SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

VARIETY TRIAL

Catalogue No.: 106
Code: 2200/3
This Crop: Plant
Site: Experiment Station
Altitude: 1350'
Soil: P E 1, Sandy Clay Loam.
Design: 9 x 4 Randomized Blocks

Fertilizer:	N	P_2O_5	K_2O
Level	140	150	50
Carrier	Urea	Double supers	Muriate

Soil Analysis:

pH ($CaCl_2$)	6.6
Clay %	19
Cond. (mmho/cm.)	.120
P_2O_5 (p.p.m.)	12
Ex. K. (m.e. %)	0.90
Ex. Ca. (m.e. %)	8.4
Ex. Mg. (m.e. %)	3.2

Age: 11.6 months (15/12/67 - 3/12/68)
Rainfall on Crop: 10.9 in.
Irrigation on Crop: 60.5 in.

Results:

VARIETY	TONS CANE PER ACRE	SUCROSE % CANE	TONS SUCROSE PER ACRE	STALK COUNT '000s/ACRE	% LODGING
N:Co.376	77.4 (2)	12.7	9.81	66.4	56
Q.70	77.0 (3)	12.6	9.63	38.6	70
N.52/219	73.1 (4=)	13.1	9.55	37.8	30
Q.63	68.3 (6)	13.8	9.39	35.4	31
Co.775	73.1 (4=)	11.6	9.54	42.0	16
Co.678	85.2 (1)	10.0	8.48	36.3	91
Q.57	51.0 (9)	13.6	6.96	25.7	9
Co.684	61.6 (7)	11.1	6.86	41.8	38
M.383/41	60.8 (8)	11.2	6.83	50.9	80
C.V. %	6.7	8.9	10.3	5.6	30.6
L.S.D. 5%	6.8	1.6	1.27	3.4	22
1%	9.3	2.1	1.73	4.6	29

NOTES:

N:Co.376 produced the highest yield of sucrose per acre; Q.70, Q.63 and N.52/219 were all very close behind. Of these four varieties, Q.63 and N.52/219 had higher sucrose, and also lodged far less than the other two varieties. N:Co.376 had an unusually high stalk population in this trial (66,000 at harvest). There was little difference in stalk population between the other 3 varieties.

Co.678 produced the highest cane yield, but sucrose content was very low. Co.775 also gave moderately good yields.

Q.57 was severely affected by smut, (1500 whips/acre) while leaf scald attacked Q.63 fairly severely (700/acre) during the last three months before harvest. N:Co.376 produced 6.7 tons cane/acre month.

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VARIETY TRIAL (2200/3/1R)

Catalogue No: 106
This crop: 1st Ratoon
Site: Experiment Station
Altitude: 1350'
Soil: PE 1 sandy clay loam
Design: 9 x 4 Randomized Blocks
Fertilizer: N P_2O_5
Level: 160 75
Carrier: Urea Double supers
Rainfall on crop: 17.50 in.
Irrigation on crop: 48.00 in.

Soil Analysis:

pH ($CaCl_2$)		6.4
Clay %		20
Cond.	(1 : 5)	212
P_2O_5	(p. p.m.)	18
Ex. K	(m. e. %)	0.45
Ex. Ca	(m. e. %)	6.2
Ex. Mg	(m. e. %)	2.9
Ex. Na	(m. e. %)	0.8

Age: 11.6 months (5/12/68-22/11/69)

Variety	T.C.A.	E.R.S.C	T.E.R.S.A.	Stalk Count '000s/ac	% Lodging	Sucrose % Cane	Fibre % Cane	Purity %	Smut Whips per acre
N:Co.376	67.4	12.6	8.51	68.7	74	14.5	13.1	88.2	270
N.52/219	59.8	13.9	8.39	45.1	96	15.8	11.7	88.4	0
Q. 63	57.3	14.2	8.16	44.7	87	16.0	12.6	90.2	0
Q. 70	57.8	13.5	7.73	41.3	84	15.3	12.4	88.9	0
Co. 775	60.2	12.4	7.48	47.7	66	14.5	11.2	84.8	0
Co. 678	67.1	11.1	7.45	43.9	95	13.2	14.4	86.2	0
M.383/41	55.9	13.2	7.37	50.1	98	15.1	12.4	86.0	10
Q. 57	49.6	13.4	6.66	33.2	41	15.2	12.2	90.0	5870
Co.684	53.6	11.5	6.19	48.8	82	13.8	15.8	86.0	10
C.V. %	8.2	6.7	10.3	4.8	17.1	-	8.4	-	-
L.s.d. 5%	7.0	1.2	1.13	3.3	20	-	1.6	-	-
1%	9.5	1.7	1.54	4.4	27	-	2.1	-	-

Note

E.R.S.C. (Estimated Recoverable Sugar % Cane) = S - 0.451 (B-S) - .077 F, where S = Sucrose, B = Brix & F = Fibre contents of cane obtained direct analysis. T.E.R.S.A. = Tons Estimated Recoverable Sugar per Acre.

