

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Code : UBO VAR 2/81/Sw

Cat. No.: 1314

TITLE: Released and pre-release varieties on a Somerling series soil.

1. Particulars of project:

<u>This crop</u> : 1st ratoon	Soil analysis: Date: August 1982
<u>Site</u> : Ubombo Ranches Ltd	pH OM% Clay % PDI
<u>Region</u> : Northern irrigated Swaziland	6,15 - > 30 -
<u>Soil Set/Series</u> : S/Somerling	ppm
<u>Design</u> : Randomised blocks	P K Ca Mg
<u>Varieties</u> : NCo 376, N11, J59/3 N14, N15, 69E991, N52/219	74 163 > 1800 > 220
<u>Fertilizer</u> : N P K	Age: 13,1 months
Top dress 100 0 100	Dates: 25/8/82-27/9/83
	Rainfall: 378 mm (effective)
	Irrigation: 832 mm (effective)
	Total : 1210 mm

2. Objectives:

- 2.1 To continue testing the performance of 6 released and one pre-release variety on a Somerling series soil.
- 2.2 To observe the ratooning ability and disease tolerance of the varieties in subsequent ratoons.

3. Notes on treatments

- 3.1 Fertilizer was top-dressed over the cane row as a single application 7 weeks after harvesting.
- 3.2 N top-dressed was ammonium nitrate (34,5%N)
- 3.3 K top-dressed was muriate of potash (50,0% K)

4. Results:

Table 1: Crop growth measurements at 5,5 months

Variety	Stalk heights (cm)	Populations x 1000/ha
69E991	122	163
N52/219	122	156
N14	117	163
NCo 376	108	198
N15	106	163
N11	105	170
J59/3	98	154
Mean	111	167

Table 11: Yield

Variety	tc/ha	% NCo 376	S % C	% NCo 376	ts/ha	% NCo 376
N14	109	117	14,1	98	15,2	115
NCo 376	93	100	14,4	100	13,2	100
69E991	92	99	15,1	105	13,9	105
N11	88	95	15,1	105	13,3	101
N52/219	88	95	14,7	102	12,9	98
J59/3	81	87	15,5	108	12,6	95
N15	71	76	15,7	109	11,1	84
C V %	10,8		4,4		9,4	
LSD (0,05)	11,3		0,8		1,5	
(0,01)	15,3		1,0		2,0	

Table 111: Yield per month and per 100 mm water.

Variety	tc/ha/month	tc/ha/100 mm
N14	8,3	9,0
NCo 376	7,1	7,7
69E991	7,0	7,6
N11	6,7	7,3
N52/219	6,7	7,3
J59/3	6,2	6,7
N15	5,4	5,9
Mean	6,9	7,4

Table IV: Third leaf analysis (% dm) at 3,5 months (Dec) and at 6,0 months (Feb)

Variety	Age in months					
	3,5 month (Dec)			6,0 month (Feb)		
	N	P	K	N	P	K
N14	1,81	0,20	0,92	1,48	0,20	1,16
NCo 376	1,87	0,23	1,00	1,64	0,23	1,32
69E991	1,68	0,22	1,08	1,34	0,19	1,23
N11	1,80	0,21	1,06	1,61	0,20	1,43
N52/219	1,70	0,19	1,07	1,51	0,19	1,31
J59/3	1,73	0,24	1,26	1,41	0,22	1,49
N15	1,72	0,21	1,03	1,52	0,19	1,21

5. Smut incidence and flowering.

Table V: % smut whips/ha at 5 months and % flowering at ± 11 months

Variety	% smut whips/ha	% flowering
N14	0,3	28
N11	0,4	26
N52/219	Nil	25
69E991	0,8	16
NCo 376	6,4	1
N15	2,7	< 1
J59/3	0,1	Nil

