

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 8/86/SW MIL Hom
CAT. NO.: 1659

TITLE: RELEASED VARIETIES ON A "H" SEI SOIL

1. PARTICULARS OF PROJECT

<p>This crop : 1st ratoon</p> <p>Site : Mhlume Sugar Co Ltd Field 307</p> <p>Region : Northern irrigated (Swaziland)</p> <p>Design : Randomised Blocks Ten replications</p> <p>Soil Set/ Series : H/Homestead</p> <p>Varieties : NCo376, N14, N17 N19</p> <p>Fertilizer : N P K (kg/ha)</p> <p>Top-dress : 160 40 100</p> <p>Total : 160 40 100</p>	<p>Soil Analysis : Date 25/5/1987</p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">pH</td> <td style="text-align: center;">OM%</td> <td style="text-align: center;">Clay %</td> <td style="text-align: center;">PDI</td> </tr> <tr> <td style="text-align: center;">6,01</td> <td style="text-align: center;">-</td> <td style="text-align: center;">>30</td> <td style="text-align: center;">-</td> </tr> </table> <hr style="border: 0; border-top: 1px dashed black; margin: 5px 0;"/> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">P</td> <td style="text-align: center;">K</td> <td style="text-align: center;">Ca</td> <td style="text-align: center;">Mg</td> <td style="text-align: center;">S</td> <td style="text-align: center;">Zn</td> <td style="text-align: center;">Mn</td> </tr> <tr> <td style="text-align: center;">43</td> <td style="text-align: center;">82</td> <td style="text-align: center;">903</td> <td style="text-align: center;">220</td> <td style="text-align: center;">41</td> <td style="text-align: center;">1,0</td> <td style="text-align: center;">59</td> </tr> </table> <p>Dates : 13/5/1987 - 12/5/1988</p> <p>Age : 12,0 months</p> <p>Rainfall : 678 mm</p> <p>Irrigation : 720 mm</p> <p>Total : 1398 mm</p>	pH	OM%	Clay %	PDI	6,01	-	>30	-	P	K	Ca	Mg	S	Zn	Mn	43	82	903	220	41	1,0	59
pH	OM%	Clay %	PDI																				
6,01	-	>30	-																				
P	K	Ca	Mg	S	Zn	Mn																	
43	82	903	220	41	1,0	59																	

2. OBJECTIVES

- 2.1 To continue the performance comparisons of recently released varieties to that of the more established varieties on a duplex soil.
- 2.2 To assess their disease and pest tolerance.
- 2.3 To determine the ripening response of each variety to a recommended rate of ripener applied early season.

3. TREATMENTS

- 3.1 Varieties : NCo376, N14, N17, N19.
- 3.2 Nitrogen as urea (46% N) at 160 kg N/ha was applied as two equal parts, 3,5 and 14,0 weeks after harvesting.
- 3.3 40 kg P/ha as single superphosphate (10,5% P) was top-dressed 3,5 weeks after cutting.
- 3.4 Potassium as KCl (50% K) was top-dressed at a rate of 100 kg K/ha 14,0 weeks after harvesting in August.
- 3.5 The entire trial was artificially ripened in error by the estate.

4. RESULTS

4.1 Growth Data.

Table 1. Crop growth measurements and populations at 1,5; 4,0; 7,5 and 11,5 months of age.

VARIETY	STALK HEIGHTS (MM TO TVD)		POPULATIONS (X 1000/HA)			
	11,5M		1,5M	4,0M	7,5M	11,5M
NCo376	242		114	156	203	148
N14	244		116	116	153	112
N17	267		68	98	174	135
N19	279		100	152	137	112
MEAN	258		99	131	167	127

4.2 Harvest Data.

Table 2. Cane yield, cane quality and sucrose yield.

VARIETY	TONS CANE/HA	SUCROSE % CANE	TONS SUCROSE/HA
NCo376	129	12,25	15,8
N14	125	11,67	14,7
N17	120	12,02	14,6
N19	134	13,69	18,3
LSD Variety			
Means (0,05)*	12	1,10	2,2
(0,01)**	16	1,49	3,0
Significance	*	**	**
Mean	127	12,41	15,9
CV %	10,3	9,7	15,2

Table 3. Cane yield per month and per 100mm water.