Conclusions N:Co. 376 produced the highest yields of sugar per acre, closely followed by N.52/219 and Q. 63, these two varieties giving the highest sucrose content and E.R.S.C. Lodging was severe in all the loading varieties. N.52/219 had a low fibre content, and was resistant to smut. to smut. N:Co. 376 was moderately infected with smut. Q. 63 was again severely infected with leafscald, while M.383/41 showed the leaf stripe symptoms of leaf scald in one plot. Yellow wilt was observed in Co.678 and M.383/41. Leaf galls (pseudo Fiji) were observed in Co. 678, Co.684, Co.775 and M.383/41. The leaf stripe symptoms of gumming were observed in N. 52/219, Q. 57 and Q. 63. Some pokkah boeng was evident in N:Co.376.

MG/23rd February, 1970

Results

Table 1. Yield and crop characteristics at harvest.

Treatment	Cane (t/ha)	ERS % cane	ERS (t/ha)	Cane (t/ha /100 mm	Stalk counts X10^{-3}/ha	Stalk mass kg	Stalk height cm
1. Top dress P	107	11,7	12,4	5,2	105	1,02	216
2. Residual P	110	11,3	12,4	5,3	109	1,02	216
3. Residual P	113	11,2	12,6	5,4	112	1,01	216
4. Top dressed P	123	11,4	14,1	6,0	115	1,07	229
5. Residual P	116	10,9	12,7	5,6	111	1,05	223
6. Top dressed P	121	11,2	13,5	5,8	118	1,02	221
C.V.%	4,9	3,7	4,5		4,6	5,0	-
S.E.	2,5	0,2	0,3		2,7		
L.S.D. (0,05)	7,4	0,6	0,8		6,7		
(0,01)	10,0	0,8	1,0		9,1		

Table 2. Third leaf analysis with time (months).

	Date: 11.2.77. Age : 4,7 m					Date: 10.3.77. Age : 5,9 m					Date: 15.4.77 Age : 7 m				
	N%	P%	K%	Ca%	Mg%	N%	P%	K%	Ca%	Mg%	N%	P%	K%	Ca%	Mg%
1. Top dressed P	2,25	0,19	1,63	0,35	0,20	2,08	0,18	1,42	0,31	0,23	2,06	0,19	1,26	0,34	0,27
2. Residual P	2,26	0,19	1,59	0,32	0,19	2,13	0,18	1,40	0,32	0,23	2,05	0,18	1,23	0,34	0,27
3. Residual P	2,31	0,20	1,66	0,33	0,19	2,09	0,18	1,35	0,31	0,26	2,02	0,18	1,24	0,33	0,27
4. Top dressed P	2,31	0,20	1,67	0,33	0,18	2,07	0,18	1,38	0,32	0,26	2,04	0,19	1,25	0,33	0,28
5. Residual P	2,30	0,19	1,62	0,34	0,19	2,10	0,17	1,40	0,31	0,23	2,05	0,19	1,25	0,34	0,28
6. Top dressed P	2,34	0,20	1,67	0,34	0,19	2,09	0,18	1,41	0,31	0,22	2,08	0,19	1,25	0,35	0,28

Table 3. Growth measurements with time (months).

Treatment	Date: 11.2.77. Age : 4,7 m		Date: 15. 4.77. Age : 13 m		Date: 18.10.77. Age : 13 m	
	Stalk counts $X10^{-3}$/ha	Stalk height cm	Stalk counts $X10^{-3}$/ha	Stalk height cm	Stalk counts $X10^{-3}$/ha	Stalk height cm
1. Top dressed P	149	32	162	73	140	100
2. Residual P	186	33	177	73	144	104
3. Residual P	162	32	177	73	146	107
4. Top dressed P	214	37	188	90	154	120
5. Residual P	195	35	176	85	152	114
6. Top dressed P	196	34	177	83	149	110

Comments on results

1. C.V.'s are good and low.

2. There is statistical evidence of highly significant yield responses to broadcast supers applied at planting.

   ERS % was reduced but not significantly.

