

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

6400/26 MAXIMUM YIELD TRIAL

Cat. No.: 1365

Object: To obtain the maximum yields of cane and recoverable sucrose and fermentables from 12-month old ratoon NCo 376 harvested in early May, through a balanced supply of luxury levels of all nutrients, a non-limiting moisture regime, and the application of a chemical ripener.

This crop: Second ratoon Age: 12,0 months (7.5.82-5.5.83)

Location: ZSA Experiment Station, Blocks F1 and F3.

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

Design: No statistical layout, 6 replications.

Variety/ Spacing: NCo 376 in 1,5m rows.

Fertiliser:

	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Control: Standar levels	180	100	60
Treated: Luxury levels	300	150	180

Applied as shown below.

First digit: Fertiliser levels:

	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
0: Control: Standar levels	180	100	60
1: Treated: Luxury levels applied in addition to Control	120	50	120

20kg N/ha and 20kg K<sub>2</sub>O/ha applied at 4-weekly intervals from 20 weeks to 40 weeks inclusive, 50kg P<sub>2</sub>O<sub>5</sub>/ha applied at 20 weeks.

Second digit:  
 0: No ripener applied  
 1: Glyphosate applied: 170,94 l/ha applied, containing 39,1ml Roundup/l.

Rainfall: 377,2 mm

Irrigation: Overhead at 40mm(nett) deficit: 1 305,0 mm

Conduct: 6400/26 was superimposed on 6400/25(a) (Reps 1-3 Block F1) and Block F3 (Reps 4-6). Original luxury fertiliser-treated plots were maintained, and a 2m path was cut through the centre of F1 and F3 to give sprayed and un-sprayed plots,

## RESULTS

Relevant harvest data are presented in the attached tables. Table 3 shows data from 6400/25(a) and 6400/26 for comparative purposes.

(a) Cane yields: Luxury fertiliser had a positive effect, boosting yield by 12,7%. The effect of the chemical ripener was only slightly negative, resulting in a 2,3% drop at standard fertiliser levels, but in a 6,5% yield drop at luxury fertiliser levels. Mean yields for the trial were slightly down on the previous year, but the effect of excess fertiliser was considerably greater (12,7% against 7,6%).

(b) Sucrose quality: Luxury fertiliser levels had a significant effect on sucrose quantity, pol % cane being depressed by 5,2% and ERC % cane by 6,4%. The application of glyphosate improved sucrose quality parameters at both luxury and standard fertiliser levels. Pol % cane increased by 6,7% and 6,0% at standard and luxury fertiliser levels; ERC % cane increased by 8,4% and 7,4% respectively. The ripening effect boosted sucrose quality parameters to just above those of Control (standard fertiliser, no ripener).

(c) Fermentable quality: Fermentable quality parameters were not as adversely affected; TFAS % cane being depressed by 4,2% and ERF % cane by 3,9% as a result of luxury fertiliser levels. Glyphosate, similarly, had a reduced ripening effect; TFAS % cane and ERF % cane were increased by 3,4% and 2,5%, respectively at standard fertiliser levels and 3,4% and 3,4% at luxury fertiliser levels. Reducing sugars were increased by 6,1% as a result of higher nutrient levels while the ripener suppressed reducing sugars by 29,1% and 16,2% at standard and luxury fertiliser levels respectively.

(d) ERC yield: The lowest ERC yield was recorded from unripened standard fertilised cane. The increased yield from luxury fertiliser more than off-set the adverse quality effects, resulting in a 5,7% yield increase. The ripener-induced quality benefits resulted in a 6,5% ERC yield increase from normally fertilised cane and a 1,4% increase at luxury fertiliser levels. The combined effect of ripener and excess fertiliser resulted in a 7,1% increase in crystal yield (1,07 tonnes ERC/ha). These increases are contrary to the actual yield suppression recorded the previous year.

(e) ERF yield: The lowest ERF yield was recorded from the Control treatment. The combined effects of yield increase and reduced suppression of ERF % cane resulted in the unripened higher nutrient level treatment yielding the maximum level of fermentables, 8,4% increase. The ripener resulted in only a 1,9% increase at standard fertiliser levels and a 3% decrease in fermentable yield at luxury fertiliser levels.

3/Conclusions...

