SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Cat No : 1603
Project No: 3125
Cat. No : HW 279/R1/86

Title: Variety Phytotoxicity Trial

Objectives: To test all currently used and promising varieties for their sensitivity to 4 post emergent herbicide treatments

1. **Particulars of the project:**

This crop	: 1st ratoon
Site	: La Mercy
Region	: N. Coast Coastal
Soil System	: Umzinto
Soil form/series	: Longlands/ Longlands
Variety	: Various (13)
Age	: 15.4 months
Dates	: 29/5/86-10/9/87
Rainfall	: 1201 mm
LTM Rainfall	: 1154 mm

Soil analysis

pH (water)	Clay %
4,99	< 14

P ppm	K ppm	Ca ppm	Mg ppm
16	100	478	161

Fertiliser: (kg/ha)	N	P	K
Top dress 1:0:1 (47)	141	0	141

2. **Design**

Design : Split Plot
Replication : 2
Row spacing : 1,5 m
Whole plot size : 3 m x 4 rows x 1,5 m
Net plot size : 3 m x 4 rows x 1,5 m

3. Treatments

Treatments	Rates ℓ or kg product /ha	Time of application	Method
a) Herbicides			
T1 Control	unsprayed		
T2 Sencor + Diuron	2 + 1	Post em	Over Row
T3 Velpar + Diuron	1,8 + 2,5	Post em	Over Row
T4 Bimate + surfactant	4	Post em	Over Row
T5 Bladex Plus + surfactant	9	Post em	Over Row
b) Varieties			
J59/3 N12			
N52/219 N13			
NCo376 N14			
NCo293 N16			
N7 N17			
N8 N18			
N11			

4. Chemical Formulations Used

Product	Formulation	Active ingredient
P1 Sencor	700 g/kg wp	Metribuzin
P2 Diuron	800 g/l sc	diuron
P3 Bimate	500/250g/kg wp	diuron/tebuthiuron
P4 Bladex Plus	500 g/l sc	cyanazine + atrazine
P5 Velpar	240 g/l ec	hexazinone

5. Application detail

Treatment dates	15/10/86
Time of application	12h00
Applicator	CP3
Nozzle	TK 5
Pressure	130 kpa
Height of cane	40-80cm depending on variety
Method	Over the row
Output	256 l/ha

6. Weather Conditions at time of spraying

Treatment dates	15/10/86
General	Cool
Dew	Nil
Soil surface	Moist
Wind	Slight
Sunshine hours	1,9
Temperature (°C)	
08h00	19,6
14h00	22,4
Relative humidity (%)	
08h00	71
14h00	68
Rainfall	
mm On day of spray	7,7
No of days to 1st rain	9
mm At 1st rain	1,7
mm In 1st 14 days	43,8

7. Results

Table 1: Visual ratings of the percent scorch exhibited 20 days after treatment

Variety	Sencor + Diuron	Velpar + Diuron	Bimate	Bladex Plus	Average
	% Scorch				
J59/3	15	13	10	10	12
N52/219	10	10	7	8	8,8
NCo376	4	5	3	3	3,8
NCo293	5	8	6	5	6
N7	5	7	5	4	5,3
N8	20	18	16	8	15,5
N11	4	6	5	5	5
N12	2	5	3	8	4,5
N13	2	4	4	6	4
N14	10	14	8	5	9,3
N16	8	5	5	6	6
N17	5	10	4	4	5,8
N18	18	20	14	7	14,8
Average	8,3	9,6	6,9	6,1	

Comment

Sencor + diuron and Velpar + diuron in general caused more scorching than did Bimate or Bladex Plus. Bladex Plus tended to be the least damaging of the herbicides used.

Three varieties N8, N18 and J59/3 appeared to be the most sensitive to scorching while N14 and N52/219 where moderately sensitive to herbicide scorch. NCo376, N13 and N12 were least affected.

The only treatment which showed some degree of stunting associated with scorching was N18 when sprayed with Velpar + diuron. All other treatments had little or no visible stunting effect.

