SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 10/87/Sw SIM Rhe

CAT: 1634

TITLE: RELEASED VARIETIES ON A 'R' SET SOIL

1. PARTICULARS OF PROJECT

This Crop	:	Plant
Site	:	Simunye Sugar Estate Field 606. Panel 3
Region	:	Northern Irrigated (Swaziland)
Design	:	Randomised blocks 8 replications
Soil Set/Series	:	'R'/Rhebok
Varieties	:	NCo 376; N14; N17; CP66/1043; N19

Fertilizer	:	N	P	K	S
Furrow		20	40	50	
Top-dress		100	-	100	48
Total (kg/ha)	:	120	40	150	48

Soil Analysis : Date 14/3/87

pH	OM%	Clay %	PDI
6,84	3,18	30	-

ppm

P	K	Ca	Mg	S	Zn
18	419	3478	788	18	2

Dates : 30/3/87 - 27/4/88

Age : 12,9 months

Rainfall :
Irrigation : } Not available
Total water:

2. OBJECTIVES

2.1 To observe and record the performance of recently released varieties on an early season cycle on a better type 'R' set soil.

2.2 To assess the resistance of these varieties to pests and disease.

2.3 To assess the response of these varieties to chemical ripeners.

3. TREATMENTS

3.1 Varieties : NCo 376; N14; N17; CP66/1043; N19

3.2 MAP (11% N + 22% P) was applied into the planting furrow before planting, as was KCL (50% K).

3.3 Nitrogen as ASN (27% N + 13,5% S) and KCL (50% K) were top-dressed at 16 and 23 weeks after planting respectively, in July and September.

3.4 Seedcane was pre-cut into 3 node setts and double stick planted.

3.5 The trial was irrigated very soon after planting.

3.6 A chemical ripener was not applied as the cane lodged during February 1988.

4. RESULTS

4.1 Growth data.

Table I. Crop growth measurements and populations at o,5 ; 1,3 ; 1,7; 2,8 ; 3,6 ; 5,8 and 7,4 months of age.

	STALK HEIGHTS (MM TO TVD)	POPULATIONS (x1000/Ha)						
VARIETY	7,4m	0,5m	1,3m	1,7m	2,8m	3,6m	5,8m	7,4m
NCo 376	213	67	150	216	328	349	312	166
N14	222	81	172	252	301	316	233	133
N17	212	71	125	206	299	281	269	126
N19	224	61	130	212	244	318	256	148
CP66/1043	222	57	131	158	193	229	213	118

4.2 Harvest data

Table II. Cane yield, cane quality and sucrose yield.

VARIETY	TONS CANE/HA	SUCROSE % CANE	TONS SUCROSE/HA
NCo 376	200	9,4	18,8
N14	209	10,4	21,7
N17	159	10,6	16,7
N19	184	12,3	22,6
CP66/1043	145	15,5	22,4
LSD (0,05)*	20	0,8	2,0
LSD (0,01)**	26	1,1	2,7
SIGNIFICANCE	**	**	**
MEAN	179	11,6	20,4
CV%	10,6	6,6	12,3

Table III. Yield per month.

VARIETY	TONS CANE/HA/MONTH	TONS SUCROSE/HA/MONTH
NCo 376	15,5	1,5
N14	16,2	1,7
N17	12,3	1,3
N19	14,3	1,8
CP66/1043	11,2	1,7
MEAN	13,9	1,6

4.3 Foliar analysis

Table IV. Third leaf analysis (%dm) at 5,3 months of age in September.

VARIETY	5,3 MONTHS SEPTEMBER				
	N	P	K	S	Zn
NCo 376	2,06	0,20	1,15	0,16	21
N14	1,81	0,17*	1,00*	0,16	16
N17	1,82	0,18*	1,04*	0,15	18
N19	1,72*	0,18*	1,27	0,15	14*
CP66/1043	1,76*	0,19	1,26	0,12*	16

* = Marginal to low (using SASA thresholds)

4.4 Eldana levels

Table V. Eldana damage at harvest

VARIETY	PERCENTAGE INTERNODES DAMAGED
NCo 376	0,7
N14	3,2
N17	1,1
N19	2,9
CP66/1043	4,7

5. COMMENTS

5.1 The plant crop grew exceptionally well and yields were probably close to the potential for each variety.

5.2 Crop growth measurements taken at 7,4 months of age showed N14, N19 and CP66/1043 to have the longest stalks (Table I). Populations were however lower in these varieties compared to NCo376 despite a 52% tiller mortality between 3,6 and 7,4 months of age.

5.3 Cane yields were particulary high in N14, NCo376 and N19 which were significantly greater than the other varieties.

5.4 Cane quality for CP66/1043 was significantly higher than N19 which in turn was significantly better than N14 and N17. Sucrose % cane for NCo 376 was very much lower than the other varieties which is often not the case at the start of the season.

5.5 Very high sucrose yields were achieved by N19 and CP66/1043 due to exceptional cane quality for this period. N14 because of its high cane tonnage also produced significant increases in sucrose yields compared to NCo 376 while N17 once again was overshadowed by the other varieties.

5.6 These results support findings from other variety trials where N19 has proven successful over a range of soil conditions during the early season. CP66/1043 performed well in this trial but is known to compete favourably only under the best conditions.

5.7 Third leaf samples taken at 5.3 months of age in September indicated inadequate nutrient values in the newer varieties while values for NCo 376 were above the threshold. One reason could be that fertilizer levels were calculated on NCo 376's nutrient requirements. which are thought to differ from that of other varieties. Yields however did not seem to be adversely effected by the low nutrient values. The higher N (%dm) value for NCo 376 undoubtedly influenced cane quality for this variety which could have been corrected with the use of a ripener.

5.8 Eldana damage was higher in the high sucrose varieties and lowest in NCo 376 (Table V).

5.9 Smut recordings showed only a trace of the disease in NCo 376.

5.10 This trial has been re-established and is now in its 1st ratoon.

NBL/cg
19/7/1988

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 10/87/Sw SIM Rhe
CAT.NO: 1634

TITLE: RELEASED VARIETIES ON A 'R' SET SOIL

1. PARTICULARS OF PROJECT

This Crop	: 1st ratoon	Soil Analysis : 11/5/1988	
Site	: Simunye Sugar Estate Field 606. Panel 3	pH 6.68	OM% -
		Clay% 30	PDI -
Region	: Northern Irrigated (Swaziland)	ppm	
Design	: Complete randomised 4 replications	P 12	K 318
		Ca 2310	Mg 532
		S 20	Zn 1.2
Soil Set/Series	: 'R' /Rhebok		
Varieties	: NCo376, N14, N17, CP66/1043, N19	Dates : 27/4/88 - 27/4/89	
		Age : 12 months	
Fertiliser Top dress (kg/ha)	: N P K S	Rainfall : 620 mm	
	: 140 40 150 40	Irrigation: 1024 mm	
		Total : 1644 mm	

2. OBJECTIVES

2.1 To evaluate the performance of recently released varieties on an early season cycle on a 'R' set soil.

2.2 To assess the resistance of these varieties to pests and diseases.

2.3 To assess the response of these varieties to chemical ripeners.

2.4 To compare the nutrient content of the third leaf of varieties to that of NCo376.

3. TREATMENTS

3.1 Varieties : NCo376; N14; N19; N17; CP66/1043

3.2 Nitrogen as urea (46% N) at the rate of 40 kg N/ha and as ASN (27% N + 13.5% S) at the rate of 100 kg N/ha and 50 kg S/ha was top-dressed in early June and early August respectively.

