

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Code: HW157/77/R3
Cat No: 1275

Title: Herbicide phytotoxicity to varieties

1. Particulars of the project

This crop : 3rd Ratoon
Site : Pongola Field Station
Region : Northern area
Soil system : Komatipoort
Soil form/series : Hutton/Shorrocks
Design : Randomised blocks + spot plots
Variety : 6 Varieties
Fertilizer/ : N P K
kg/ha 138 23 100
Date sprayed : 23.12.80
Sprayer : CP₃ knapsack
Nozzle : TK5
Pressure : 2 bars
Time : 0600-0900
Weather : Clear and warm
Soil : Moist

Soil analysis: Date 4.6.81

pH	O.M.%	Clay%	Silt%	Sand%	CEC
6,7	1,75	23	11	66	10-90

ppm.

P	K	Ca	Mg	Zn	Al
22	176	784	>220	-	-

Age: 11,8 months Dates: 11.1180-4-11-81
Rainfall: 597 mm
Irrigation: 610 mm
Total: 1207 mm
Wind: Very slight
Temperatures (8 am): 28,3°C
(2 pm): 35,8°C
Rel. Humidity: (8 am): 80%
(2 pm): 41%

2. Objectives:

To determine the sensitivity of six varieties to a range of herbicide treatments.

3. Treatments:

<u>Chemical</u>	<u>Rate in kg or ℓ</u> <u>ai or ae/ha</u>	<u>Rate in kg or ℓ</u> <u>prod/ha</u>
1. Control (unsprayed)	-	-
2. Diuron + paraquat	3,2 + 0,5	4 + 5
3. Diuron + MSMA	4,8 + 4,32	6 + 6
4. Diuron + 2,4-D amine + S	4,0 + 2,88	5 + 4

NB. Rates used were twice those normally recommended.

4. Cane growth stages at the time of application were:

	NCo 376	NCo 293	N52/219	N55/805	N8	N11
Leaf canopy height (mm)	600	650	550	750	400	450
Av.No. leaves unfurled/shoot	6-8	6-8	6-7	6-7	5-7	5-7

5. Experimental

The nozzle was held directly over the cane rows and the output was 310 l/ha.

6. Results:

6.1 Visual ratings of leaf scorch (L.S.) and stunting (St) taken 20 days after spraying. Leaf scorch ratings are based on a 1-9 scale where 1 = no effect and 9 = dead, while stunting ratings are based on a 1-5 scale where 1 = very poor and 5 = no stunting.

Variety treatment	Control		Di + pa		Di+MSMA		Di+2,4-D	
	L.S.	St.	L.S.	St.	L.S.	St.	L.S.	St.
NCo 376	1	5	4,3	2,8	3,5	3,8	4,3	1,5
N52/219	1	5	3,3	3	4	3,8	4,3	2,3
N55/805	1	5	5,3	2,5	4	4	2	4
NCo 293	1	5	5	2	4	3,5	3	2,5
N8	1	5	5,5	1,5	5	2,5	6	1
N11	1	5	4,3	2,3	3,3	3,8	2,5	2,8

6.2 Stalk populations and height measurements taken 8 days and one, three and five months after spraying

Variety	Treatment	Stalk hts (m)				Stalk populations(100/ha)			
		8 days	1	3	5	8 days	1	3	5
NCo 376	Control	0,49	1,04	1,86	2,38	536	233	187	173
	Di + par	0,29	0,69	1,54	1,98	504	292	174	162
	Di + MSMA	0,33	0,87	1,70	2,14	554	288	192	175
	Di + 2,4-D + S	0,30	0,52	1,24	1,72	445	333	202	174
N52/219	Control	0,51	1,04	1,85	2,34	399	192	132	120
	Di + par	0,29	0,81	1,57	2,12	332	202	146	133
	Di + MSMA	0,36	0,80	1,62	2,06	356	218	124	110
	Di + 2,4-D + S	0,32	0,68	1,38	1,84	360	208	146	133
N55/805	Control	0,41	1,00	1,76	2,13	488	255	152	138
	Di + par	0,29	0,66	1,33	1,82	425	313	160	148
	Di + MSMA	0,38	0,83	1,58	1,96	471	249	154	142
	Di + 2,4-D + S	0,38	0,85	1,60	1,98	439	216	142	131
NCo 293	Control	0,46	1,01	1,88	2,39	398	219	151	138
	Di + par	0,29	0,69	1,45	1,92	398	223	145	135
	Di + MSMA	0,38	0,81	1,68	2,18	398	207	146	131
	Di + 2,4-D + S	0,35	0,68	1,49	1,99	392	205	152	137
N8	Control	0,53	1,10	2,29	2,66	423	224	182	167
	Di + par	0,27	0,71	1,73	2,22	406	248	170	162
	Di + MSMA	0,28	0,78	1,73	2,26	418	260	182	164
	Di + 2,4-D + S	0,27	0,55	1,57	2,05	399	286	158	145
N11	Control	0,53	1,04	1,79	2,36	539	235	157	140
	Di + par	0,26	0,66	1,47	1,90	405	293	158	148
	Di + MSMA	0,31	0,76	1,65	2,13	486	243	167	154
	Di + 2,4-D + S	0,35	0,67	1,50	1,99	511	256	167	151