6. Comments

- 6.1 Yields from all varieties except 69E991 decreased compared with the plant crop; the decline of 30 tc/ha in the case of N15 was most severe.
- 6.2 As in the plant crop N14 out yielded all the other varieties ($P=0,01$) in tc/ha.
- 6.3 All varieties except N14 were, as in the plant crop, higher in sucrose % cane than NCo 376. J59/3 and N15 had the highest S % C ($P=0,01$).
- 6.4 N14 outyielded the other varieties in ts/ha ($P=0,01$) while 69E991 and N11 outyielding the other varieties in ts/ha.
- 6.5 Smut was absent in N52/219, negligible in N14, N11, J59/3 and 69E991, whilst it was highest in NCo 376 and moderate in N15.
- 6.6 Third leaf analysis showed N14, NCo 376 and N11 to have N% (d.m) above threshold at 3,5 months of age. The remaining varieties were slightly below threshold at this stage and all were below at 6,0 months of age. K % (d.m.) levels increased between the two samplings and, as in the plant crop, N14 third leaf K % (d.m) values were lower than the other varieties.
- 6.7 All the varieties have regenerated well in the second ratoon, and there is little evidence of pest damage.

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

CODE : VAR 2/81/Sw UBO Som

TITLE : RELEASED AND PRE-RELEASED VARIETIES ON A SOMERLING SERIES SOIL

1. PARTICULARS OF PROJECT

Cat. No.	: 1314	Soil Analysis	: Date 10/11/1983		
This crop	: 2nd ratoon	pH	OM%	Clay %	P.D.I.
Site	: Ubombo Ranches Ltd	673	-	>30	-
Region	: Northern Irrigated (Swaziland)	ppm			
Soil Set/Series	: S/Somerling	P	K	Cu	Mg
Design	: Randomised Blocks	73	148	>1800	>220
Varieties	: See Treatments	Age	: 11,8 months		
Fertilizer	: <u>N</u> <u>P</u> K	Dates	: 27/9/83 - 20/9/84		
Top Dress (kg/ha)	100 - 100	Rainfall	: 376 mm (net)		
		Irrigation	: 580 mm (net)		
		Total	: 956 mm		

2. OBJECTIVES

- 2.1 To continue testing the performance of 6 released and one non-released variety on a Somerling series soil.
- 2.2 To observe the ratooning ability and disease tolerance of the varieties especially with regard to smut.

3. TREATMENTS

- 3.1 Varieties : NCo 376, N11, J59/3, N14, N15, 69E991, N52/219
- 3.2 Fertilizer was top-dressed over the cane row as a single application 6,3 weeks after harvesting.
- 3.3 N. top-dressed as ammonium nitrate (34,5%N)
- 3.4 K. top-dressed as muriate of potash (50% K)

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4. RESULTS

Table I. Crop growth measurements and populations taken at 5,8 months and 11,4 months after harvest.

VARIETY	GROWTH (CMS TO TVD)		POPULATION (x1000/HA)	
	STALK HEIGHTS	STALK HEIGHTS	POPULATIONS	POPULATIONS
	5,8 mnths	11,4 mnths	5,8 mnths	11,4 mnths
NCo 376	160	213	132	113
N11	154	214	130	124
N14	174	242	116	107
69E991	178	239	119	105
N15	152	217	108	88
J59/3	152	213	105	87
N52/219	169	234	96	87

Table II. Cane Yield, Cane Quality and Sucrose Yields.

VARIETY	CANE YIELD		CANE QUALITY		SUCROSE YIELD	
	tc/ha	%NCo 376	S%C	%NCo 376	ts/ha	%Nco376
N14	105	115	15,4	105	16,1	122
69E991	96	105	16,8	115	16,1	122
J59/3	94	103	16,9	116	15,9	120
N52/219	88	97	16,7	114	14,7	111
N11	86	95	16,2	111	13,9	105
NCo 376	91	100	14,6	100	13,2	100
N15	76	84	16,9	116	12,9	98
CV %	8,7		5,1		8,4	
LSD (0,05)	9,3		1,0		1,5	
LSD (0,01)	12,5		1,3		2,0	

Table III. Yield per month and per 100 mm water.

