SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Code: A/KS/83/

Cat. No.: 1428

TITLE: Rates of potassium and sulphur for ratoon cane grown in a Hutton/Clansthal soil on the north coast

1. Particulars of project

This crop	:	8th Ratoon
Site	:	Field 61 CFS Sub Stn
Region	:	North Coast Coastal
Soil system	:	Berea
Soil form/series	:	Hutton/Clansthal
Design	:	Factorial x 3 reps.
Variety	:	N55/805
Fertilizer/ Ameliorants	:	N 100 P - K ↓ See treatments
Soil description	:	A deep, porous, light brown loamy sand

Soil analysis: 8 November 1983

ppm							
pH	P	S	Ca	Mg	Na	Zn	Clay %
7,9	35	35	1015	32	20	1,0	12

Applied K kg ha^{-1}	Soil K ppm		
	Oct 81	Oct 82	Nov 83
0	24	33	33
100	29	44	44
150	35	51	52
200	40	57	64

Age: 8,6 months Dates: (8.11.83-27.07.84)

Rainfall: 1 293 mm LTM: 749 mm

Irrigation: Nil

2. Objectives

To measure:

1. The response to high levels of potassium and
2. The response to sulphur on ratoon cane grown in a Clansthal series soil.

3. Treatments (Kg ha^{-1})

	Levels of K	Levels of sulphur
1.	0	0
2.	200	50
3.	400	100
4.	600	500

Notes on treatments (Treatments applied on 13.12.83 five weeks after harvest).

- N as Urea (46) was banded over the cane row.
- K as KCl (50) was banded over the cane row.
- Sulphur applied as pure sulphur (powder) and banded on both sides of the cane row so as not to burn the foliage.
- Temik at 20 kg ha^{-1} was banded over the cane row.

Rainfall (mm)

Months	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
1983/84	225	162	369	170	86	116	51	21	92	1 293
LTM	118	99	147	103	106	56	64	22	34	749

4. Results

4. 1 Yield and crop characteristics at harvest

Table 1

Treatments (Kg ha $^{-1}$)		t ha^{-1} cane	Sucrose % cane	t ha^{-1} sucrose	Stalk counts x10^{-3}ha^{-1}	Stalk length (cm)
K0 = Nil	S0	50,5	11,89	6,0	149	150
	S1	64,8	12,23	7,9	144	167
	S2	52,9	12,38	6,5	124	143
	S3	46,7	12,00	5,6	115	138
K1 = 200 K	S0	54,8	12,27	6,7	124	150
	S1	72,8	12,03	8,8	135	170
	S2	74,4	12,19	9,0	137	166
	S3	61,1	11,81	7,2	124	153
K2 = 400 K	S0	71,5	12,12	8,7	140	162
	S1	67,3	12,74	8,6	125	156
	S2	69,0	12,67	8,7	105	170
	S3	75,3	12,34	9,3	147	166
K3 = 600 K	S0	67,7	12,07	8,2	125	164
	S1	70,3	12,20	8,6	153	167
	S2	67,8	12,33	8,4	124	158
	S3	66,0	12,38	8,2	143	159
Mean		64,6	12,23	7,9	132	159
CV%		11,6	3,6	12,4		
SE of treatment mean	±	4,31	0,256	0,56		
LSD (0,05)		12,46	0,739	1,63		
(0,01)		16,76	0,995	2,19		
K0 = Nil		53,7	12,13	6,5	133	149
K1 = 200 kg K ha^{-1}		65,8	12,07	7,9	130	160
K2 = 400 kg K "		70,8	12,47	8,8	129	163
K3 = 600 kg K "		68,0	12,25	8,3	137	162
S0 = Nil		61,1	12,09	7,4	134	157
S1 = 50 kg S ha^{-1}		68,8	12,30	8,5	139	165
S2 = 100 " "		66,0	12,39	8,2	123	159
S3 = 500 " "		62,3	12,13	7,6	132	154
Mean K and S LSD (0,05)		6,23	0,37	0,81		
(0,01)		8,38	0,498	1,095		

4. 2 Third leaf analyses at 3 and 4 months of age

Table 2

Treatments (Kg ha^{-1})	2,5 m 23.01.84		3,8 m 2.03.84	
	N	K	N	K
Potassium				
K0 = Nil	2,12	0,87	1,70	0,91
K1 = 200	2,14	1,35	1,72	1,25
K2 = 400	2,17	1,38	1,72	1,24
K3 = 600	2,14	1,47	1,73	1,33
	S	N/S	S	N/S
Sulphur				
S0 = Nil	0,20	10,7	0,19	9,0
S1 = 50	0,22	9,9	0,19	8,9
S2 = 100	0,22	9,9	0,20	8,7
S3 = 500	0,23	9,5	0,19	8,9

5. Comments on results

The trial was harvested young because of an accidental fire.

Rainfall recorded was 172% of LTM with most of the rain occurring in November and January. A mean yield of 65 tons cane was obtained. This is equivalent to 7,5 tons cane ha^{-1} $month^{-1}$ or five tons cane ha^{-1} 100 mm^{-1} rainfall.