### CONCLUSIONS

Results followed previously-reported patterns with respect to fertiliser effects, except that the effect on yield was greater than in the previous crop and the effect on quality was less severe. This resulted in luxury fertiliser levels out-yielding the standard treatment (see Table 3).

The effects from the applied glyphosate also followed predictable patterns in that the effect was greater for sucrose yield than for fermentable yield.

The optimum treatment for sucrose production would be to artificially ripen cane grown with luxury fertiliser levels, while for fermentable production it would be more beneficial to harvest unripened, luxury-fertilised cane.

### SUMMARY

The results from 6400/25(a) and 6400/26 show that, potentially, there is a place, early season only, for higher fertiliser levels, ripened artificially with a chemical ripener. This hypothesis should be tested in a more rigorous trial.

JJR/May'83  
arg

6400/26 MAXIMUM YIELD TRIAL

Table 1: HARVEST AND QUALITY DATA

Treatments	Cane Yield t/ha	ERC Yield t/ha	ERF Yield t/ha	ERC % Cane	ERF % Cane	Pol % Cane	TFAS % Cane	Red.Sug% Cane
00: Std.Fert. no ripener	127,84	14,96	17,94	11,72	14,05	13,45	14,92	1,44
01: Std.Fert. with ripener	126,23	15,94	18,29	12,70	14,54	14,34	15,33	1,04
10: Lux.Fert. no ripener	144,02	15,82	19,46	10,97	13,51	12,74	14,20	1,53
11: Lux.Fert. with ripener	135,82	16,03	18,92	11,86	13,99	13,55	14,70	1,21
Significance	N.S.	N.S.	N.S.	*	*	*	*	**
L.S.D. P = 0,05	19,78	1,80	2,20	0,92	0,66	0,87	0,67	0,26
P = 0,01	27,36	2,49	3,05	1,27	0,91	1,20	0,93	0,36
Mean	133,48	15,69	18,65	11,81	14,02	13,52	14,76	1,30
S.E. (Plots) $\pm$	16,08	1,47	1,79	0,75	0,53	0,70	0,54	0,21
S.E. (Treatments) $\pm$	6,56	0,60	0,73	0,30	0,22	0,29	0,22	0,09
C.V. %	12,04	9,34	9,60	6,32	3,80	5,21	3,69	16,44

Table 2: HARVEST AND QUALITY DATA % OF CONTROL

Treatments	Cane Yield t/ha	ERC Yield t/ha	ERF Yield t/ha	ERC % Cane	ERF % Cane	Pol % Cane	TFAS % Cane	Red.Sug % Cane
00: Control	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
01: Std.Fert. with ripener	98,7	106,5	101,9	108,4	103,5	106,7	103,4	71,9
02: Lux.Fert. no ripener	112,7	105,7	108,4	93,6	96,1	94,8	95,8	106,1
11: Lux.Fert. with ripener	106,2	107,1	105,4	101,2	99,5	100,8	99,2	83,8

6400/26 MAXIMUM YIELD TRIAL

Table 3: HARVEST AND QUALITY DATA: 6400/25(a) and 6400/26

Harvest and Quality Parameters		FERTILISER EFFECTS					
		CONTROL		TREATED		TREATED AS % OF CONTROL	
		1R	2R	1R	2R	1R	2R
Yield Data t/ha	Cane yield	140,37	127,84	151,05	144,02	107,61	112,66
	ERC yield	16,32	14,96	15,26	15,82	93,50	105,75
	ERF yield	18,16	17,94	17,87	19,46	98,40	108,42
Quality Data % Cane	Pol	12,96	13,45	11,50	12,74	88,73	94,72
	TFAS	13,67	14,82	12,53	14,20	91,66	95,82
	ERC	11,64	11,72	10,11	10,97	86,86	93,64
	ERF	12,95	14,05	11,84	13,51	91,45	96,15
	Red.Sug.	0,75	1,44	1,08	1,53	144,00	106,25
Stalk pop./ha x 10 <sup>3</sup>		156,8	152,5	162,6	157,7	103,70	103,40
Stalk lengths m		2,32	2,27	2,62	2,39	112,93	105,29

NOTE: 1R Data was taken from 6400/25(a) harvested in 1982.

2R Data was taken from 6400/26 harvested in 1983. Only unsprayed data was used for comparative purposes.