

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

2000/42 HERBICIDE PHYTOTOXICITY TRIAL

TERMINAL REPORT

Cat 1645
Object: To determine the phytotoxicity of a range of herbicides on 9 (nine) Pre-release varieties and NCo376.

Planted: 20th October, 1987.

Terminated: 10th October, 1988, after the plant crop.

Location: ZSA Experiment Station, M1.

Soil type: PE.1 sandy clay loam derived from gneiss.

Design: Observational, no statistical design.

Spacing: 1,5m between rows.

Fertiliser: 100 kg/ha P₂O₅ disced in before planting.
60 kg/ha K₂O topdressed at 4 weeks.
47 kg/ha N topdressed at 4 weeks.
93 kg/ha N topdressed at 8 weeks.

Treatments:

a) Varieties

- | | |
|------------|------------|
| 1. 78-66 | 6. 79-1166 |
| 2. 79-3266 | 7. 78-1610 |
| 3. 78-1635 | 8. N14 |
| 4. 79-2343 | 9. 78-912 |
| 5. 78-1910 | 10. NCo376 |

b) Herbicides

<u>Trade Name</u>	<u>Chemical Name</u>	<u>Standard rate</u>	<u>Time of application</u>
1. Gramoxone 25% s.c.	Paraquat	1,5 l/ha	post-emergent
2. MCPA 40% a.e.	MCPA	4,0 l/ha	post-emergent
3. Daconate 6 72% e.c.	MSMA	2,0 l/ha	post-emergent
4. Gesaprim 50% s.c.	Atrazine	3,2 l/ha	pre-emergent
5. Gesapax 80% w.p.	Ametryn	2kg/ha	post-emergent
6. Dalapon w.p.	Dalapon	3kg/ha	post-emergent
7. Actril DS 70% e.c.	Ioxynil	1,25 l/ha	post-emergent
8. Dual 72% e.c.	Metolochlor	1,5 l/ha	pre-emergent

Conduct: The pre-emergent herbicides (Gesaprim and Dual) were applied on the third day after the first irrigation. All other herbicides were applied 42 days after planting when the crop was at the 8 leaf stage.

The herbicides were sprayed over the middle row of the 3-row plot. A 1m swath was sprayed over the cane line. Phytotoxicity was assessed 12 days after the post-emergent application and again 20 days later. The unsprayed rows were used to compare the effect of the herbicides on the sprayed cane. The phytotoxicity was assessed using the EWRC scale described on the next page:

<u>Score</u>	<u>Phytotoxicity symptoms</u>
1	absolutely no symptoms, healthy plants,
2	very slight symptoms, some stunting, yellowing,
3	slight symptoms as above, but clearly visible,
4	stronger chlorosis and/or stunting, probably no influence on yield,
5	thinning of stand, strong chlorosis and/or stunting, influence on yield expected,
6	
7	
8	increasing damage until no crop is left
9	

At harvest, all the rows were weighed and the stalks counted.

RESULTS

The visual assessment scores, cane yields and stalk counts are presented in the attached tables.

a) Visual assessment

Gramoxone: The cane was severely scorched 15 hours after the herbicide was sprayed. At the first assessment date, the cane was still scorched. At the second assessment date the scorching was no longer visible but the cane was stunted.

MCPA: Slight stunting of cane was visible at the first assessment date. The stunting was more evident at the second assessment date. No chlorosis was evident.

Daconate: At the first assessment date, chlorosis, especially of the leaf edges and tips, was clearly visible. Symptoms disappeared at the time of the second assessment.

Gesaprim: No phytotoxic symptoms were evident.

Gesapax: Chlorosis was evident at the first assessment date with some varieties expressing more severe symptoms than others. At the second assessment date, most of the chlorosis had disappeared but the cane was stunted.

Dalapon: Cane was definitely stunted at the first assessment date but no chlorosis was visible. Stunting appeared worse at the second assessment date.

Actril: Leaf chlorosis was evident at the first assessment date but had disappeared at the second assessment date. Slight stunting was evident at both assessment dates.

Dual: No phytotoxicity symptoms were evident.

b) Yield parameters

Pre-emergent application of Gesaprim seemed to improve cane yields in most varieties. The rest of the herbicides apparently reduced cane yields to varying degrees. The most severe yields reductions was recorded when Gramoxone was applied.