VARIETY	tc /ha /month	tc /ha /100mm
N14	8,9	10,9
69E991	8,1	10,0
J59/3	8,0	9,8
NCo 376	7,7	9,5
N52/219	7,5	9,2
N11	7,3	9,0
N15	6,4	8,0
Mean	7,8	9,5

Table IV. Third Leaf analysis at 3,9 months (January) and 5,2 months (March)

VARIETY	3,9 months (Jan)				5,2 months (Mar)			
	N	P	K	S	N	P	K	S
NCo 376	1,36	0,21	1,22	0,12	1,41	0,22	1,38	0,10
N14	1,38	0,21	1,14	0,12	1,40	0,21	1,30	0,10
69E991	1,28	0,20	1,20	0,13	1,22	0,20	1,51	0,10
N11	1,37	0,20	1,29	0,13	1,39	0,19	1,63	0,11
N52/219	1,34	0,21	1,26	0,13	1,32	0,20	1,53	0,10
N15	1,32	0,19	1,13	0,13	1,36	0,20	1,35	0,10
J59/3	1,31	0,20	1,34	0,14	1,36	0,22	1,61	0,11

/4.....

Table V. % Smut stools/ha at 4 months and % flowering at 10 months of age.

VARIETY	% SMUTTED STOOLS/HA	% FLOWERING
N52/219	<1.0	10,0
N11	11.0	8,0
69E991	11.0	1,0
N14	8.0	0,9
NCo 376	53.0	0,2
N15	50.0	Nil
J59/3	2.0	Nil

5. COMMENTS

- 5.1 *
- * Cane yields for the second ratoon were similar to the previous crop for all varieties. N14 has been the highest yielder from plant to 2nd ratoon and was highly significant ($P=0,01$) compared to NCo 376 for this crop.
 - * Sucrose % cane of all the varieties was superior to last season and other than N14 were significantly ($P=0,01$) better than NCo 376 for the 2nd ratoon.
 - * N14, J59/3 and non/released 69E991 significantly ($P=0,01$) out yielded NCo 376 in sucrose yield/ha. Sucrose yield from N52/219 was also significantly ($P=0,05$) better than NCo 376.
 - * Smut has purposely been left unchecked in this trial for three years to observe each variety's tolerance to the disease. Results have shown that under these condition reduced yields can be expected from highly infected NCo 376 and N14 is likely to gradually succumb to the disease in 'older ratoons'.
 - * Third leaf N % (dm) values were below threshold for all varieties at 3,9 months in January and 5,2 months of age in March. Excessive leaching of the soil by unusually high rainfall in November '83 and cyclone rain in January '84 could possibly be the reason for these low values. Phosphate and Sulphur % (dm) values in the third leaf were marginal to low in all varieties while K % (dm) values remained unexplainably high.
- 5.2 The trial is now in its third ratoon. Nitrogen top-dressing rates have been increased substantially for this crop as there is evidence of additional N requirements for older ratoons on these soils.

NBL/gj
28/1/84

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

CAT NO : 1314

CODE : VAR2/81/Sw UBO Som

TITLE : VARIETIES ON A SOMERLING SERIES SOIL

1. PARTICULARS OF PROJECT

This Crop	: 3rd Ratoon	Soil Analysis	: Date 10/10/1984			
Site	: Ubombo Ranches Compound North	pH	OM %	PDI	Clay%	
		6,73	-	-	>30	
Region	: Northern Irrigated (Swaziland)	_____ p p m _____				
Soil Set/Series	: 'S'/Somering	P	K	Cu	Mg	S
Design	: Randomised blocks	78	149	>1800	>220	18
Varieties	: See Treatments	Age		: 11,6 months		
Fertilizer	: N P K	Dates		: 20/9/84 - 9/9/85		
Top dress kg/ha	: 160 20 183	Rainfall		: 357 mm (Net)		
		Irrigation		: 800 mm (Net)		
		Total		: 1157 mm (Net)		

2. OBJECTIVES

- * To test the performance of 6 released and one non-released variety up to the third ratoon stage on a Somering series soil.
- * To observe the smut tolerance of these varieties by purposely exposing them to high spore loads by non-roguing.

3. TREATMENTS

- 3.1 Varieties : NCo 376, N11, J59/3, N14, N15, 69E991, N52/219
- 3.2 Fertilizer was top-dressed over the cane row as a single application approximately one month after harvest.
- 3.3 N top-dressed as ammonium nitrate (34,5 % N)
K top-dressed as muriate of potash (50 % K)
P top-dressed as single superphosphate (10,5 % P)

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4. RESULTS (3RD RATOON ONLY)

4.1 Crop Growth

Table 1 Crop growth measurements and populations taken at ± 9 months of age.