	Response	S.E. of diff.
Cane t/ha	118 - 108 = 10	± 2,17
ERS %	11,2 - 11,5= -0,3	± 0,16
ERS (t/ha)	13,2 - 12,4= 0,8	± 0,23

   The response to broadcast supers was evident in increased stalk population and stalk height from a young age.

3. There is no statistically significant difference in response to the two levels of broadcast supers. The high rate of broadcast supers decreased yield slightly.

	1½ t supers/ha	3 t supers/ha	Response	S.E. of diff.
Cane (t/ha)	136	134	2	± 2,50
ERS %	11,3	11,0	0,3	± 0,19
ERS (t/ha)	13,3	13,1	0,2	± 0,26

4. Top dressing the plant crop broadcast supers treatments, with additional supers has increased yields and sucrose content.

Response to top dressing with single supers

	F.A.S. (In furrow)	1½ t supers Broadcast	3 t supers Broadcast	S.E. of diff
Cane (t/ha)	-3	10	5	± 2,5
ERS %	0,4	0,2	0,3	± 0,19
ERS (t/ha)	0	1,5	0,8	± 0,26

The response to top dressing the 1½ t level of broadcast supers was evident in increased stalk population and height from a young age.

5. Third leaf P values did not reflect the different levels of P applied. The levels of other nutrients were adequate with the N level being particularly high.

6. Soil P values do not reflect treatments.
Aluminium is approaching toxic levels for this soil.

7. In terms of cane yields, ratoon crop yields are slightly lower than those of the plant crop.

	Plant crop	1st Ratoon
Cane (t/ha/m)	5,6	5,3
Cane (t/ha/100 mm rainfall)	8,4	5,6

END/VSJ.
12th September, 1978.

File : 14. 4. 5.
Folio No. : 106

SOUTH AFRICAN SUGAR INDUSTRY

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Phosphate Levels x Soil P.D.I. - Midlands (Glenside)

Code : FT8P/74/R1
Catalogue No. : 919
This crop : 1st Ratoon
Site : Glenside
Altitude : 1 000 m
Soil series : Inanda
Design : Incomplete Latin square
Variety : NCo 293
Fertilizer : N - 140 kg/ha as urea
P - See treatments
K - 170 kg/ha as KCl
Water regime : Rainfed.

Soil analysis at the end of the 1st ratoon.

	pH	P.D.I	Clay %
	5,1	0,06	33

Treatment: ppm

	ppm					
	P	K	Ca	Mg	Al	Zn
1.	16	44	268	55	47	3,3
2.	20	50	219	72	50	3,6
3.	18	45	175	56	58	3,1
4.	26	42	270	66	46	2,6
5.	16	41	269	69	45	2,2
6.	19	42	222	50	59	2,6

Rainfall: 2 044 mm (gross)
Age: 21,7 m (14.9.76 - 6.7.78)

Object

To measure 1st ratoon responses to treatment with phosphate applied by various methods and rates in the plant crop on soils of different P fixing characteristics and to assess the most efficient way of meeting the P requirements of cane grown on these soils.

Treatments

Levels of phosphorus in kg/ha applied as single superphosphate (8,3% P).

	Plant crop		1st Ratoon
	In furrow	Broadcast	Top dressed
1.	98	-	50
2.	196	-	-
3.	98	125	-
4.	98	125	50
5.	98	250	-
6.	98	250	50

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

VARIETY TRIAL 2200/3/2R

Catalogue No: 106

This crop: 2nd Ratoon
Site: Expt. Stn, Chiredzi
Altitude: 1350'
Soil: P E 1 sandy loam
Design: 9 x 4 randomized blocks

Fertilizer:	N	P_2O_5
Level	160	75
Carrier	A/Nitrate	Single supers

Rainfall on crop: 15.1 in
Irrigation on crop: 58.0 in
Results:

Soil analysis:

pH	4.8
Cond. (mmho/cm)	187
P_2O_5 (ppm)	68
Ex. K (m.e.%)	0.48
Ex. Ca (m.e.%)	4.17
Ex. Mg (m.e.%)	1.93
Ex. Na (m.e.%)	0.28

Age: 12.5 months (24.11.69 - 7.12.70)

