SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Code : HW224/81/P
Cat. No: 1343

Title: HERBICIDE SENSITIVITY OF VARIETIES N8 AND N13

1. Particulars of the project:

This crop : Plant cane

Site : Felixton

Region : Zululand

Soil system : Berea

Soil set/series : Fernwood/Fernwood

Design : Randomised block

Variety : N8 and N13

Fertilizer :	**N**	**P**	**K**
In furrow	-	-	150
Topdressed split	59	-	59
	59	-	59
Total	118	-	268

Temik (in furrow): 20 kg/ha

Soil analysis: **Date:** 14.9.81

pH	**OM%**	**CEC**	**CLAY%**	**SILT%**	**SAND%**		
					Fine	**Med**	**Coarse**
6,47	1,53	5,78	5	4	49	37	5

ppm

P	**K**	**Ca**	**Mg**	**Zn**
> 80	101	654	69	> 4,0

Age : 12,5 months
Dates : 14.9.81-29.9.82
Rainfall : 964 mm **LTM:** 1 383 mm

Rainfall (mm):

Month	**Rain**	**LTM**	**Month**	**Rain**	**LTM**
Sept'81	137	103	Mar '82	134	155
Oct	104	124	Apr	78	124
Nov	133	124	May	100	92
Dec	71	126	Jun	11	54
			Jul	33	60
Jan '82	66	144	Aug	15	66
Feb	100	159	Sept	110	103

2. Objectives:

To test herbicide combinations at two stages of cane growth for their phytotoxic effects on N8 and N13.

3. Treatments:

	Herbicide	**Variety**	**Rate**	**Application**
1.	Control	N8	-	-
2.	Dual + atrazine	N8	5,5 + 4	pre-emergence (of crop)
3.	Sencor	N8	6	post-emergence (of crop)
4.	Diuron + Actril DS	N8	5 + 2,5	Post-emergence (of crop)

	Herbicide	Variety	Rate	Application
5.	Bladex Plus	N8	18	post-emergence (of crop)
6.	Control	N13	-	-
7.	Diuron + Actril DS	N13	5 + 2,5	post-emergence (of crop)

Product formulations were: Dual 72%, atrazine 50%, Sencor 70%, diuron 80%, Actril DS 70%, Bladex Plus 50%.

Note on treatments

Pre-emergence treatments were applied immediately after planting. After two weeks very little treatment effect on weeds was apparent and so a second application of Dual + atrazine at standard rates 2,75 + 2 ℓ/ha was applied a week later. Very little cane germination had occurred at this stage.

Post-emergence treatments were applied as directed interrow treatments when the cane was from the spike to 4-leaf stage (N13) and three leaf stage (N8). Not all cane had germinated at the time of spraying which was carried out six weeks after planting. Cane foliage was contacted by the spray solution.

4. **Experimental:**

The trial area which had in the past been abandoned to Panicum maximum pasture was repeatedly disced and ploughed to give a fine tilth but not all old Panicum maximum plants were killed.

Furrows were ridged out, Temik at 20 kg/ha applied in furrows and cane setts, after dipping in Benlate at 0,75 g/ℓ, were planted in the furrows.

Soil moisture at the time of planting was 13,6%.

Pre-emergence treatments were applied on 15.9.81, the day of planting, and repeated on 12.10.81. Post-emergence treatments were applied on 26.10.81.

Spraying details were:

Applicator : CP_3 knapsack
Nozzle : TK5 Spraying Systems floodjet
Pressure : ± 1,7 - 2 bars
Output : 304 - 340 ℓ/ha

Conditions at spraying	**Dates of spray**		
	15.9.81	**12.10.81**	**26.10.81**
Soil moisture	13,6%	Very moist	25,7%
Weather: Temp °C 8 am/2 pm	16,4/27,4	19,2/23,2	17,6/24,0
Rel. humidity % 8 am/2 pm	79/52	62/45	71/50
Sunshine hours	10,1	11,2	2,2
Rainfall (mm): (Umzimbete Estate records)			
On the day of spray	0	0	26,0
Within 2 weeks of spray	8,2	15,5	36,7
Days to first rain	8	13	0
Amount of first rain	2,8	11,4	26,0

Plot sizes were: 8 m x 5 rows x 1,3 m = 52 m^2
Net: 6 m x 3 rows x 1,3 m = 23,4 m^2
No replications: 5

The whole experiment was hand weeded repeatedly in an attempt to prevent any confounding effects of weed competition.

Weeding details were:

Date	Weeks after planting	Details
9.10.81	3,5	Hand weed in furrow only - heavy weed germination/% ground cover: P. max 30; D. sang 55; E. ind 5; C. esc 10
26.10.81	6	Hand weed in furrow, hoe weed interrow
6.11.81	7,5	Hand weeded control plots in row only
16.11.81	9	Hand weeded rows, hoe weeded interrows
18.12.81	13,5	Hand weeded throughout
25/26.1.81	19	Hand weeded throughout
16.2.82	22	Hand weeded
16.3.82	26	Hand weeded

Crop growth measurements and observations of visual phytotoxic effects were taken regularly.