3.3 Phosphorus as single supers (10.5 % P) at the rate of 40 kg P/ha and Potassium as muriate of potash (50% K) at the rate of 150 kg K/ha were top-dressed in early August.

3.4 Ethrel was applied early in February 11 weeks before harvest at a rate of 1.5 l/ha. Fusilade Super was applied late in March, 5 weeks before harvest at 0.45 l/ha on NCo376 and at 0.6 l/ha on the other varieties.

4. RESULTS

4.1 Growth Data

Table 1: Crop growth Measurements at 7; 8.5 and 9.25 Months of age

VARIETY	STALK HEIGHTS (mm to TVD)			POPULATION COUNT (* 1000/ha)		
	7 m	8.5 m	9.25 m	7 m	8.5 m	9.25 m
NCo376	1050	1810	2200	252	167	153
N14	1140	1830	2180	195	134	124
N17	1110	1940	2290	199	146	136
N19	1190	2090	2375	188	139	122
CP66/1043	1210	1970	2265	181	121	112

4.2 Harvest data.

Table 2: Cane Yield, Cane Quality and Sucrose Yield

VARIETY	TONS CANE/HA			SUCROSE % CANE			TONS SUCROSE/HA		
	Control	Ripened	Mean	Control	Ripened	Mean	Control	Ripened	Mean
NCo376	183	179	181	10.5	13.5	12.0	19.2	24.2	21.7
N14	153	164	159	11.4	12.9	12.0	17.4	20.7	19.1
N17	142	139	141	11.6	14.0	12.8	16.5	19.5	18.0
N19	166	146	156	12.7	14.4	13.5	21.0	20.9	22.0
CP66/1043	122	119	121	16.1	18.0	17.1	19.7	21.5	20.6
Mean	153	150	-	12.5	14.5	-	18.8	21.3	-
LSD Variety (0.05) *		13			0.7			1.8	
(0.01) **		18			0.9			2.4	
Significance		**			**			**	
LSD Ripener (0.05) *		9			0.5			1.2	
(0.01) **		13			0.6			1.7	
Significance		NS			**			**	
Trial Mean		151.5			13.5			20.1	
CV %		8.6			4.8			8.5	

Table 3: Mean Differences Between Ripened and Unripened Treatments

VARIETY	TONS CANE/HA	SUCROSE %	TONS SUCROSE/HA
NCo376	+ 4	+ 2.9 **	+ 4.9 **
N14	+ 11	+ 1.2 **	+ 3.2 *
N17	- 3	+ 2.4 **	+ 3.0 *
N19	- 21*	+ 1.7 **	- 0.2
CP66/1043	+ 3	+ 1.9 **	+ 1.8

4.3 Foliar analysis

Table 4: Third Leaf Analysis (% dm) at 5.5 and 6.2 Months of Age

VARIETY	5.5 months October							6.25 months November						
	N	P	K	S	Ca	Mg	Zn/ppm	N	P	K	S	Ca	Mg	Zn/ppm
NCo376	2.02	0.20	1.45	0.18	0.25	0.20	17.9	1.84	0.19	1.43	0.15	0.22	0.16	19.1
N14	1.96	0.18	1.25	0.18	0.30	0.23	17.0	1.79	0.18	1.42	0.16	0.25	0.19	16.8
N17	2.17	0.20	1.39	0.19	0.28	0.22	19.6	1.89	0.18	1.43	0.15	0.23	0.17	17.9
N19	1.90	0.19	1.43	0.18	0.28	0.18	14.3	1.76	0.19	1.48	0.15	0.24	0.14	14.4
CP66/1043	2.08	0.19	1.54	0.17	0.26	0.18	16.0	1.89	0.19	1.60	0.15	0.26	0.15	14.3
LSD														
(0.05) *	0.085	0.010	0.095	0.011	0.023	0.017	1.63	0.069	0.009	0.081	0.006	0.019	0.012	1.93
(0.01) **	0.114	0.014	0.128	0.014	0.031	0.023	2.20	0.094	0.013	0.110	0.008	0.025	0.016	2.60
Significance	**	**	**	*	**	**	**	**	**	**	NS	**	**	**
Mean	2.03	0.19	1.41	0.18	0.27	0.20	16.9	1.84	0.19	1.47	0.15	0.24	0.16	16.47

5. COMMENTS

5.1 Cane Yield

Highly significant differences in cane yield existed between varieties. Yield of NCo376 for this first ratoon was significantly higher than that of all other varieties. The performance of CP66-1043 on the other hand was by far the poorest and statistically lower than that of any other variety. N14, N19 and N17 occupied an intermediate position and the differences in yield between them were not statistically significant.

Ripening resulted in a significant (P = 0.05) decrease in the cane yield of N19 but in a non significant response in the other varieties.

5.2 Cane Quality

Highly significant differences in cane quality between varieties were apparent and sucrose content of CP66/1043 was markedly higher than the other varieties.

There was a highly significant increase in the sucrose content of all varieties where ripener was applied. The response was best on NCo376 and N17 and poorest on N14.

5.3 Sucrose Yield

N19 and NCo376 produced significantly more sucrose than N14 and N17 with CP66/1043 being intermediate.

The response in sucrose yield to ripening differed between varieties. Positive responses were recorded in all varieties except N19 where a small reduction of sucrose yield was associated with a negative effect of ripening on cane yield. The best response was observed in NCo376 which further confirms the efficacy of the combination ripening treatments on this variety.

5.4 Foliar Analysis

Nutrients content of NCo376 at 5.5 months of age were above the thresholds for that variety thus indicating no nutritional limitations in this trial. There were significant differences between varieties in third leaf nutrient content for all nutrients except for Sulphur.

Nitrogen content was lowest in N19 while Potassium content was lowest in N14 and was associated with the highest Calcium and Magnesium levels.

5.6 Eldana and Smut Levels

Traces of smut were found only in NCo376 .

Eldana infestation was generally low in this trial. The highest levels were found in N14.

6. CONCLUSION

* N19 was superior to all other varieties on this 'R' set soil when unripened.