Potassium

There was a significant and linear response to K up to the 400 kg ha^{-1} level. There was no difference in yield between the 400 kg K ha^{-1} and the 600 kg K ha^{-1} levels. Cane quality also increased (ns) with increasing levels of K up to 400 kg ha^{-1}. Third leaf K analysis indicated values well above threshold for all K levels except where no K was applied. The data do not coroborate the yield response to high levels of K.

Sulphur

There was a significant and curvilinear response to suplhur ($P = 0,05$) up to the 50 kg S ha^{-1} level. There was no significant difference between the higher rates. Cane quality appeared to be improved by S application up to 100 kg ha^{-1} levels.

The soil S values were above the threshold value (15 ppm) at the start of the experiment, and a response to sulphur was not expected. Third leaf S values were slightly lower in the S0 plots at 2,5 months but were well above threshold in all treatments at both sampling dates.

Considering both the soil and leaf S values measured in this experiment, the yield response to applied S is surprising and requires confirmatory data. The trial will continue with the same treatments being re-applied.

Nitrogen

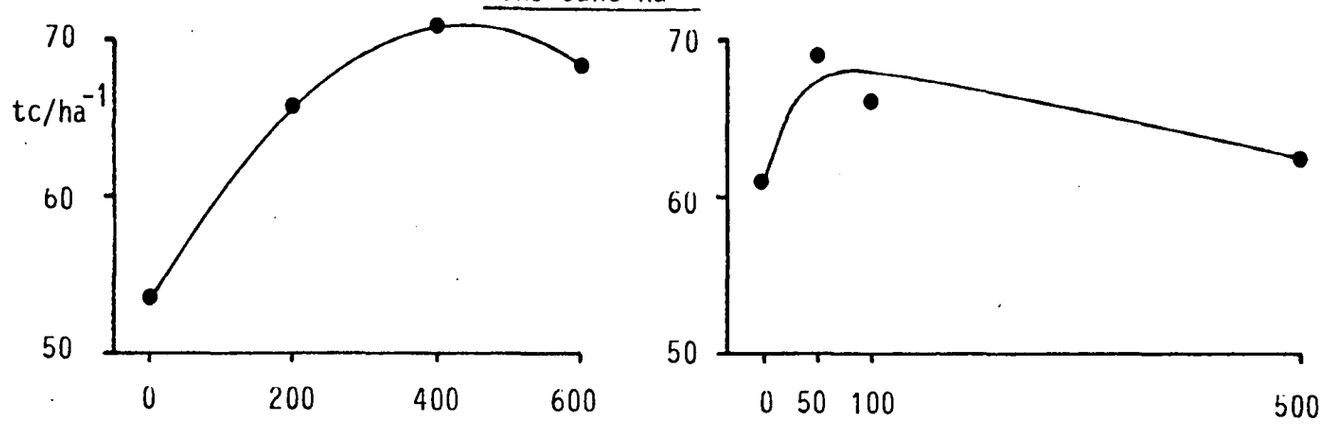
It appears that the rate of 100 kg N ha^{-1} is sufficient for this Clansthal soil. At both leaf samplings the third leaf N analyses revealed values above threshold.

MFA1C/VJ
22 August 1984

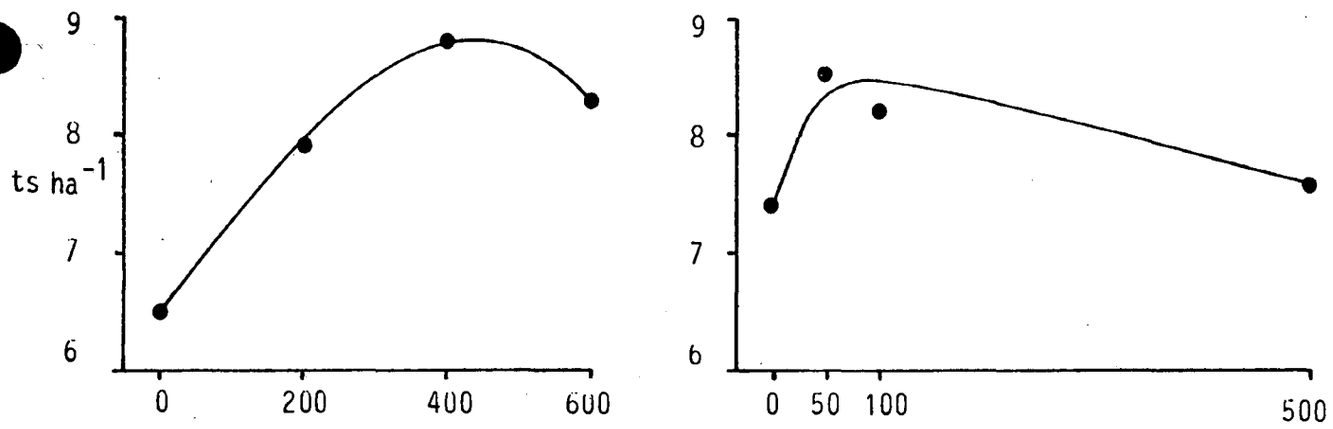
Response to potassium

Response to sulphur

Tons cane ha^{-1}



Tons sucrose ha^{-1}



Sucrose % cane