5. Results:

Table 1: Visual ratings of leaf chlorosis and necrosis and stunting taken at intervals after planting

Treatments	Variety	Application		Ratings/Dates			
		Method	Date	Leaf scorch*			Stunting**
				22.10	29.10	6.11	18.12
Control-unsprayed	N8	-	-	1,8	1,4	1	3,1
Dual + atrazine	N8	pre	15.9,12.10	2,2	1,5	1	4
Sencor	N8	post	26.10	2	3,7	4,2	3,5
Diuron + Actril DS	N8	post	26.10	1,9	2,9	4,2	3,6
Bladex Plus + S	N8	post	26.10	1,8	3	3,8	4
Control	N13	-	-	3,2	2,2	1,6	3,3
Diuron + Actril DS	N13	post	26.10	3,3	4,3	4,8	4,5

* 1-9 scale where 1 = no effect, 9 = completely chlorotic and necrotic
** 1-5 scale where 1 = very poor, 5 = very good growth

Comments

1. Some yellowing of cane plants was evident in both varieties prior to spraying of post-emergence treatment (ratings taken on 22.10.81) and N13 was markedly worse than N8.

2. After post-emergence treatments immediate differences in chlorosis became apparent with Sencor causing the most severe effects on N8.

3. Although these differences were more marked on 6.11.81, all evidence of chlorosis in all treatments disappeared in time and was virtually gone by 2.12.81, some five weeks after application.

4. Visual differences in cane growth were obvious 13 weeks after planting in favour of herbicide treated plots and in particular the pre-emergence applied Dual + atrazine. This difference is assumed to be due to weed competition in the early stages of crop growth. The weed population was extremely heavy and weather conditions were not ideal and this could have exaggerated the competitive effects.

Table 2: Crop measurements taken 3 days and 1,5, 3,5 and 6 months after post-emergence treatments were applied

Treatments	Variety	Measurements/Date							
		Stalk length (m)				Population (1000/ha)			
		3	1,5	3,5	6	3	1,5	3,5	6
Control	N8	0,064	0,20	1,03	1,53	40	160	155	123
Dual + atrazine	N8	0,055	0,25	1,09	1,64	48	208	156	144
Sencor	N8	0,067	0,22	1,06	1,59	46	188	162	131
Diuron + Actril DS	N8	0,062	0,24	1,07	1,63	47	213	153	135
Bladex Plus + S	N8	0,068	0,23	1,05	1,60	46	206	155	144
Control	N13	0,088	0,23	0,80	1,19	36	113	132	119
Diuron + Actril DS	N13	0,089	0,25	0,95	1,37	44	136	135	127

Comments

1. Although stalk populations were slightly low in unsprayed plots of both varieties at the time of post-emergence treatment application this is not thought to be associated with the continued low populations recorded throughout the crop growth period of both varieties in unsprayed control plots (see Appendix).

2. Stalk lengths show a similar trend in that unsprayed control plots are worse than treated in spite of similar lengths at the time of spraying post-emergence treatments.

3. Differences between treatments are substantial with the best stalk length and populations being recorded in plots treated with Dual + atrazine pre-emergence of the crop. Sencor was the worst of the post-emergence treatments.

Table 3: Yield data and crop measurements at harvest

Treatments	Rate ℓ or kg prod/ha	Variety	Yield				Crop measurements	
			Cane t/ha	Suc t/ha	Ers % cane	Ers t/ha	Stalk length (m)	Stalk popln (1000/ha)
Control	-	N8	60	7,4	10,5	6,3	1,85	123
Dual + atrazine	5,5 + 4	N8	72*	8,9	10,5	7,6	1,94	138*
Sencor	6	N8	68	8,7	11,0	7,5	1,87	130
Diuron + Actril DS	5 + 2,5	N8	69	8,4	10,4	7,2	1,88	131
Bladex Plus + S	18	N8	69	8,4	10,5	7,2	1,91	131
Control	-	N13	64	8,5	11,8	7,6	1,50	114
Diuron + Actril DS	5 + 2,5	N13	76*	9,7	11,1	8,5	1,61	118
CV %			10,5	15,1	8,9	16,9	4,3	7,3
LSD (0,05)			9,358	1,695	1,257	1,635	0,1013	12,10
LSD (0,01)			12,67	2,294	1,702	2,214	0,1371	16,38

* significantly different from control at the 5% level
LSD (N8) at P = 0,05 = 9,5 tons cane/ha ± 3,585

Comments

1. Yield results confirm the trend in growth measurements towards better growth from treated plots. This reaches a level of statistical significance in only three cases but the consistency of the results indicate that all differences are real.

2. It is thus evident that differences due to weed competition have far outweighed any disadvantage due to crop phytotoxicity of these treatments. Differences between pre-emergence and post-emergence treatments can also not be related directly to greater phytotoxicity from post-emergence treatments (as was evident in chlorosis ratings) as they were sprayed later than pre-emergence treatments and differences in weed competition were possible.