* When ripened with the combination treatment, however, NCo376 produced the highest sucrose yields.

* The performance of ripened N19 was disappointing and resulted from significant reductions in cane yield. Reductions in cane yield of N19 have been noted in a number of trials this year and have been associated with applications of 0.6 l/ha of Fusilade. It has become apparent that this rate is too high for N19 and this aspect will receive attention in the ripener trial programme during the coming season.

* Foliar analysis confirmed that significant differences exist in the third leaf nutrient content of the varieties tested. It is becoming increasingly apparent that current nutrient threshold values may need to be adjusted to take account of variety.

* This trial is being continued and is now in its second ratoon. Provision has been made to apply a lower rate of Fusilade to N19.

PCH/aw/ynm
3 May 1990

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 10/87/Sw SIM Rhe
CAT.NO.: 1634

TITLE: RELEASED VARIETIES ON A 'R' SET SOIL

1. PARTICULARS OF PROJECT

This Crop	: 3rd ratoon	Soil Analysis : 10/12/90			
Site	: Simunye Sugar Estate Field 606. Panel 3	pH	OM%	Clay %	Silt %	Sand %
		7.23	3.99	44	13	40
Region	: Northern Irrigated (Swaziland)			ppm		
		P	K	Ca	Mg	(Ca + Mg)/K
Design	: Randomized blocks 4 replications	23	270	3043	775	14
		CEC : 26.59 me/100g soil				
		KDI : 0.93				
Soil/Set/Series	: 'R'/Rhebok	Dates : 02/05/90 - 03/05/91				
		Age : 12 months				
Varieties	: NCo376, N14, N17, N19, CP66/1043	Rainfall : ?				
		Irrigation : Full				
Fertilizer Top dress (kg/ha)	: N 140, P 20, K -	Total :				

2. OBJECTIVES

2.1 To evaluate the performance of recently released varieties on an early season cycle on a 'R' set soil.

2.2 To assess the resistance of these varieties to pests and diseases.

2.3 To assess the response of these varieties to chemical ripeners.

2.4 To compare the nutrient content of the third leaf of each variety to that of NCo376.

3. TREATMENTS

3.1 Varieties : NCo376, N14, N17, N19, CP66/1043

3.2 Fertilizer:

* Nitrogen as Urea (46% N) was top-dressed on the cane row at rates of 50 kg N ha^{-1}, and 90 kg N ha^{-1} at 3 weeks and 3.7 months after harvesting respectively.

* Phosphorus as single supers (10.5% P) was surface broadcast at the rate of 20 kg P ha^{-1} 1.2 months after harvesting.

3.3 Ripeners

Table 1. Details of Ripener Treatments

Variety	Treatment	Date Applied	Age (months)	Spray - Harvest (weeks)	Purity at Spraying (%)
NCo376	Control	-	-	-	64
	E @ 1.5l ha^{-1}+	06/02/91	9.25	12	63
	F @ 0.45l ha^{-1}	23/03/91	10.75	6	78
N14	E @ 1.5l ha^{-1}+	06/02/91	9.25	12	66
	F @ 0.6l ha^{-1}	05/03/91	10.00	8	77
	F @ 0.6l ha^{-1}	05/03/91	10.00	8	77
N17	E @ 1.5l ha^{-1}	06/02/91	9.25	12	64
	F @ 0.6l ha^{-1}	05/03/91	10.00	8	75
N19	E @ 1.5l ha^{-1}	06/02/91	9.25	12	69
	E @ 1.5l ha^{-1}+	06/02/91	9.25	12	69
	F @ 0.45l ha^{-1}	05/04/91	11.00	4	86
CP66	E @ 1.5l ha^{-1}	06/02/91	9.25	12	82
	E @ 1.5l ha^{-1}+	06/02/91	9.25	12	80
	F @ 0.6l ha^{-1}	23/03/91	10.75	6	90

* Ripeners were applied with A CO_2 constant pressure knapsack with hand held "T" boom. Delivery rate was ± 49 l ha^{-1} through two TK 1.5 flood nozzles.

* Spraying was carried out early morning. The weather at spraying was fine except on 05/03/91 when conditions were slightly windy and cloudy.

4. RESULTS

4.1 Growth Data

Table 2: Growth Measurements

Variety/ Treatment	Stalk Height cm to TVD			Stalk Population (x1000/Ha)	
	Age (mths)			Age (mths)	
	8.8	11.3	12.0	8.8	12.0
NCo376 Unripened	195	227	289	196	154
NCo376 + E 1.5 + F 0.45	193	275	281	152	170
N14 + E 1.5 + F 0.6	196	251	259	174	143
N14 + F 0.6	186	247	251	175	142
N17 + E 1.5	210	276	283	191	159
N17 + F 0.6	201	261	264	183	136
N19 + E 1.5	216	287	306	179	115
N19 + E 1.5 + F 0.45	209	286	286	169	127
CP66/1043 + E 1.5	207	273	280	162	110
CP66/1043 + E 1.5 + Fe 0.6	216	262	282	152	117
Mean	203	270	278	173	137

4.2 Harvest Data

Table 3: Cane Yield, Sucrose % and Sucrose Yield

Variety/ Treatment	Tons Cane/ha	Sucrose % Cane	Tons Sucrose/ha
NCo376 Unripened	184	12.51	23.0
NCo376 + E 1.5 + F 0.45	177	14.88	26.3
N14 + E 1.5 + F 0.6	171	14.34	24.5
N14 + F 0.6	149	13.92	20.7
N17 + E 1.5	166	14.99	25.0
N17 + F 0.6	147	15.09	22.2
N19 + E 1.5	179	14.36	25.7
N19 + E 1.5 + F 0.45	159	15.32	24.4
CP66 + E 1.5	146	17.52	25.7
CP66 + E 1.5 + F 0.6	147	18.28	26.8
Mean	162	15.12	24.4
LSD (0.05)	19	0.99	3.2
(0.01)	26	1.33	4.4
Significance	**	**	*
SE one plot	13	0.68	2.24
CV %	8	4.50	9.2

Note: Allowance for the effect on cane yield of taking four sucrose samples was made for by adding four times the weight of the last sucrose sample to the harvested cane weight.

