + diuron did cause some stunting but the level of stunting was similar to MBSA 1977 + diuron and AC 499.

Garlon did not appear to be phytotoxic.

Stalk height and plant population

Table 2 : The effect of post emergent herbicides on cane stalk height and plant population

Treatments	Rate product per ha	Stalk height (cm)				Counts (x 1000)			
		17 DAT*	49 DAT	74 DAT	105 DAT	17 DAT	49 DAT	74 DAT	105 DAT
MBSA 1997	1,5	29	54	76	85	171	230	170	138
MBSA 1997	3	28	56	81	86	183	246	164	137
AC 499	1	22	41	61	73	151	260	190	156
AC 499	2	20	33	45	61	146	274	217	179
MBSA + diuron	2,5 + 5	22	44	66	78	160	223	186	142
Garlon	3	30	61	86	88	177	226	180	133
Sencor + diuron	6 + 4	23	51	70	83	163	227	181	139
Control	Handweeded	32	58	84	88	183	224	170	132

* DAT - Days after treatment

AC 499 at both single and double rates resulted in significant plant height reduction relative to the unsprayed control. This reduction in stalk height was evident upto 105 days after treatment.

MBSA 1997 + diuron was still affecting plant height at 105 days after treatment but Sencor + diuron did not appear to be a problem after 105 days after treatment.

Garlon and MBSA 1997 on its own did not affect plant stalk height at any stage after spraying.

Harvest data

Table 3 : The effect of various post emergent applied herbicides on ratoon cane at harvest

Treatments	Rate ℓ product per ha	Cane t/ha	Sucrose t/ha	Pol % cane	% Joints bored
MBSA 1997	1,5	49	6,6	13,7	7,1
MBSA 1997	3	54	7,3	13,5	7,2
AC 499	1	47	6,0	12,8	7,4
AC 499	2	40	5,2	13,0	6,9
MBSA + diuron	2,5 + 5	49	6,5	13,2	5,9
Garlon	3	53	7,1	13,3	9,3
Sencor + diuron	6 + 4	52	7,3	13,8	5,7
Control	Handweeded	50	6,8	13,8	6,5
CV %		16,7	18,4	4,2	24,3
SE difference of mean		4,7	0,7	0,3	0,98
LSD 0,05		10	1,4	0,7	2,0
LSD 0,01		13	1,9	0,9	2,7

At harvest only AC 499 at double rates (3 l/ha) caused a yield response that was just significantly lower than the unsprayed control. The Pol % cane was also significantly lower for both AC 499 rates.

No other treatments appeared to deterimentally affect the yields at harvest.

The incidence of eldana was greater in the Garlon treatment. No other treatment appeared to be as affected.

DISCUSSION AND CONCLUSION

MBSA 1997 at standard and double rates and Garlon (at double rates 3 l/ha) did not cause any phytotoxic symptoms on the cane. The responses were similar to the untreated control.

Garlon did however cause a slightly higher incidence of eldana than the other treatments.

The initial phytotoxicity symptoms observed were confirmed with physical height measurement for both rates of AC 499 and MBSA 1997 + diuron. At harvest only the double rate of AC 499 still appeared to have influenced cane yield.

The application of AC 499 as a post emergent herbicide would not be recommended.

The intital phytotoxicity observed with MBSA 1997 + diuron at double rates appeared to have been overcome by harvest. The response was similar to the double rate application of Sencor + diuron, MBSA 1997 on its own was safe.

MW/dlz
25 October 1988