Stalk numbers followed a more or less similar trend to cane yields but with the herbicide Dalapon showing the greatest depressive effect on stalk numbers. Variety 79-3266 recorded higher stalk numbers when sprayed with MCPA, Daconate, Gesaprim and Dual.

Varieties seemed to be affected differently by different herbicides. Variety 78-1635 recorded increased cane yields when sprayed with Daconate, Gesaprim, Dalapon and Actril. Cane yields of variety 78-1610 seemed most severely affected by most herbicides.

CONCLUSIONS

Pre-emergent applications of Gesaprim showed increases in cane yield. The herbicide, absorbed through the roots, acts as a photosynthesis inhibitor but it has also been known to have additive effects. Hence it is possible that the recorded yield increases were significant.

Gramoxone, sprayed over the cane, severely depressed yield in all the varieties although to varying degrees. Other herbicides also depressed cane yields but to a lesser extent. The varieties were physiologically and morphologically different hence they showed varied responses to herbicides.

However, the small plot sizes and the fact that the trial was unreplicated precludes drawing of definite conclusions.

ERT/Jan'89

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9000/42 HERBICIDE PHYTOTOXICITY TRIAL

FIRST ASSESSMENT : 15th December, 1987

Variety	Gramoxone	MCPA	Daconate	Gesaprim	Gesapax	Dalapon	Actril D/S	Dual
78-66	6	2	4	1	2	4	2	1
79-3266	6	2	4	1	3	5	5	1
78-1635	6	3	4	1	4	5	1	1
79-2343	6	3	4	1	3	5	1	1
78-1910	6	3	4	1	4	5	1	1
79-1166	6	2	4	1	6	4	2	1
78-1610	6	1	3	1	6	4	2	1
N14	6	1	2	1	6	4	1	1
78-912	6	1	2	1	5	4	1	1
NCo376	6	1	2	1	5	5	1	1

SECOND ASSESSMENT : 5th January, 1988

Variety	Gramoxone	MCPA	Daconate	Gesaprim	Gesapax	Dalapon	Actril D/S	Dual
78-66	6	5	1	1	5	5	3	1
79-3266	6	5	1	1	5	5	2	1
78-1635	6	5	1	1	5	5	3	1
79-2343	6	5	1	1	5	5	1	1
78-1910	6	5	1	1	5	5	1	1
79-1166	6	2	1	1	6	6	2	1
78-1610	6	2	1	1	6	6	1	1
N14	6	2	1	1	6	6	1	1
78-912	6	2	1	1	6	6	1	1
NCo376	6	2	1	1	6	6	2	1

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STALK NUMBERSSPRAYED ROW EXPRESSED AS % OF UNSPRAYED ROWS

Variety	Gramoxone	MCPA	Daconate	Gesaprim	Gesapax	Dalapon	Actril DSS	Dual	MEANS
78-66	76	95	96	112	93	77	111	86	93
79-3266	96	114	102	107	96	74	95	107	98
78-1635	94	97	96	105	88	44	80	79	84
79-2343	92	87	78	89	101	47	99	90	85
78-1910	86	87	94	116	91	86	106	94	95
79-1166	78	94	102	112	95	62	81	108	91
78-1610	66	96	100	104	88	35	103	98	85
N14	82	98	109	104	87	55	99	104	92
78-912	90	103	84	93	86	77	113	71	90
NCO 376	92	104	96	119	83	72	88	100	94
MEANS	85	98	96	106	91	62	96	95	91

CANE YIELDSPRAYED ROW EXPRESSED AS % OF UNSPRAYED ROWS

Variety	Gramoxone	MCPA	Daconate	Gesaprim	Gesapax	Dalapon	Actril DSS	Dual	MEANS
78-66	66	95	99	119	91	79	97	98	93
79-3266	80	92	92	103	92	83	76	103	90
78-1635	54	73	119	110	77	107	139	94	96
79-2343	63	77	85	91	89	46	96	95	80
78-1910	65	76	87	104	90	120	99	78	89
79-1166	48	82	89	112	80	69	72	97	80
78-1610	45	80	93	102	72	45	84	96	77
N14	46	84	112	96	72	81	96	104	85
78-912	60	98	81	99	82	82	90	70	83
NCO 376	61	88	92	124	79	64	69	111	84
MEANS	58	85	95	105	82	77	92	94	86