4.3 Leaf Analysis

Table 4a: Third Leaf Analysis (% dm) in August (3.25 mths)

Variety	% dm						ppm
	N	P	K	S	Ca	Mg	Zn
NCo376	2.18	0.20	1.08	0.19	0.35	0.23	23.9
N14	2.29	0.22	1.14	0.20	0.40	0.29	19.5
N17	2.27	0.23	1.32	0.20	0.32	0.25	22.4
N19	2.09	0.21	1.29	0.20	0.42	0.26	21.0
CP66/1043	2.25	0.22	1.39	0.18	0.30	0.22	18.3
LSD Variety							
(0.05)	0.094	0.015	0.11	0.012	0.021	0.030	4.9
(0.01)	0.13	0.020	0.15	0.017	0.028	0.040	6.6
Significance	**	*	**	**	**	**	NS
Mean	2.22	0.22	1.24	0.19	0.36	0.25	21.0
SE one plot	0.091	0.015	0.10	0.012	0.20	0.029	4.7
CV %	4.1	6.7	8.5	6.3	5.7	11.6	22.1

Table 4b: Third Leaf Analysis (% dm) in October (5.2 mths)

Variety	% dm						ppm
	N	P	K	S	Ca	Mg	Zn
NCo376	1.63	0.19	1.35	0.16	0.23	0.19	16.6
N14	1.70	0.19	1.37	0.17	0.26	0.23	14.5
N17	1.58	0.20	1.49	0.18	0.23	0.21	16.0
N19	1.50	0.20	1.47	0.16	0.24	0.18	13.5
CP66/1043	1.70	0.20	1.54	0.15	0.21	0.18	13.8
LSD Variety							
(0.05)	0.16	0.016	0.13	0.010	0.027	0.020	2.15
(0.01)	0.22	0.022	0.17	0.014	0.037	0.027	2.92
Significance	**	NS	**	**	**	**	**
Mean	1.64	0.19	1.46	0.16	0.23	0.20	14.9
SE one plot	0.11	0.011	0.037	0.007	0.019	0.014	1.5
CV %	6.9	5.7	6.0	4.3	8.1	7.1	10.0

4.4 Eldana Damage

Table 5: Eldana Damage at Harvest

Variety/ Treatment		% Internodes Damaged	
		Treatment Means	Variety Means
NCo376	Control	1.52	
	E + F	0.88	1.20
N14	E + F	4.80	
	F	0.78	2.79
N17	E	0.67	
	F	0.88	0.78
N19	E	0.57	
	E + F	1.15	0.86
CP66	E	1.26	
	E + F	0.08	0.67

5. COMMENTS

5.1 General

Two ripening treatments were compared for each variety (except NCo376) this year in an effort to ensure that each variety produced it's optimum response (previously a control was compared to only one ripener treatment and this may not have been the optimum treatment).

5.2 Cane Yield

Cane yields of the highest yielding treatments of each variety indicated that N19 yielded similarly to NCo376, N14 slightly lower and N17 considerably lower although none of these differences were statistically significant. Cane yields of CP66/1043 were significantly lower than NCo376 (Table 3).

In varieties N14, N17 and N19 there were apparently significant differences in cane yield between ripening treatments (Table 3). These differences, however, must be viewed with caution as they were already apparent in the sucrose sample weights before the application of Ethrel and Fusilade (Appendix 1) and in cane height at 8.8 months of age (Table 2).

5.3 Cane Quality

The sucrose content of CP66/1043 was significantly higher than all other varieties (Table 3). Sucrose content of the best treatment of each variety showed that N19 was superior to ripened NCo376, N17 was similar and N14 was inferior although these differences were not statistically significant.

There were no significant differences in sucrose content between ripening treatments in a given variety although the combination treatment tended to be better than the single treatments in N19 and CP66/1043 (Table 3, Fig. 1).

5.4 Sucrose Yield

There were statistically significant differences in sucrose yield between varieties. The highest sucrose yield was achieved by CP66/1043 which had received the combination ripening treatment. Although not significantly different from ripened NCo376, the performance of CP66/1043 is remarkable considering its low cane yield. Sucrose yields of the best treatments of the other varieties tended to be lower than ripened NCo376 but the differences were not statistically significant.

Differences in sucrose yield between ripening treatments in varieties N14 and N17 tended to be significant, reflecting the differences in cane yield (see note above).

5.5 Leaf Analysis

Levels of nitrogen were below threshold in all varieties in October at 4.25 months of age. Levels of the other nutrients were satisfactory. The increase in leaf-K content between August and October is unusual for spring sampled cane.

There were differences in the content of nutrients between NCo376 and the other varieties and these are summarized as follows:

Variety	% NCo376 (% dm in Oct.)						ppm
	N	P	K	S	Ca	Mg	Zn
N14	104	100	101	106*	113*	121**	87
N17	97	105	110*	112**	100	110*	96
N19	92	105	109*	100	104	95	81**
CP66/1043	104	105	114**	94*	91	95	83**

* significant at P = 0.05
** significant at P = 0.01

5.6 Smut

Very low levels of the disease was recorded in this trial.

5.7 Eldana

Eldana damage was lower than last year at this site. The highest incidence of the pest occurred in N14 treated with the combination treatment.

6. CONCLUSIONS

* CP66/1043 ripened with a combination treatment produced the highest yield of sucrose under these favorable soil conditions. Although the difference in sucrose yield between CP66/1043 and NCo376 was not significant, the lower cane yield of CP66/1043 would make it more attractive than NCo376 in areas far from the mill.

* Historically this trial has shown ripened N19 to perform poorly compared to ripened NCo376. This season, N19 has achieved sucrose yields close to those of NCo376. It is clear now from inspecting historical data that some of the past results obtained in ripening N19 were biased because randomization did not adequately even out natural cane yield variability between treated and untreated plots.

* Results of this trial showed that the combination treatment increased sucrose content of varieties N19 and CP66/1043 more than single treatments. This difference was not observed in N14 and confirms previous results on this variety.

* Differences in third leaf nutrient contents between varieties did not conform to long term means and may have been influenced by the inadequate nitrogen levels.

* This trial was cut by accident in ±Dec 1991. The trial will be slashed in May 1992 for final harvest in May 1993.

AGK/PCH/fkd
03.02.92

Appendix 1 — Sample Data

Variety/ Treatment		Date of Sample (weeks before harvest)											
		4/2/91 (12)				4/3/91 (8)				21/3/91 (6)			
		P%C	g/st	ERC%	gERC/st	P%C	g/st	ERC%	gERC/st	P%C	g/st	ERC%	gERC/st
NCo376	C	64,4	673	4,66	31					74,6	1105	6,99	77
	E + F	63,5	697	4,43	31					78,4	987	8,59	85
N14	E + F	65,1	879	4,51	40	76,2	1135	7,18	81				
	F	67,6	832	5,19	43	77,2	935	7,16	67				
N17	E	63,9	805	4,48	36	78,1	932	8,24	77				
	F	62,9	704	4,22	30	75,5	865	7,06	61				
N19	E	67,9	940	5,27	50								
	E + F	70,1	868	5,78	50								
CP66	E	82,5	978	10,98	107					89,2	1345	13,74	184
	E + F	80,4	866	10,14	90					90,1	1333	14,24	190