Variety	T.C.A.	E.R.S. % C.	T.E.R.S.A.	Stalk count '000s/acre	% Lodging	Sucrose % cane	Fibre % cane	Brix % cane	Purity %	Sucrose yield	Smut whips/acre	Stalk Diameter (mm)
Q 70	65.6	13.80	9.06	43.2	98	15.6	12.0	17.4	89.4	10.22	0	27.2
NCo 376	70.9	12.73	9.03	69.1	72	14.7	13.2	16.9	87.0	10.44	325	22.1
Q 63	58.0	14.03	8.14	44.3	99	15.9	13.1	17.8	89.3	9.22	30	26.5
Co 775	64.4	12.55	8.09	46.1	100	14.4	11.8	16.4	87.4	9.27	15	25.7
N 52-219	56.6	13.76	7.77	48.4	98	15.5	11.2	17.4	89.0	8.75	0	24.6
Co 678	71.3	10.65	7.55	50.2	100	12.8	14.6	15.2	84.8	9.11	37	27.9
M 383-41	53.3	12.46	6.65	51.4	100	14.4	12.3	16.6	86.7	7.69	0	24.1
Co 684	56.4	11.59	6.52	53.0	98	13.7	14.5	16.0	85.8	7.73	103	22.8
Q57	45.4	13.59	6.16	37.6	74	15.3	11.8	17.2	89.3	6.95	13961	24.5
C.V.%	7.9	6.2	9.6	7.6	12	5.2	4.6	4.5	-	-	-	5.8
L.s.d.5%	7.0	1.16	1.07	5.5	16	1.1	0.8	1.1	-	-	-	2.1
1%	9.5	1.58	1.46	7.4	21	1.5	1.2	1.5	-	-	-	2.9

Conclusions

Q 70 and NCo 376 gave highest yields of sugar per acre. Q 70 is highly resistant to smut but unfortunately lodges severely at an early age. The next varieties were Q 63 (highly susceptible to Leaf Scald) Co 775 and N 52-219. The latter was disappointing, but his was partly due to one plot which gave inexplicably low yields. However, it may possibly be evidence of declining vigour in ratoons. Q 57 has become very highly infected with smut, and probably because of this, is now giving the lowest yields of sugar/acre.

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

VARIETY TRIAL 2200/3/3R

Catalogue No. : 106
This crop : 3rd Ratoon
Site : RSA Experiment Station, Chiredzi
Soil : P E 1 sandy loam
Altitude : 410 m
Design : 9 x 4 randomised blocks
Fertilizer : N P_2O_5
Level 179 84
Carrier Ammonium nitrate Single supers
Rainfall on crop : 426 mm
Irrigation on crop : 1300 mm

Soil analysis:
pH ($CaCl_2$) 4,8
Clay % 16
Cond. (mmho/cm) 187
P_2O_5 (ppm) 68
Ex. K (m.e. %) 0,48
Ex. Ca(m.e. %) 4,17
Ex. Mg(m.e. %) 1,93
Age: 11,9 months (11/12/70-9/12/71)

RESULTS

Variety	TCH	ERS % C	TERSH	Stalk Count '000s/ ha	% Lodging	Sucrose % Cane	Fibre % Cane	Brix % Cane	Purity %	Smut Whips/ ha
NCo 376	132,5	13,40	17,79	201,6	40	15,4	13,7	17,6	87,8	839
Q 63	114,4	14,63	16,75	125,4	92	16,8	13,4	19,2	87,5	73
N 52-219	121,0	13,65	16,55	119,7	86	15,9	10,9	19,0	83,6	0
Co 678	133,8	12,20	16,31	120,3	100	14,3	14,4	16,5	86,8	55
Q 70	118,4	13,74	16,26	115,7	85	16,1	11,8	19,2	83,8	0
Co 775	119,4	13,46	16,08	121,8	91	15,4	12,0	17,7	87,1	0
M 383-41	107,2	12,96	13,89	142,4	99	15,0	12,9	17,2	87,1	0
Q 57	87,3	13,70	11,91	94,9	42	15,6	12,9	17,5	89,1	48620
Co 684	98,0	11,92	11,66	147,6	98	14,2	14,7	16,9	84,6	237
C.V.%	6,7	6,6	9,0	5,1	21,0	4,3	6,8	3,3	4,8	-
L.S.D. 5%	11,2	1,27	2,00	9,9	25	1,0	1,3	0,8	6,0	-
1%	15,2	1,72	2,72	13,4	34	1,3	1,7	1,2	8,2	-

Notes:

NCo 376 gave the highest yields of sugar/ha, with very little difference between Q 63, N 52-219, Co 678, Q 70 and Co 775. Q 63 gave the highest sucrose % cane and E.R.S. % C. NCo 376 had an exceptionally high stalk count. N 52-219 had the lowest fibre.

TCH = Tons cane per hectare
ERSC = Estimated recoverable sugar % cane
TERSH = Tons estimated recoverable sugar per hectare