3. The crop was harvested at a young age for this area and yields were:

	N8	N13
tc/ha/100 mm	6,2	6,6
tc/ha/month	5,4	5,6

4. Competitive effects of weeds have been exaggerated due to low rainfall, wide row spacing and consequent length of time to canopy and the exceptional weed population due to the field having been a Panicum maximum pasture. The weak status of the soil in terms of clay content may also have affected crop growth.

6. Conclusions:

1. The expected damage from herbicide treatments on N8 growing on weak sands was not apparent except in the form of temporary leaf chlorosis.

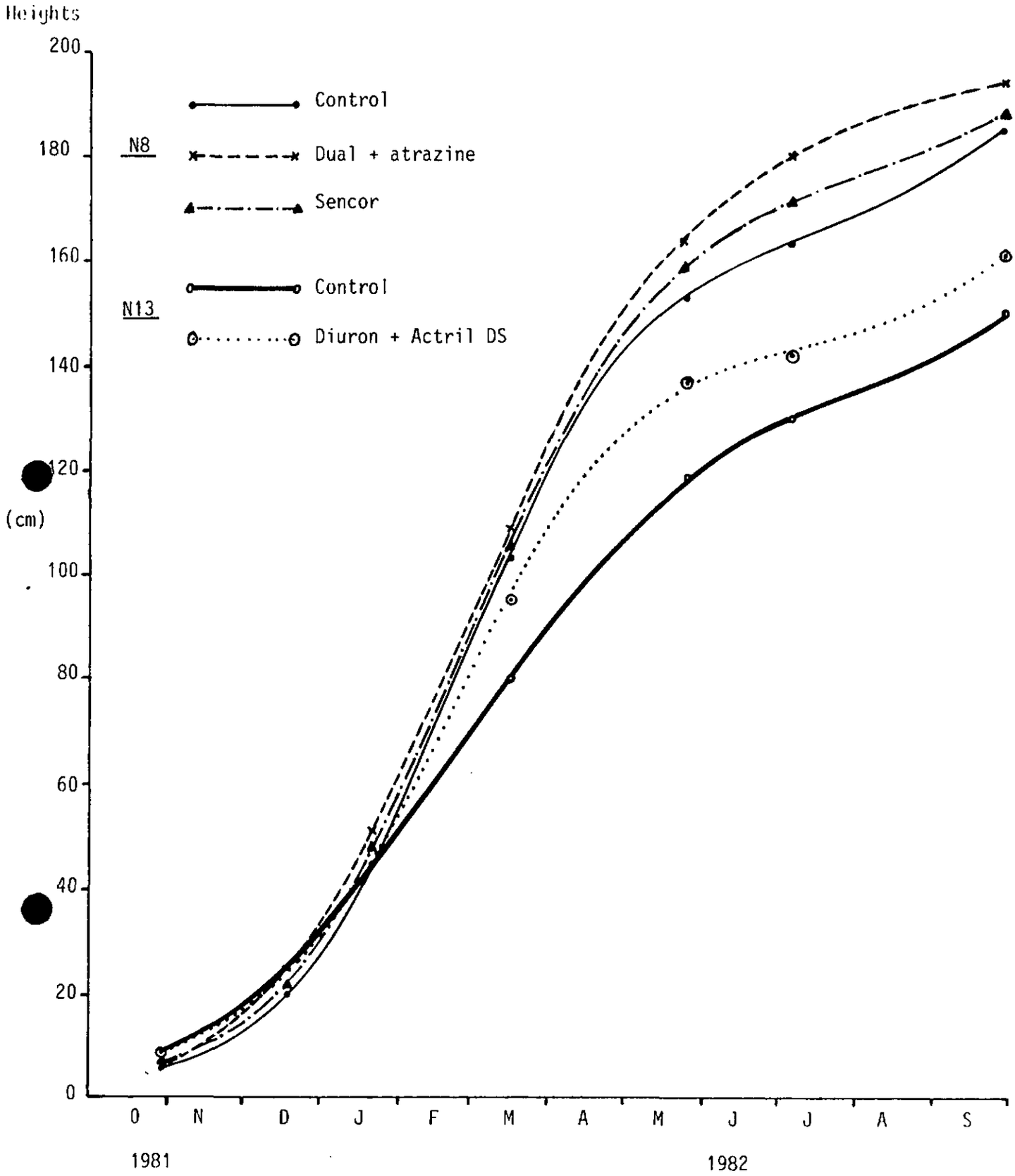
2. All herbicide treatments were superior to hand weeding in maintaining the crop free of competition under the conditions of this trial.

3. Reasons for the lack of severe phytotoxic effects of herbicides could be (a) the use of Temik nematicide instead of Curaterr, (b) the relatively high organic matter content of the soil (probably due to old Panicum maximum plants which had been ploughed in).

4. The importance of early weed control in plant cane under these conditions (weak sand, dry season) are clearly illustrated by these results.

PETT/HDN
23/6/83

Crop growth - stalk height



Crop growth - stalk populations