		5/4/91 (4)				29/4/91 (1)				3/5/91 (0)			
NCo376	C					86,1	1116	10,85	121	86,6	1146	11,06	127
	E + F					89,7	1252	13,50	169	87,5	1187	13,75	157
N14	E + F	85,6	1178	10,95	129					86,6	1237	12,29	152
	F	84,8	1088	10,68	116					89,1	1403	12,92	181
N17	E	86,6	1057	11,55	122					91,4	1220	13,69	167
	F	85,6	938	11,36	107					89,6	1078	13,60	147
N19	E	86,4	1435	11,23	161	91,0	1249	13,12	164	89,1	1314	12,94	170
	E + F	85,8	1372	11,10	152	91,0	1394	13,25	185	91,5	1401	14,02	196
CP66	E					93,8	1400	16,08	225	93,1	1473	16,26	239
	E + F					94,4	1375	17,21	237	93,2	1340	16,98	227

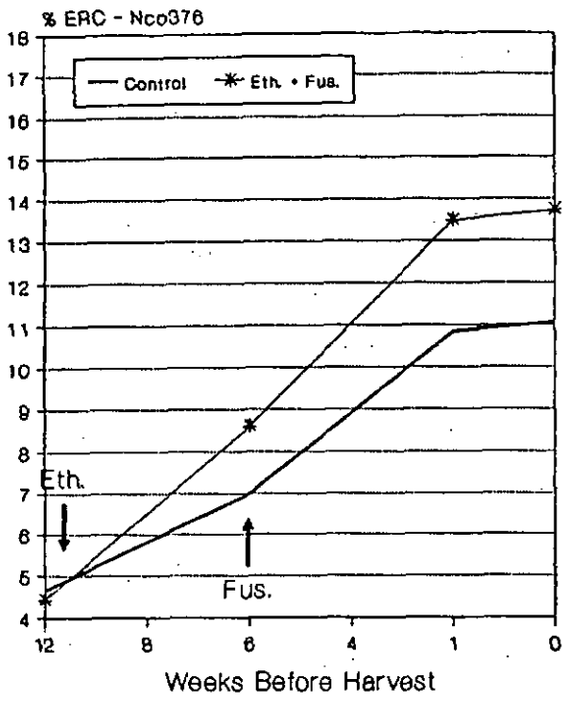
C - Control
E - Ethrel
F - Fusilade

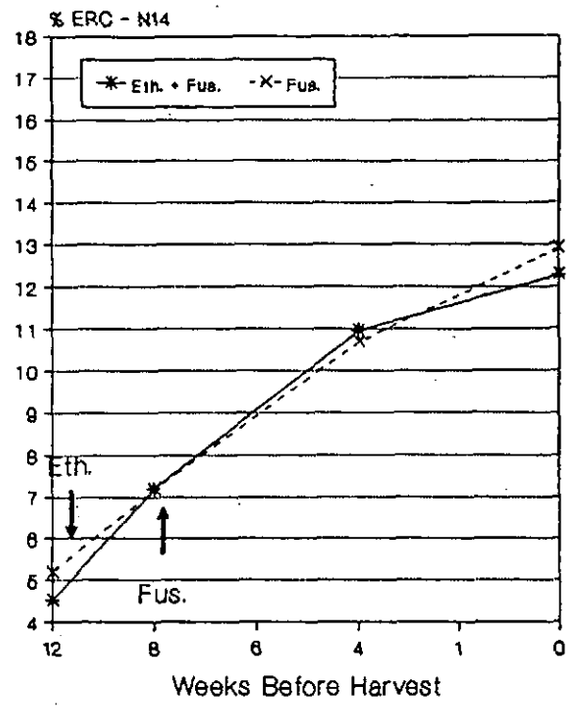
SUCROSE SAMPLING METHOD

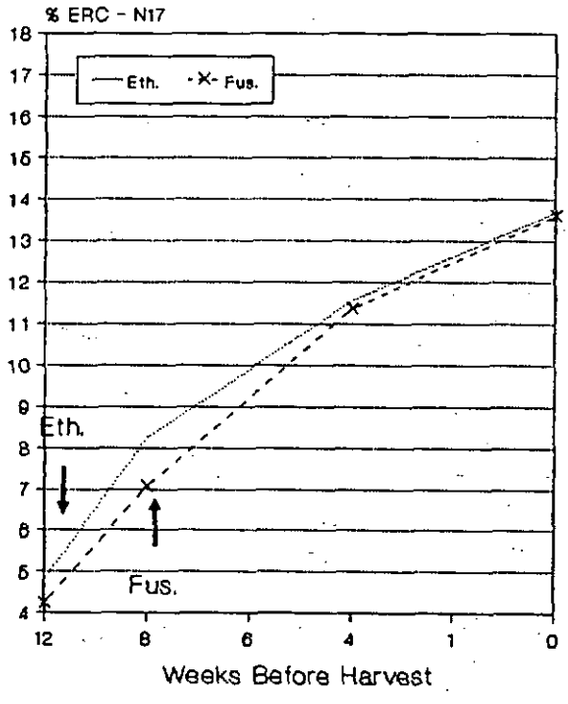
1 Each variety was sampled for sucrose four times. Samples were taken at Ethrel and Fusilade spraying, at harvest and once between Fusilade spraying and harvest.

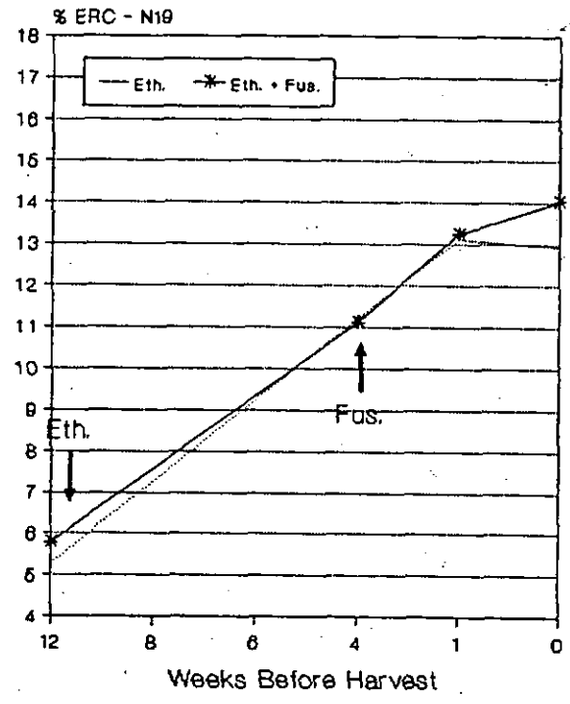
1 Samples comprises 20 stalks taken from 4 localities in the net lines.

