

**SOUTH AFRICAN SUGAR INDUSTRY  
AGRONOMISTS' ASSOCIATION**

Cat No : 1618  
Project No: 3256  
Cat. No : HW 293/86/R2

**Title:** Comparison between manual, mechanical and chemical weed control.

**Objectives:** To compare the effects of three methods of weed control on four cane varieties.

**1. Particulars of the project:**

This crop : 2nd ratoon  
Site : Pongola Field Station  
Region : Northern Area  
Soil System : Komatipoort  
Soil form/series: Hutton/Shorrocks  
Variety : N11, NCo376, N14 J59/3  
Age : 12,2 months  
Dates : 17/9/86-22/9/87  
Rainfall : 603 mm  
Irrigation : 854 mm  
Total : 1457 mm  
LTM : 650 mm

Soil analysis

pH (water)	Clay %			
6,66	>30			
=====				
P ppm	K ppm	Ca ppm	Mg ppm	
21	204	786	>220	
=====				
Fertiliser: (kg/ha) N			P	K
850 kg 5:1:5 (38) Top dressing			147	29 147

**2. Design**

Design : Split Plot  
Replication : 4  
Whole plot size : 8 m x 6 rows x 1,4 m = 67,2 m<sup>2</sup>  
Net plot size : 6 m x 4 rows x 1,4 m = 33,6 m<sup>2</sup>

### 3. Treatments

Treatments	Rates l or kg product /ha	Time of application	Method
<b>a) Weed Control Treatments</b>			
T1 Control (Handweeded)	-	-	-
T2 Cultivation + Handweeding	-	31/10/87	Spring tyne
T3 Diuron + Actril DS Repeated application + Handweeding	2,5 + 1,25	Post em	Interrow
<b>b) Varieties</b>			
N11			
N14			
NCo376			
J59/3			

### 4. Chemical Formulations Used

Product	Formulation	Active ingredient
P1 Diuron	800 g/l sc	diuron
P2 Actril DS	600/100g/l ec	2,4-D / ioxynil

### 5. Application detail

Treatment dates	22/10/86	25/11/86
Time of application	07h30	05h30
Applicator	CP3	CP3
Nozzle	APM Green	APM Green
Pressure	100 kpa	130 kpa
Method	Directed interrow	Directed interrow
Output	231 l/ha	243 l/ha

### 6. Weather Conditions at time of spraying

Treatment dates	22/10/86	25/11/86
General	Clear & Warm	Clear & Mild
Dew	Nil	Slight
Soil surface	Moist	Moist
Wind	Slight	Slight
Sunshine hours	9,2	9,0
Temperature (°C)		
08h00	22,8	24,9
14h00	29,2	29,6
Relative humidity (%)		
08h00	75	58
14h00	39	39
Rainfall		
mm On day of spray	0	0
No of days to 1st rain	5	1
mm At 1st rain	0,8	1,8
mm In 1st 14 days	21	52,7

7. Results

**Table 1 : Visual phytotoxicity ratings at 22 days after the first (A) and second (B) spray application**

Treatments	Rates l or kg product/ha	% Leaf Scorch		Stunting *	
		A	B	A	B
T1 Control + N11	-	4,5	3	4,7	5
T2 Cultivation + N11	-	4,3	2	4,5	4,5
T3 Diuron + Actril + N11	2,5 + 1,25 Repeated	7,8	3	4,7	5
T4 Control + N14	-	3,5	3	4,7	5
T5 Cultivation + N14	-	0,5	2	5	5
T6 Diuron + Actril + N14	2,5 + 1,25 Repeated	8,5	3	5	5
T7 Control + NCo376	-	2	2	4,7	5
T8 Cultivation + NCo376	-	0,5	2	4,7	5
T9 Diuron + Actril + NCo376	2,5 + 1,25 Repeated	8,3	3	4	5
T10 Control + J59/3	-	3,5	3	4,7	5
T11 Cultivation + J59/3	-	2,5	2	5	4,5
T12 Diuron + Actril + J59/3	2,5 + 1,25 Repeated	7,3	4	4,5	4,5

\* Stunt rating : 1 = severe stunting. 5 = No stunting.