VARIETY	STALK HEIGHTS (mm to TVD)	STALK POPULATIONS (x 1000/ha)
N52/219	2570	97
N14	2540	111
69E991	2470	107
NCo 376	2460	124
N15	2270	105
N11	2250	116
J59/3	2220	100

4.2 Yields

Table II Cane yield, sucrose % cane and sucrose yield

VARIETY	CANE YIELD		CANE QUALITY		SUCROSE YIELD	
	TC/HA	% NCo 376	SUC % CANE	% NCo 376	TS/HA	% NCo 376
NCo 376	110	100	15,2	100	16,7	100
N14	109	99	15,4	101	16,9	101
N15	88**	80	16,2**	107	14,2**	85
69E991	94**	85	16,0*	105	14,9*	89
J59/3	97*	88	17,0**	112	16,5	99
N52/219	101	92	15,5	102	15,5	93
N11	88**	80	15,9	105	13,9**	83
CV %	10,2		4,0		9,5	
LSD (0,05)*	12		0,8		1,7	
LSD (0,01)**	16		1,0		2,3	

Table III Yield per 100 mm water

VARIETY	TC/HA/100 MM WATER
NCo 376	9,5
N14	9,4
N52/219	8,7
J59/3	8,3
69E991	8,1
N15	7,6
N11	7,6

4.3 Leaf Analysis

Table IV Third leaf analysis (% dm) at 3,8 months (January) and 6,1 months (March)

VARIETY	3,8 MONTHS (JANUARY)				6,1 MONTHS (MARCH)			
	N	P	K	S	N	P	K	S
NCo 376	1,74	0,22	1,11	0,14*	1,45*	0,22	1,24	0,12*
N14	1,72	0,20	0,95*	0,14*	1,39*	0,20	1,07*	0,12*
N15	1,67*	0,20	1,12	0,14*	1,44*	0,19*	1,20	0,13*
69E991	1,57*	0,20	1,15	0,14*	1,30*	0,18*	1,25	0,12*
J59/3	1,62*	0,23	1,38	0,14*	1,44*	0,22	1,41	0,13*
N52/219	1,58*	0,19*	1,15	0,13*	1,43*	0,18*	1,30	0,12*
N11	1,58*	0,22	1,18	0,13*	1,41*	0,19*	1,35	0,14*

* = Marginal to deficient

5. RESULTS (Plant crop plus three ratoons)

5.1 Yields

Table V Cane yield (TC/ha/month) from plant crop to 3rd ratoon

VARIETY	PLANT (9,5m)	1ST RATOON (13,1m)	2ND RATOON (11,8m)	3RD RATOON (11,6m)	MEAN
N14	13,2	8,3	8,9	9,4	10,0
NCo 376	10,5	7,1	7,7	9,5	8,7
69E991	9,8	7,0	8,1	8,1	8,3
N52/219	10,2	6,7	7,5	8,7	8,3
J59/3	9,6	6,2	8,0	8,4	8,1
N11	10,2	6,7	7,3	7,6	8,0
N15	10,7	5,4	6,4	7,6	7,5

Table VI Cane quality (Suc % Cane) from plant crop to 3rd ratoon

VARIETY	PLANT (9,5m)	1ST RATOON (13,1m)	2ND RATOON (11,8m)	3RD RATOON (11,6m)	MEAN
J59/3	15,9	15,5	16,9	17,0	16,3
N15	15,4	15,7	16,9	16,2	16,1
N11	15,4	15,1	16,2	15,9	15,7
69E991	14,3	15,1	16,8	16,0	15,6
N52/219	14,3	14,7	16,7	15,5	15,3
N14	13,6	14,1	15,4	15,4	14,6
NCo 376	13,6	14,4	14,6	15,2	14,5