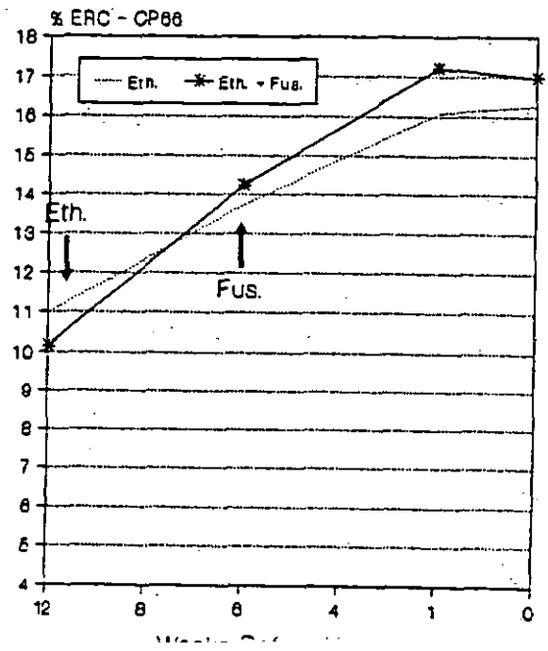
Figure 1: Effects of Ripening on ERC % Cane











SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

Cat. No.: 1634

CODE: VAR 10/87/Sw/SIM Rhe

TITLE: RELEASED VARIETIES ON A "R" SET SOIL

1. PARTICULARS OF PROJECT

This crop	: 5th Ratoon			Soil Analysis:	17/11/92	
Site	: Simunye Sugar Estate Field 606. Panel 3			pH	OM%	Clay %	KDI
				7.0	4	44	0.93
Region	: Northern Irrigated (Swaziland)			ppm (control)			
				P	K	Ca	Mg	(Ca+Mg)/K
				17	287	3155	773	14
Soil Set/Series	: 'R'/Rhebok						
				Date	: 05/05/92 - 18/05/93		
Design	: Randomized Blocks 4 replications			Age	: 12.4 months		
Fertilizer	: N	P	K	Rainfall	: 602 mm		
Total (kg/ha)	: 140	20	200	Irrigation	: No records (overhead)		
				Total	:		

2. OBJECTIVES

2.1 To evaluate the performance of released varieties in an early season cycle on a 'R' set soil.

2.2 To assess the resistance of these varieties to pests and diseases.

2.3 To assess the response of these varieties to chemical ripeners.

2.4 To compare the third leaf nutrient content of each variety to that of NCo376.

3. TREATMENTS

3.1 Varieties: NCo376, N14, N17, N19, CP66/1043

3.2 Ripener: Different treatments of Ethrel and Fusilade Super (hereafter referred to as Fusilade) were applied to all varieties at certain stages before harvest (table 1). A CO_2 constant pressure knapsack with a hand held 'T' boom, delivering ±49 l/ha through two TK 1.5 nozzles, was used in calm, cool conditions.

Table 1: Details of ripening treatments

Variety & treatment		Ripeners and rates	Date applied	Age (mths)	Spray-Harvest (weeks)	(%) Purity at spraying
NCo376	U	Control				78
	C	E 1.5 l/ha &	20/02/93	9.5	13	79
		F 0.45 l/ha	06/04/93	11	6	87
N14	C	E 1.5 l/ha &	20/02/93	9.5	13	82
		F 0.6 l/ha	17/03/93	10.4	9	83
	F	F 0.6 l/ha	17/03/93	10.4	9	84
N17	E	E 1.5 l/ha	20/02/93	9.5	13	79
	F	F 0.6 l/ha	17/03/93	10.4	9	85
N19	E	E 1.5 l/ha	20/02/93	9.5	13	81
	C	E 1.5 l/ha &	20/02/93	9.5	13	79
		F 0.45 l/ha	06/04/93	11.0	6	88
CP66	E	E 1.5 l/ha	20/02/93	9.5	13	89
	C	E 1.5 l/ha &	20/02/93	9.5	13	89
		F 0.6 l/ha	17/03/93	10.4	9	88

Note: U = Unripened C = Combination Ethrel and Fusilade
E = Ethrel treatment F = Fusilade treatment

3.3 Fertilizer:

Nitrogen (Urea, 46% N) was applied on the cane row at 140kg N/ha. Applications were divided into two dressings: 80 kg N/ha, 2 weeks after harvest and 60 kg N/ha, 3 months after harvest.

Phosphorus (Superphosphate, 10.5% P) and Potassium (KCl, 50% K) was applied on the cane row at 20kg P and 200kg K/ha, 4 weeks after harvest.

3.4 Soil Sampling

A composite sample was taken from the whole field to determine fertilizer requirements.

4. RESULTS

4.1 Leaf Analysis

Table 2: Third leaf analysis in October at 5.4 months

	%dm				
Variety	N	P	K	Ca	Mg
NCo376	1.68	0.19	0.98	0.30	0.21
N14	1.73 (103)	0.20 (105	1.09 (111)	0.37 (123)	0.24 (114)
N17	1.76 (105)	0.20 (105	1.26 (129)	0.35 (117)	0.26 (124)
N19	1.65 (98)	0.20 (105	1.14 (116)	0.36 (120)	0.20 (95)
CP66/1043	1.70 (101)	0.20 (105	1.25 (128)	0.32 (107)	0.19 (90)
LSD (0.05)	0.08	0.01	0.11	0.06	0.03
Significance	NS	NS	**	NS	**
Mean	1.70	0.20	1.14	0.34	0.22
SE Diff. ±	0.04	0.005	0.05	0.03	0.02
CV %	4.5	4.8	9.1	17.2	13.0

( ) = Leaf nutrient level as a % of NCo376

4.2 Growth and Eldana Data

Table 3: Growth measurements at various ages and Eldana damage at harvest

Variety/ Treatment	Stalk Height (cm to TVD)				Stalk Population (*1000/ha)				% Internodes Damaged	
	Jan (8.7mths)		Apr (11.4mths)		Jan (8.7mths)		Apr (11.4mths)			
	Treatments	Mean	Treatments	Mean	Treatments	Mean	Treatments	Mean	Treatments	Means
NCo376 U	170	172	243	241	137	140	122	126	0.82	0.65
NCo376 C	174		239		142		130		0.47	
N14 C	169	170	215	220	106	97	95	101	0.80	0.48
N14 F	171		225		88		108		0.16	
N17 E	167	171	250	244	107	118	110	108	1.28	0.86
N17 F	176		238		130		107		0.44	
N19 E	181	167	244	243	101	109	95	102	0.00	0.25
N19 C	153		243		118		109		0.51	
CP66 E	163	172	234	226	92	96	85	82	0.07	0.12
CP66 C	181		218		100		79		0.16	
Significance	NS	NS	**	**	**	**	**	**	NS	-
Mean	170	-	235	-	112	-	104	-	0.47	

