SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Code : HW 300/85/R1
Cat. No. : 1547

Title : Herbicide phytotoxicity to N14

1. Particulars of the project

This crop : 1st Ratoon
Site : Central Field Station
Region : N. Coast coastal
Soil System : Berea
Soil form/series : Hutton/Clansthal
Design : Randomised blocks
Variety : N14

Fertilizer/ Ameliorants :	N	P	K
Top dressing	165	-	165

Soil analysis: Date: 16.8.85

pH	Clay %
8,1	<14

ppm			
P	K	Ca	Mg
>80	57	>1800	52

Age: 15,4 months Dates: 1.8.85-13.11.86
Rainfall: 986 mm L.T.M.: 916 mm

Weather conditions at spraying

Date		11.10.85	13.12.85
General		Clear and Warm	Clear and Hot
Rainfall : On day of spray (mm)		0	0
: No. days to 1st rain		2	1
: No. mm at 1st rain		2,0	15,1
Sunshine hours		10,7	3,2
Dew		Nil	Nil
Wind		Strong	Strong
Temperature (°C)	8 am	20,6	25,2
	2 pm	24,7	27,4
Relative Humidity (%)	8 am	70	73
	2 pm	57	76

2. Objectives

To measure the effects of herbicide induced stress on the growth of N14.

3. Treatments

		Rate (kg or ℓ product $^{-1}$)
1	Control (unsprayed)	-
2	Diuron (80) + Sencor (70)	2 + 2
3	Diuron + Actril DS (70)	2,5 + 1,25
4	Diuron + Actril DS x 2	2,5 + 1,25

4 Experimental

Plots were 6 m x 6 rows x 1,4 m gross and 4 m x 4 rows x 1,4 m net in size. There were 4 replications per treatment.

Conditions and application details

Date of spray	:	11.10.85	13.12.85
Time of spray	:	11:30 - 12:20	08:00 - 08:15
Applicator	:	CP3	CP3
Nozzle	:	APM Green	APM Green
Output	:	331 ℓ/ha	262 ℓ/ha
Pressure	:	1,5 bars	1,5 bars
Method	:	Directly over the row	Directly over the row
Leaf height	:	± 30 cm	± 70 cm
No. leaves/shoot	:	4 - 5	7 - 8
General	:	Some iron chlorosis	Well grown
Population	:	Fair	Good

Table 1 - Crop measurements taken in 1 m long sample areas from one net row of each plot, 1,5; 4,4 and 6,7 months after the repeat application of Diuron + Actril DS

Treatment	Rate in kg or ℓ Product ha^{-1}	Stalk Length (cm)			Stalk Population		
		T+1,5	T+4,4	T+6,7	T+1,5	T+4,4	T+6,7
1 Control (unsprayed)	-	76	187	217	34	21	19
2 Diuron+Sencor	2+2	75	184	209	40	23	22
3 Diuron+Actril DS	2,5+1,25	66	173	204	39	19	20
4 Diuron+Actril (x2)	2,5+1,25	53	149	185	43	22	24

Stalk length

All treatments appeared to have slowed stalk elongation. However, the double application of Diuron+Actril DS severely reduced stalk length.

Stalk population

There are no apparent effects from treatments on stalk population.

Table 2 - Crop measurements taken 1,5; 4,4 and 6,7 months after the repeat application of Diuron+Actril DS

Treatments	Rate in kg or ℓ Product ha^{-1}	Stalk Length (cm)			Stalk Population (1000/ha)		
		T+1,5	T+4,4	T+6,7	T+1,5	T+4,4	T+6,7
1 Control (Unsprayed)	-	106	198	225	155	125	112
2 Diuron+Sencor	2+2	104	189	221	152	120	112
3 Diuron+Actril DS	2,5+1,25	99	185	207	164	125	116
4 Diuron+Actril DS (x2)	2,5+1,25	81	164	192	154	114	107

Stalk length

Both Diuron+Actril DS treatments reduced stalk length 6,7 months after spraying. However the repeated application effect was severe on stalk length reduction.

Stalk population

There were no apparent effects on stalk population from treatments.

Table 3 - Eldana survey done at harvest showing damage to individual treatments

Treatments	Rate in ℓ or kg product ha^{-1}	Stalk			Joints		
		No.	Damage	% Damaged	Total	Bored	% Bored
1 Control (unsprayed)	-	50	18,8	37,5	16,7	0,70	4,25
2 Diuron+Sencor	2+2	50	14,3	28,5	16,5	0,53	3,26
3 Diuron+Actril DS	2,5+1,25	50	15,0	30,0	16,4	0,63	3,82
4 Diuron+Actril DS (x2)	2,5+1,25	50	12,3	24,5	16,7	0,44	2,65

Treated plots seemed to be less affected by eldana than the control.

Table 4 - Yield data at harvest

Treatments	Rate in kg or ℓ Product ha^{-1}	Yield			Crop Measurements	
		Cane t/ha	Sucrose % cane	Sucrose t/ha	Stalk length (cm)	Stalk Population (1000/ha)
1 Control (unsprayed)	-	136	14,4	19,5	240	94
2 Diuron+Sencor	2+2	137	14,4	19,7	236	99
3 Diuron+Actril DS	2,5+1,25	130	14,3	18,7	227	105
4 Diuron+Actril DS (x2)	2,5+1,25	106	14,1	14,9	218	99
C.V.%		6,0	5,3	6,0	3,2	5,1
SE D		5,38	0,53	0,76	5,2	2,51
LSD (0,05)		12,18	1,21	1,73	11,8	8,05
LSD (0,01)		17,51	1,74	2,49	17,0	11,58

Yield

The repeated application of Diuron+Actril DS resulted in a significant (P=0,01) reduction in cane t ha^{-1} and sucrose t ha^{-1}.

No other treatments resulted in statistically significant reductions in yields.

Crop measurements

a Stalk length

A significant reduction in stalk length (P=0,01) was achieved by the repeated application of Diuron+Actril DS. The single application of Diuron+Actril DS depressed yield at the (P=0,05) level.

b Stalk population

There were no effects from treatments on stalk population.

Conclusions

A repeated application of Diuron+Actril DS over the cane row reduces N14 yield significantly, under coastal conditions.

All Diuron+Actril DS applications should be as directed interrow, avoiding cane foliage as much as possible.

Future

Individual cane stalk elongation will be monitered to assess whether longer stalks at an early growth stage are similarly affected by herbicide treatments than are the weaker smaller stalks.

LHGW/1b
3 March 1987