Table VII Sucrose yield (Ts/ha/month) from plant crop to 3rd ratoon

VARIETY	PLANT (9,5m)	1ST RATOON (13,1m)	2ND RATOON (11,8m)	3RD RATOON (11,6m)	MEAN
N14	1,8	1,2	1,4	1,5	1,5
69E991	1,4	1,1	1,4	1,3	1,3
J59/3	1,5	1,0	1,3	1,4	1,3
N52/219	1,5	1,0	1,2	1,3	1,3
N11	1,6	1,0	1,2	1,2	1,3
NCo 376	1,4	1,0	1,1	1,4	1,2
N15	1,7	0,8	1,1	1,2	1,2

5.2 Smut

Table VIII Smut levels (% smutted stools/ha) for 2nd and 3rd ratoons

VARIETY	% SMUTTED STOOLS/HA	
	2ND RATOON (4m)	3RD RATOON (3m)
NCo 376	53	64
N15	50	58
N11	11	21
69E991	11	18
N14	8	9
N52/219	<1	3
J59/3	2	<1

5.3 Flowering

Table IV Flowering (% flowered stalks/ha) from 1st to 3rd ratoon

VARIETY	% FLOWERED STALKS/HA		
	1ST RATOON	2ND RATOON	3RD RATOON
N52/219	25	10	6
N11	26	8	4
N14	28	<1	4
69E991	16	1	11
N15	<1	-	5
NCo 376	1	<1	-
J59/3	-	-	<1

6. COMMENTS

- 6.1 Cane yields for NCo 376 and N14 were surprisingly similar in the third ratoon, as NCo 376 had extremely high smut levels. Yields from both these varieties were significantly greater than all the others except N52/219. NCo 376 had the highest monthly yield (Tc/ha/month) in the third ratoon but N14 had a better average over the 4 crops.
- 6.2 Sucrose % cane followed similar trends to previous years being lowest in NCo 376 and N14 and significantly (P = 0,01) higher in N15 and J59/3.
- 6.3 Because of the relatively high cane yields from NCo 376 and N14 in the 3rd ratoon, sucrose yields were significantly better than N15, N11 and 69E991. Although the performance of NCo 376 improved during the 3rd ratoon, its average sucrose yield over 4 crops was below that of N14.
- 6.4 Stalk height measurements for the 3rd ratoon taken at ± 9 months of age showed best growth in N14 and N52/219. NCo 376 had the highest stalk populations and N52/219 the lowest.
- 6.5 N14 was found to be one of the heaviest flowering varieties being comparable to N11 and N52/219. Pithiness in the stalk was present in all varieties including non-flowered J59/3 but the degree of pithiness was greatest in flowered N14.
- 6.6 Smut levels recorded for the 2nd and 3rd ratoons have shown N15 and NCo 376 to be the most susceptible and N52/219 and J59/3 the most resistant of the varieties tested. The increase in N14 from zero smutted stools in the plant crop to ± 9% in the 3rd ratoon is cause for concern and emphasises the need for regular roguing.
- 6.7 There was no visual evidence of excessive eldana infestations in the 3rd ratoon crop.

6.8 Third leaf samples taken at 3,8 months of age in January showed all varieties except NCo 376 and N14 to be deficient in N % (dm). All varieties were below the third leaf nitrogen % (dm) threshold at 6 months of age in March. Third leaf P values were reduced with age and were marginal at 6 months except in NCo 376, N14 and J59/3. As is normally the case, third leaf K % (dm) values were much lower in N14 compared to the remaining varieties. Sulphur was marginal to deficient for all varieties at both sampling dates.

7. COMMENTS

The poor quality of N14 at the beginning of the season and effects of flowering towards the end of the season make it more suited to a mid-season cycle. Subsequent trials have shown N14 to be intolerant to stress conditions and an attempt should be made to restrict planting to the better soils.

The large increase of smutted stools in NCo 376 from the plant to the 3rd ratoon crop (from $\pm 10\%$ to $\pm 60\%$) had an effect on reducing millable stalk populations and cane yields, but may also have suppressed cane quality and hence sucrose yields. Stringent smut control would have undoubtedly enabled sucrose yields for NCo 376 to approach those attained by N14. In addition, NCo 376 has been found to withstand stress conditions better than N14 and should be the choice of cultivar on poorer soils.

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