**Comment**

The application of diuron + Actril caused slight to moderate scorch on all varieties and the repeat application did not seem to compound this effect. Twenty-two days after the second application there were no real differences between unsprayed and sprayed plots.

The stunting that was observed was slight and not consistent with treatment.

**Table 2 : Stalk lengths and counts 22 days after the first (A) and second (B) spray application**

Treatments	Rates l or kg product/ha	Stalk Length (cm)		Plant Population (x 1000ha <sup>-1</sup> )	
		A	B	A	B
T1 Control + N11	-	41	82	401	345
T2 Cultivation + N11	-	38	67	314	344
T3 Diuron + Actril + N11	2,5 + 1,25 Repeated	38	78	339	302
T4 Control + N14	-	42	79	282	354
T5 Cultivation + N14	-	42	84	320	358
T6 Diuron + Actril + N14	2,5 + 1,25 Repeated	40	80	293	365
T7 Control + NCo376	-	36	84	387	342
T8 Cultivation + NCo376	-	40	80	395	360
T9 Diuron + Actril + NCo376	2,5 + 1,25 Repeated	34	78	394	369
T10 Control + J59/3	-	36	74	300	371
T11 Cultivation + J59/3	-	37	79	280	339
T12 Diuron + Actril + J59/3	2,5 + 1,25 Repeated	35	74	306	387

**Comment**

Cultivation carried out with a tyne cultivator showed no adverse effect on plant growth as indicated by stalk length. In fact it would appear to have had a slight beneficial effect except possibly for N11.

Diuron + Actril did retard growth very slightly.

**Table 3 : Stalk length measurements 22 days, 66 days and 105 days after the first spray application and at harvest**

Treatments		Stalk Length (cm)			
		Days after treatment			
		22	66	105	Harvest
Control	N11	41	141	264	280
Cultivation	N11	38	141	260	267
Diuron + Actril	N11	38	133	266	276
Control	N14	42	138	259	287
Cultivation	N14	42	140	252	285
Diuron + Actril	N14	40	133	258	285
Control	NCo376	36	138	264	276
Cultivation	NCo376	40	144	265	272
Diuron + Actril	NCo376	34	134	254	282
Control	J59/3	36	137	258	289
Cultivation	J59/3	37	136	259	267
Diuron + Actril	J59/3	35	133	256	276

**Comment**

There appeared to be no effect of treatment on stalk length for the different varieties after the first measurement. NCo376 appeared to be the only variety affected by the spray treatment but by harvest there was no adverse effect apparent.

Table 4 : Yield data for 4 varieties and 3 methods of weed control

Treatments		Cane t/ha	Sucrose t/ha	Po1 % cane
Control	N11	123	16,4	13,4
Cultivation	N11	125	16,3	13,1
Diuron + Actril	N11	115	15,3	13,3
Control	N14	142	18,2	12,8
Cultivation	N14	141	18,8	13,3
Diuron + Actril	N14	138	16,8	12,2
Control	NCo376	148	18,1	12,2
Cultivation	NCo376	146	18,7	13,1
Diuron + Actril	NCo376	145	18,2	12,5
Control	J59/3	121	17,2	14,2
Cultivation	J59/3	137	20,1	14,7
Diuron + Actril	J59/3	130	19,3	14,8
CV % whole ; sub-plot		2,7;5,5	2,7; 7,8	1,6;4,6
SE same whole plot or diff whole plot		3,7	0,7	0,3
LSD same whole plot				
0,05		11	2,0	0,9
0,01		14	2,7	1,2
LSD diff whole plot				
0,05		13	2,4	1,1
0,01		19	3,6	1,6

**Comment**

In general there were no treatment differences between the weed control methods. J59/3 when cultivated mechanically had an advantage in yield over the control although crop measurements did not show marked differences.

**8. Discussion and Conclusion**

A shallow cultivation if carried out when the crop is still young would appear to have no adverse effect on yield.

The application of diuron + Actril also did not affect the final yield although slight to moderate scorch was observed, as was a trend in N11, N14 and NCo376 to slightly lower yields (MS).

It would be of interest to see if a repeat cultivation three to four weeks after the first would be harmful to the crop and whether an application of diuron + Actril also at this time would be phytotoxic following an early cultivation.