6.3 Crop characteristics and yield at harvest

Variety	Treatment	Stalk height (m)	Yield				Cane (t/ha) expressed as % control
			Cane t/ha	Sucrose t/ha	Ers % cane	Ers t/ha	
NCo 376	Control	2,57	132	18,1	11,7	15,4	100
	Di + par	2,20	123*	16,2**	11,1	13,7*	93
	Di + MSMA	2,44	131	18,2	11,9	15,5	99
	Di + 2,4-D + S	2,02	110**	14,8**	11,3	12,4**	83
N52/219	Control	2,48	116	17,5	13,0	15,1	100
	Di + par	2,33	110	16,5	12,9	14,3	95
	Di + MSMA	2,33	109	15,9*	12,7	13,8*	94
	Di + 2,4-D + S	2,20	106*	15,6*	12,8	13,5*	91
N55/805	Control	2,33	114	16,9	12,8	14,6	100
	Di + par	2,18	102**	15,0**	12,6	12,9**	89
	Di + MSMA	2,33	112	16,8	13,1	14,6	98
	Di + 2,4-D + S	2,30	112	16,6	12,7	14,3	98
NCo 293	Control	2,54	125	16,5	11,1	13,8	100
	Di + par	2,26	105**	14,3**	11,5	12,1**	84
	Di + MSMA	2,49	113**	15,2*	11,4	12,8	90
	Di + 2,4-D + S	2,36	109**	15,0*	11,6	12,7	87
N8	Control	2,77	107	14,0	10,8	11,5	100
	Di + par	2,32	95**	11,4**	9,5**	9,0**	89
	Di + MSMA	2,50	98*	11,9**	9,7	9,5**	92
	Di + 2,4-D + S	2,28	79**	9,5**	9,4*	7,5**	74
N11	Control	2,48	112	15,0	11,4	12,7	100
	Di + par	2,32	98**	12,5**	10,3*	10,2**	88
	Di + MSMA	2,28	106	14,3	11,6	12,3	95
	Di + 2,4-D + S	2,41	105	14,0	11,3	11,8	94
	C.V.%		4,93	5,76	6,13	6,78	
	L.S.D.(0,05)*		7,66	1,23	1,01	1,22	
	L.S.D.(0,01)**		10,21	1,64	1,34	1,63	

6.4 Smut whip counts (mean per plot) 72 and 84 days after previous harvest

Varieties Treatment	Days after harvest											
	NCo 376		N52/219		N55/805		NCo 293		N8		N11	
	72	84	72	84	72	84	72	84	72	84	72	84
Control	1,3	2,8	0	0	7,8	12,8	0	0	0	0	19,3	12,3
Diuron + par	1	2	0	0	8,5	17	1,5	0,25	0	0	16,3	17,3
Diuron + MSMA	0,5	1,3	0	0	10,3	10	0	0	0	0	13,5	21,5
Diuron + 2,4-D + S	0,5	1	0	0	25,3	22,5	0	0	0	0	13,8	27,8

6.5 Lodging - Number of lines lodged per plot at 11 months

Treatment	NCo 376	N52/219	N55/805	NCo 293	N8	N11
Control	1,3	1	1,3	1,3	3,3	3
Di + par	0	1,8	1,5	0,5	2,3	0,5
Di + MSMA	1,3	1,8	1,3	2	1,3	1
Di + 2,4-D + S	1,3	1,8	0,8	0,8	3	0,5

7. Comments:Visual ratings:

Generally very severe leaf scorch symptoms were evident on all varieties even from diuron + 2,4-D amine + S. The hot conditions were probably responsible for an exaggerated effect.

Stunting was also marked due to most treatments. Least stunting occurred in N55/805 after treatment with diuron + 2,4-D + S and diuron + MSMA while the greatest effect appeared to be on N8 after treatment with diuron + 2,4-D + S.

Early stalk measurements:

All varieties were affected by all treatments in terms of stalk length but differences occurred between treatments and varieties in the degree of severity. N8 was the most severely affected variety and N55/805 the least, the latter showing particular insensitivity to diuron + 2,4-D + S and diuron + MSMA. Diuron + MSMA was generally safer than the other two treatments. Varieties NCo 376, N52/219 and N8 were more sensitive to 2,4-D than paraquat while the reverse was true for varieties N55/805 and N11. Very little difference occurred between these treatments on NCo 293.

Populations of stalks were slightly reduced by herbicide treatments initially except in NCo 293. However, compensatory tillering occurred subsequently causing treated cane to have higher populations. Ultimate differences were small except for N8 after treatment with diuron + 2,4-D and N52/219 after treatment with diuron + MSMA.