4.3 Harvest Data

Table 4: Cane yield, sucrose % and sucrose yield

Variety /Treatment	TCane/ha		Sucrose % Cane		TSuc/ha	
	Treatments	Mean	Treatments	Mean	Treatments	Mean
NCo376 U	136	138	13.92	14.85	19.1	20.5
NCo376 C	139		15.78		22.0	
N14 C	114	119	14.48	14.84	16.5	17.7
N14 F	124		15.21		18.8	
N17 E	124	124	15.18	15.46	18.8	19.2
N17 F	124		15.74		19.5	
N19 E	138	132	15.00	15.68	20.6	20.6
N19 C	126		16.37		20.6	
CP66 E	112	104	16.64	17.59	18.7	18.3
CP66 C	96		18.54		17.8	
LSD (0.05)	20	13	0.65	0.91	3.3	2.2
Significance	**	**	**	**	NS	*
Mean	123	-	15.69	-	19.2	-
SE Difference ±	9.9	6.5	0.32	0.44	1.6	1.11
CV %	11.3	-	2.9	-	11.9	-

5. COMMENTS

5.1 Leaf Analysis

Leaf analysis in October showed that P, K, Ca and Mg levels were satisfactory and above their respective thresholds in all the varieties. Leaf N levels were marginal in N14, N17 and CP66/1034 and below the current threshold of 1.8 %dm in NCo376 and N19. Similar leaf P levels were observed in all varieties while leaf K and Ca levels of NCo376 were well below those of the other varieties. Third leaf Mg levels of N19 and CP66/1043 were below levels observed in NCo376 while those in N14 and N17 were higher than levels in NCo376 (table 2).

5.3 Cane Growth and Eldana damage

There were no apparent differences in stalk length between the different varieties in January. This was however, not the case in April when stalks of varieties NCo376, N17 and N19 were considerably longer than varieties N14 and CP66/1043. Different ripening treatments affected the length of stalks of varieties differently but no consistent trend was observed (table 3).

Stalk populations were the highest in variety NCo376 and the lowest in variety CP66/1043 in both months sampled. Considerable population differences were observed between the different varieties (table3).

Eldana damage in this trial was negligible and variety N17 was apparently most severely affected (table 3).

5.4 Harvest Results

Cane yields obtained from variety NCo376 were significantly higher than those of varieties N17, N14 and CP66/1043. Cane yields from variety N19 were only slightly lower than those of NCo376. Yields of varieties N14, N19 and CP66/1043 were reduced by combination ripening, although differences were not statistically significant (table 4).

The mean sucrose content of CP66/1043 was significantly higher than any of the other varieties. N19 had the second highest sucrose content, followed by N17, N14 and NCo376. Sucrose content differences between these 4 varieties were however not statistically significant (table 4).

Combination ripened CP66/1043 had the highest sucrose content. Differences between ripened treatments in all varieties, except N17, were highly significant (P=0.01). Sucrose contents of the combination treatments were, except in the case of N14, consistently higher than that of treatments receiving either Ethrel or Fusilade alone (table 4).

The highest sucrose yield was obtained from the combination ripened treatment of variety NCo376, which was 1.4 t sucrose more than obtained from either of the treatments of variety N19. This was followed by the Fusilade treatments of N17 and N14 and combination ripened CP66/1043. Differences in sucrose yield between the different treatments of the 5 varieties were, however, not quite statistically significant (table 4).

6. CONCLUSIONS

- Results from this trial confirm the superior sucrose yields obtained from combination ripened NCo376 and highlights the suitability of variety N19 early in the season.
- Differences in leaf nutrient levels did not conform to long term means. This was especially obvious in variety N14 which usually has lower leaf nutrient levels, but showed all nutrients levels higher than those of NCo376 in this trial.
- Results from this trial confirm previous findings that combined treatments of Ethrel and Fusilade increases the sucrose content of N19 and CP66/1043 more than any single ripener treatment.
- Incidences of eldana and smut were low and had no apparent effect on yield in this trial.
- This trial has been terminated and a summary of results from the plant crop to the fifth ratoon is attached.

DMZ/AJD/fkn
19.01.94

Appendix 1: Sucrose sample data

	Date of Sample (weeks before harvest)															
	16/02/93 (13)				15/03/93 (9)				05/04/93 (6)				(0)			
Variety /Treatment	P%C	g/st	ERS	gERC/st	P%	g/st	ERS%	gERS/s	P%C	g/st	ERS	gERS/s	%C	g/st	ERS	gERC/s
NCo376 U	78.5	559	8.71	48	82.2	635	9.77	62	84.9	729	10.17	74	90.0	906	12.57	114
NCo376 C	78.7	563	8.50	48	81.6	659	9.61	64	87.1	688	11.51	80	92.1	830	14.51	120
N14 C	82.4	536	9.09	48	83.0	591	9.51	56	88.1	788	11.38	90	90.8	861	13.17	114
N14 F	80.4	591	8.64	50	83.7	695	9.62	66	88.1	796	11.28	89	92.2	105	13.96	147
N17 E	79.3	526	8.67	47	82.3	686	10.18	70	87.0	634	11.64	74	92.4	917	13.94	128
N17 F	78.9	448	8.53	38	85.1	661	10.62	70	88.6	709	12.27	88	92.1	859	14.41	125
N19 E	80.8	689	8.91	62	83.1	817	10.36	85	88.9	996	12.30	123	91.7	112	13.73	155
N19 C	79.1	641	8.83	57	83.9	823	10.66	88	88.3	920	12.23	112	93.2	989	15.17	150
CP66 E	88.7	645	13.22	85	87.7	816	13.00	105	91.2	910	14.50	131	93.8	979	14.47	151
CP66 C	88.9	617	13.22	82	87.8	723	13.02	95	93.0	811	15.98	130	94.3	946	17.33	164
LSD (0.05)	4.7	130	1.57	14.9	2.5	172	0.98	20	2.4	193	1.03	27	1.5	209	0.72	32
Significance	**	*	**	**	**	NS	**	**	**	*	**	**	**	NS	**	*
Mean	81.6	582	9.63	57	84.0	711	10.63	76	88.5	798	12.33	99	92.3	947	14.42	137
SE Diff. ±	2.3	63.2	0.76	7.3	1.2	83.7	0.48	9.9	1.2	93.8	0.50	13.3	0.8	102.	0.35	15.4
CV %	4.0	15.2	11.2	18.1	2.1	16.7	6.4	18.4	1.9	16.6	5.7	19.0	1.2	15.3	3.5	15.9