Table 2: Stalk height of cane at harvest of 13 varieties sprayed with 5 herbicide treatments

Variety	Unsprayed control	Sencor + diuron	Velpar + diuron	Bimate	Bladex Plus	Average
	Stem height (cm)					
J59/3	188	218	242	251	224	245
N52/219	237	237	236	242	232	237
NCo376	245	248	236	255	236	244
NCo293	236	235	233	244	229	235
N7	223	227	231	221	221	225
N8	252	238	261	239	221	242
N11	238	241	236	244	218	235
N12	253	258	268	275	255	262
N13	253	249	279	273	240	259
N14	244	237	262	254	220	243
N16	253	256	278	263	230	256
N17	269	294	294	270	258	224
N18	254	262	264	254	235	254
Average	242	246	255	252	232	

Comment

Bladex Plus reduced stem heights in most varieties which would seem to contradict the earlier scorch observations where Bladex Plus was the least damaging of the herbicide treatments. The other herbicide treatments did not reduce stem heights over all the varieties.

No definite conclusions can be drawn from the results because of the conflicting results.

Table 3: Varietal means over all herbicide treatments for various harvest parameters

Variety	Cane Yield t cha^{-1}	Sucrose ts ha^{-1}	Pol % cane	Plant Population x 1000 ha^{-1}
J59/3	71	10,4	14,5	101
N52/219	83	12,1	14,5	97
NCo376	121	17,3	14,4	144
NCo293	89	13,3	15,0	114
N7	93	13,4	14,5	154
N8	72	9,8	13,6	121
N11	91	13,4	14,7	120
N12	109	15,7	14,4	157
N13	114	15,8	13,9	128
N14	132	18,6	14,1	120
N16	100	14,7	14,7	126
N17	109	17,1	15,7	118
N18	112	16,6	14,9	117
CV %	9,9	9,3	1,9	7,5
SE means	6,9	1,0	0,2	6,6
LSD (0,05)	21	2,9	0,6	20
LSD (0,01)	30	4,1	0,8	28

Comment

The mean of the cane yields over all the herbicide treatments showed that N14 had the highest yield and this yield was significantly greater than N12, and N17 at the 5% level of significance and greater than J59/3, N52/219, NCo293, N7, N8, N11 and N16 at the 10% level.

These above results are similar to what could be expected based on regional variety trials. The Pol % values for J59/3 and N52/219 could have been slightly higher.

Table 4: Herbicide treatment mean over all varieties for various harvest parameters

Herbicide Treatment	Cane Yield tc ha^{-1}	Sucrose ts ha^{-1}	Pol % cane	Plant Population x 1000 ha^{-1}
Control	104	15,1	14,6	133
Sencor + diuron	99	14,6	14,7	126
Velpar + diuron	101	14,6	14,4	121
Bimate	99	14,3	14,5	124
Bladex Plus	95	13,6	14,3	118
CV %	6,8	7,1	1,4	4,6
SE Means	4,8	0,7	0,1	4,1
LSD (0,05)	18,8	2,8	0,6	16
LSD (0,01)	31,2	4,7	0,9	27

Comment

Herbicide treatments did reduce cane and sucrose yields as well as plant populations. However, in all instances these reductions were non-significant.

Bladex Plus had a greater depressive effect than the other herbicides.

Table 5: Eldana damage at harvest for 13 varieties sprayed with 5 herbicide treatments

Herbicide treatment	% damaged stalks	% joints bored
Unsprayed Control	37,7	4,7
Sencor + diuron	30,8	3,9
Velpar + diuron	35,8	4,8
Bimate	37,1	5,0
Bladex Plus	40,0	5,2
Varieties		
J59/3	60,5	8,9
N52/219	59,0	7,8
NCo376	26,0	2,9
NCo293	30,0	3,7
N7	25,5	3,3
N8	26,5	2,8
N11	45,0	6,4
N12	33,0	4,2
N13	33,5	4,5
N14	41,5	6,0
N16	32,0	3,9
N17	34,0	3,7
N18	25,0	3,0

Comment

The coefficient of variation for both herbicide and variety treatments was high (30-40%). There appeared to be no real differences in the level of eldana damage as a consequence of the herbicide treatment.

Varietal differences were apparent. The level of incidence appeared higher than normal for N7, N8 and N12 but in most other varieties the trend was as could be expected.

Conclusion

The only surprising aspect of the trial was the relatively poor performance of the plots sprayed with Bladex Plus. Bladex Plus has in 11 previous trials always had a benefical effect on yield. Bimate has usually had less adverse effects on yield than Sencor + diuron or Velpar + diuron.

The response to the herbicide treatments was overshadowed by the greater varietal yield difference. The varieties performed from a yield and eldana infestation point of view as could be expected based on the regional variety programme.

In conclusion, therefore, the choice of variety is more critical to the final yield than is the choice of herbicide treatment.