YieldCane (t/ha)

Generally trends followed stalk height differences and statistically significant reductions were produced. Average percent reductions from the treatments on all varieties were:

Di + MSMA	-	5%
Di + par	-	10%
Di + 2,4-D	-	12%

Ers % cane

This was affected in N8 and N11 only. Diuron + paraquat affected ers% of N11 and all treatments appeared to affect that of N8.

Flowering:

No flowering occurred in this experiment.

Diseases:

Smut occurred in varieties NCo 376, N55/805 and N11. An increase in smut whips was apparent in N55/805 after treatment with diuron + 2,4-D + S.

Lodging:

Severe lodging occurred in this experiment. Slight differences were apparent between treatments but these results cannot be regarded as 100% reliable.

General comments:

The most sensitive variety was N8 and the most phytotoxic treatment was diuron + 2,4-D + S.

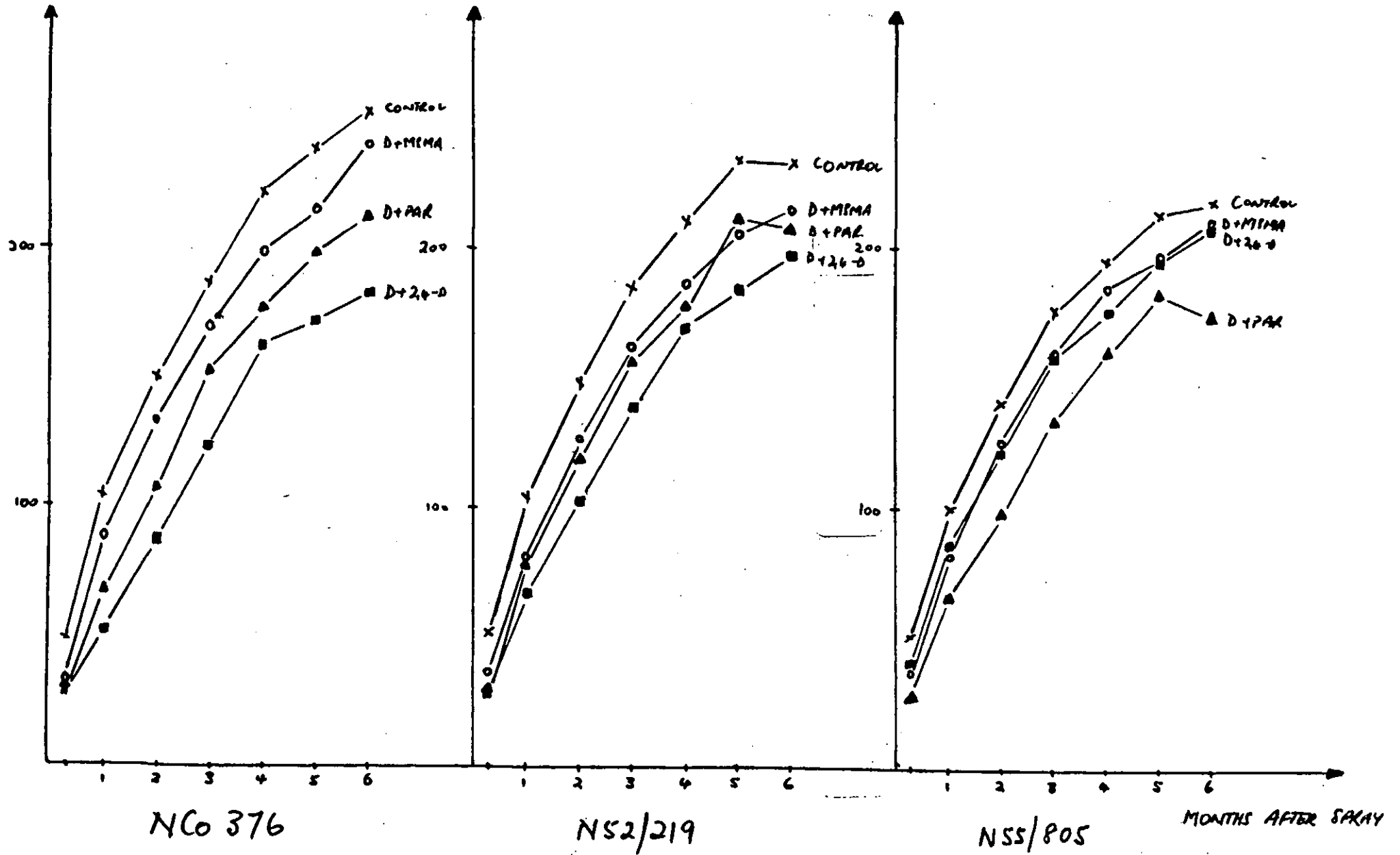
Some specific differences appear to be:

N11 and N55/805 are sensitive to diuron + paraquat but much less so to diuron + 2,4-D and diuron + MSMA.

N52/219 is not as sensitive as other varieties to paraquat. Diuron + 2,4-D is particularly phytotoxic to NCo 376, N52/219, NCo 293 and N8.

PETT/PMO
20.4.82

STALK HEIGHT (CM)



STALK HEIGHT (CM)