TERMINAL REPORT: TRIAL VAR 10/87/Sw/SIM Rhe
plant to 6th ratoon

Table 1: Details of ripening treatments - 1st to 5th ratoon

Ripening treatments 1988/89 &1989/90, Means for ratoons 1 & 2

Variety	Treatment	Age (mths)	Spray-Harv. (weeks)	Mean purity at spraying (%)
NCo376	Control			69
	Eth. 1.5l/ha	9.3	11	69
	Fus. 0.45l/ha	10.5	6	78
N14	Control			74
	Eth. 1.5l/ha	9.3	11	73
	Fus. 0.6l/ha	10.5	6	77
N17	Control			73
	Eth. 1.5l/ha	9.3	11	72
	Fus. 0.6l/ha	10.5	6	79
N19	Control			74
	Eth. 1.5l/ha	9.3	11	75
	Fus. 0.6l/ha	10.5	6	80
CP66/1043	Control			85
	Eth. 1.5l/ha	9.3	11	85
	Fus. 0.6l/ha	10.5	6	87

Ripening treatments: 1990/91 & 1992/93, Means for ratoons 3 & 5

NCo376	1	Control			71
	2	Eth. 1.5l/ha	9.25	12	71
		Fus. 0.45l/ha	10.75	6	83
N14	1	Eth. 1.5l/ha	9.25	12	74
	2	Fus. 0.6l/ha	10.0	8	80
		Fus. 0.6l/ha	10.0	8	80
N17	1	Eth. 1.5l/ha	9.25	12	75
	2	Fus. 0.6l/ha	10.0	8	80
N19	1	Eth. 1.5l/ha	9.25	12	75
	2	Eth. 1.5l/ha	9.25	12	74
		Fus. 0.45l/ha	11.0	5	87
CP66	1	Eth. 1.5l/ha	9.25	12	85
	2	Eth. 1.5l/ha	9.25	12	85
		Fus. 0.45l/ha	10.75	6	89

Note: Minor details of ripening details to be found in annual reports

Table 2: Mean cane yield, sucrose % cane and sucrose yield - plant to 2nd ratoon

Variety	TCane/ha							Suc % cane							TSuc/ha						
	1988	1988/89		1989/90		Mean*		1988	1988/89		1989/90		Mean*		1988	1988/89		1989/90		Mean*	
	U	U	R	U	R	U	R	U	U	R	U	R	U	R	U	U	R	U	R	U	R
NCo376	200	183	179	154	161	169	170	9.4	10.5	13.5	11.8	15.7	11.2	14.6	18.8	19.2	24.2	18.2	25.1	18.7	24.6
N14	209	154	164	137	148	145	156	10.4	11.4	12.9	12.6	14.3	12.0	13.6	21.7	17.4	20.7	17.3	21.3	17.4	21.0
N17	159	142	139	128	128	135	134	10.5	11.6	14.0	13.0	15.3	12.3	14.7	16.7	16.5	19.5	16.7	19.6	16.6	19.6
N19	184	166	166	151	151	159	159	12.3	12.7	14.4	13.6	15.8	13.2	15.1	22.6	21.0	23.9	20.5	23.8	20.8	23.9
CP66/1043	145	122	119	117	127	120	124	15.5	16.1	18.0	16.0	18.8	16.1	18.4	22.4	19.7	21.5	18.7	23.7	19.2	22.6

* 1988 Yield not included in mean
U = Unripened
R = Ripened

Table 3: Mean cane yield, sucrose % cane and sucrose yield - 4th and 5th ratoon

Variety	TCane/ha						Suc % cane						TSuc/ha					
	1990/91		1992/93		Mean		1990/91		1992/93		Mean		1990/91		1992/93		Mean	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	U	R
NCo376	184	177	136	139	163	158	12.5	14.9	13.9	15.8	13.2	15.4	23.0	26.3	19.8	22.0	21.4	24.2
N14	171	149	114	124	143	137	14.3	13.9	14.5	15.2	14.4	14.6	24.5	20.7	16.5	18.8	20.5	19.8
N17	166	147	124	124	145	136	15.0	15.0	15.2	15.7	15.1	15.3	25.0	22.2	18.8	19.5	21.9	20.9
N19	179	159	138	126	159	143	14.4	15.3	15.0	16.4	14.7	15.9	25.7	24.4	20.6	20.6	23.2	22.5
CP66/1043	146	147	112	96	129	122	17.5	18.1	16.6	18.5	17.1	18.3	25.7	26.8	18.7	17.8	22.2	22.3

* 1 & 2 = As noted in table 1

Table 4: Growth measurements at various ages - plant to 5th ratoon

Season	Crop	Month	Age (mths)	Height (cm to TVD)						Population (* 1000/ha)					
				NCo376	N14	N17	N19	CP66	Mean	NCo376	N14	N17	N19	CP66	Mean
1987/88	Plant	Jul	3.6	-	-	-	-	-	-	349	316	281	318	229	299
		Aug	5.8	-	-	-	-	-	-	312	233	269	256	213	257
		Jan	9.4	213	222	212	224	222	219	166	133	126	148	118	138
1988/89	1 R	Nov	7.0	105	114	111	119	121	114	252	195	199	188	181	203
		Jan	8.5	181	183	229	209	197	193	167	134	146	139	121	141
		Feb	9.3	220	218	-	238	227	226	153	124	136	122	112	129
1989/90	2 R	Nov	7.1	105	113	113	115	124	114	214	178	189	182	165	186
		Jan	9.1	190	194	212	222	220	208	189	164	155	150	131	158
		Apr	12.0	296	291	297	310	286	296	144	118	128	119	97	121
1990/91	3 R	Jan	8.8	194	191	206	213	212	203	174	175	187	174	157	173
		May	12.0	285	255	274	296	281	278	162	143	148	121	114	138
1992/93	5 R	Jan	8.7	172	170	171	167	172	170	140	97	118	109	96	112
		Apr	11.4	241	220	244	243	226	235	126	101	108	102	82	104

Table 5: Third leaf analysis at various ages - plant to 5th ratoon

	Leaf nutrient levels (%dm)									
	N		P		K		Ca		Mg	
NCo376	1.96		0.20		1.19		0.30		0.20	
N14	1.95	(99)	0.20	(100)	1.18	(99)	0.34	(113)	0.23	(115)
N17	1.98	(101)	0.21	(105)	1.31	(110)	0.30	(100)	0.22	(110)
N19	1.89	(96)	0.20	(100)	1.38	(116)	0.34	(113)	0.20	(100)
CP66/1034	1.97	(100)	0.21	(105)	1.38	(116)	0.28	(93)	0.19	(95)

( ) = Leaf nutrient level as a % of NCo376

Table 6: Eldana damage at harvest - mean for ratoons 2, 3 and 5

	% Internodes Damaged				
Variety	NCo376	N14	N17	N19	CP66/1043
Mean	0.55	1.95	0.9	0.85	0.45

Table 7: Smut infection levels (% whips) - mean for plant crop to 5th ratoon

Variety	NCo376	N14	N17	N19	CP66/1043
Mean	0.13	0	0	0	0