SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Cat. No. : 1722
Project No. : 3555
Code No. : HW345/87/R1

Title: Varietal phytotoxicity trial

Objectives: To evaluate the phytotoxicity of post-emergence herbicide treatments on three varieties at Pongola - Plant cane.

1. **PARTICULARS OF PROJECT :**

This crop	: Plant-slashed back
Site	: Pongola Sub-Station
Region	: Northern Area
Soil System	: Komatipoort
Soil form/ Series	: Hutton/Shorrocks
Variety	: N14, N17, N19
Age	: 9,2 months
Dates	: (15.12.87-20.9.88)
(mm)	
Rainfall	: 435,1 mm
LTM	: 426 mm
Irrigation	: 549 mm
Total (mm)	: 984 mm

Soil analysis Date: 08/12/87

pH	Clay (%)	OM (%)
6,65	> 30	-

P (ppm)	K	Ca	Mg
7,7	195	1859	3197

Fertilizer (Kg ha^{-1})

N	P	K

2. **DESIGN :**

Design	:	Randomised blocks
Replication	:	4
Plot size	:	6 m x 4 rows x 1,4 m = 33,6 m^2

Rainfall, irrigation and LTM (mm) at Pongola

Months	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1987-88	7	94	92	123	32	9	29	14	19	16	435 mm
LTM	40	117	86	74	43	20	9	8	16	13	426 mm
Irrigation	61	122	122	61	-	61	61	-	61	-	549 mm

3. EXPERIMENTAL

Plant cane was cut back on 15.12.87 and treatments applied on 19.1.88. Cane was well grown. About 6 leaves per shoot had developed and the height was 90 cm at the leaf bend. Stalk heights varied with varieties.

4. TREATMENTS

a) **Varieties**

N14
N17
N19

b) **Herbicides:**

	Rate (Kg or ℓ product ha^{-1})
T1 Acetochlor + Ametryne	2,5 + 6
T2 Butisan + Ametryne	2 + 3
T3 Diuron + Actril DS	2,5 + 1,25
T4 Control	Unsprayed

5. CHEMICAL FORMULATIONS USED:

Product	**Formulation**	**Active Ingredient**
Diuron	800 g/ ℓ (SC)	Diuron
Actril DS	100 + 600 g/ℓ (EC)	Ioxynil + 2,4-D
Harness EC	900 g/ ℓ (EC)	Acetochlor
Butisan S	500 g/ ℓ (SC)	Metazachlor
Ametryne 500	500 g/ ℓ (SC)	Ametryne

6. APPLICATION DETAILS

Treatment date : 19.1.88
Time : 05.30 - 07.50
Applicator : CP3
Nozzle : APM Green
Pressure : 130 Kpa
Output : 34,75 ml/S
Output : 248,2 ℓ ha^{-1}
Method : Over the row
Timing : Post-emergence

7. WEATHER CONDITIONS AT SPRAYING

General		: Warm and overcast
Dew		: Very slight
Soil surface		: Dry
Wind		: Calm
Sunshine hours		: 3.0
Temperature (°C)	08.00	: 26,2
	14.00	: 31,8
Relative humidity %	08.00	: 74
	14.00	: 56
Rainfall (mm) on day of spray		: 0,5
No of days to first rain		: -
Amount of first rain		: 0,5
Total in first 14 days		: 33,6
Total duration of trial		: 435,1

8. RESULTS

Table 1 Visual rating of percent scorch and stunting 23 days after treatment

Treatments	Kg or ℓ product ha^{-1}	N14		N17		N19	
		% Scorch	Stunt	% Scorch	Stunt	% Scorch	Stunt
T1 Harness EC + Ametryne	2,5 + 6	24	3,3	16	3,7	15	4,0
T2 Butisan S + Ametryne	2 + 3	17	3,9	5	4,4	10	4,2
T3 Diuron + Actril DS	2,5 + 1,25	29	3,3	10	3,3	11	3,7
T4 Control	Unsprayed	0	5,0	0	5,0	0	5,0

Stunting 1 = Severe 5 = No stunting

100

Table 2 Yield and other crop characteristics at harvest

Variety	Treatments	Kg or ℓ product ha^{-1}	Cane t ha^{-1}	Sucrose % cane	Sucrose t ha^{-1}	Stalk counts x 10^3 ha^{-1}	Stalk length (CM)
N14	T1 Harness EC + Ametryne	2,5 + 6	111	10,92	12,1	132	245
	T2 Butisan S + Ametryne	2 + 3	111	11,79	13,1	124	257
	T3 Diuron + Actril DS	2,5 + 1,25	95	9,40	8,9	147	231
	T4 Control	Unsprayed	124	11,63	14,4	144	258
N17	T1 Harness EC + Ametryne	2,5 + 6	94	13,02	12,3	152	262
	T2 Butisan S + Ametryne	2 + 3	97	14,60	14,1	153	269
	T3 Diuron + Actril DS	2,5 + 1,25	102	13,82	14,1	166	255
	T4 Control	Unsprayed	108	14,94	16,0	171	265
N19	T1 Harness EC + Ametryne	2,5 + 6	101	13,67	13,9	*	*
	T2 Butisan S + Ametryne	2 + 3	97	13,45	13,0	*	*
	T3 Diuron + Actril DS	2,5 + 1,25	96	13,14	12,6	*	*
	T4 Control	Unsprayed	109	13,58	14,7	*	*
	C.V. %		8,2	6,1	10,2	* cane lodging	
	S.E. of treatment mean	±	4,22	0,39	0,67		
	L.S.D. (0,05)		12,16	1,13	1,94		
	(0,01)		16,33	1,51	2,60		

Table 3 : Herbicide effects on yield

Treatments	kg or ℓ Prod ha^{-1}	Cane t ha^{-1}	Sucrose % cane	Sucrose t ha^{-1}
T1 Harness EC + Ametryne	2,5 + 6	102	12,54	12,8
T2 Butisan S + Ametryne	2 + 3	101	13,28	13,4
T3 Diuron + Actril DS	2,5 + 1,25	97	12,12	11,8
T4 Control	Unsprayed	113	13,38	15,0
S.E. of herbicide mean	±	2,44	0,23	0,39
S.E. Diff	±	3,45	0,32	0,55
L.S.D. (0,05)		7,02	0,65	1,12
(0,01)		9,43	0,87	1,50

2. **Comments**

Severe lodging of N19 prevented growth measurements for this variety. Chemical rates were within recommended levels.

Harness + Ametryne

This mixture significantly reduced cane and sucrose yields for N14 and N17, but had less effect on growth of N19. Stalk lengths were severely reduced for N14 by this treament, while populations were suppressed in both these varieties. The overall effect on all varieties was a highly significant cane and sucrose yield reduction (Table 3).

Butisan + Ametryne

This treatment had a similar reducing effect on cane yield on these varieties as the previous treatment, but generally cane quality was influenced to a lesser degree. This resulted in a reduced effect on sucrose yield for all varieties from this mixture (Table 3). However, differences still reached significant levels compared to the unsprayed control.

Diuron + Actril DS

Cane yields for N19 and particularly N14 were significantly suppressed by this treatment. Stalk lengths of N14 were reduced by ±11% which, coupled with a negative influence on cane quality, resulted in a highly significant reduction in sucrose yields. N17 appeared to tolerate this treatment slightly better than the remaining varieties.

Conclusions

N14 was by far the most sensitive variety illustrated by degree of scorch and resultant stunting in Table 1, while differences between ratings of the other varieties was small. Diuron + Actril DS was on average the most phytotoxic treatment of those tested when applied over the cane at this stage of growth.

NBL/pw
July 10, 1990