VARIETY	TONS CANE/HA MONTH	% NCo376 PLANT	% NCo376 1st RATOON	TON CANE/HA 100mm WATER
NCo376	10,8	100	100	9,2
N14	10,4	104	96	8,9
N17	10,0	85	93	8,6
N19	11,2	96	104	9,6
MEAN	10,6	-	-	9,1

4.3 Eldana

Table 4. Eldana damage at harvest

VARIETY	PERCENTAGE INTERNODES DAMAGED
NCo376	5,08
N14	8,85
N17	10,46
N19	3,63

4.4 Foliar analysis

Table 5. Third leaf analysis (%dm) at 4,7; 5,7 and 6,3 months of age

VARIETY	4,7 Months October				5,7 Months November				6,3 Months December			
	N	P	K	Zn(ppm)	N	P	K	Zn(ppm)	N	P	K	Zn(ppm)
NCo376	2,37	0,24	0,86*	18,5	1,90	0,25	1,04*	15,3	1,78*	0,24	0,94*	18,6
N14	2,22	0,24	0,82*	16,5	1,81	0,22	0,85*	14,5*	1,61*	0,22	0,87*	17,4
N17	2,27	0,26	0,89*	21,4	1,82	0,23	0,93*	18,2	1,60*	0,23	0,95*	18,7
N19	2,13	0,24	0,97*	16,3	1,69*	0,24	1,10	13,4*	1,57*	0,25	1,01*	16,0
Mean	2,25	0,25	0,89	18,4	1,81	0,24	0,98	15,4	1,64	0,24	0,94	17,7

(* = below SASA thresholds)

5. COMMENTS

- * The benefits to yield by green manuring are short lived as the 1st ratoon produced a crop similar to that expected on non-ameliorated duplex soils.
- * Cane yields for the 1st ratoon declined by 29, 33, 22 and 23% for varieties NCo376, N14, N17 and N19 respectively compared to the plant crop. N19 produced the highest cane yield which was non-significantly higher than NCo376 and N14 but was significantly ($P=0,05$) better than N17. No lodging occurred in this crop.
- * The cane quality for N19 was significantly greater than the remaining varieties (Table 2) after being ripened with an Ethrel/Fusilade combination treatment. However, the ripener contribution could not be assessed as the entire trial was sprayed.
- * Sucrose yield differences for NCo376, N14 and N17 were not statistically significant whereas that for N19 was significantly higher than the others (Table 2).
- * Stalk populations for N19 appear to have reached a peak before the other varieties and its growth towards harvest was better (Table 1).
- * Third leaf nutrient values for the three samplings showed N19 to have become N deficient before the remaining varieties, and K (%dm) values for this variety were on average higher. Although soil Zn levels showed the nutrient to be inadequate, third leaf Zn (ppm) was in almost all cases well above the threshold (15 ppm). The variability of these results outlines the need to devise separate thresholds for each of the varieties in question.
- * Traces of smut appeared in NCo376 but was not evident in any of the other varieties.
- * Eldana damage at harvest was highest in N17 and lowest in N19, N17 and N14 were the most infected in the plant crop.
- * These results, particularly concerning N19, are encouraging as its ratooning ability and seemingly favourable performance on a duplex soil may enable it to replace existing varieties in the industry's poorer soils.
- * This trial has been re-established and is now in its 2nd ratoon.

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 8/86/Sw MHL Hom

CAT.NO.: 1659

TITLE: RELEASED VARIETIES ON A "H" SET SOIL

1. PARTICULARS OF PROJECT

This crop	: 2nd ratoon	Soil Analysis	: Date 25/5/1988
Site	: Mhlume Sugar Co Ltd Field 307	<u>pH</u>	<u>OM%</u> <u>Clay %</u> <u>PDI</u>
Region	: Northern irrigated (Swaziland)	6,20	1,64 >30 -
Design	: Randomised Blocks Five replications.	<u>ppm</u>	
Soil Set/ Series	: H/Homestead	<u>P</u> <u>K</u> <u>Ca</u> <u>Mg</u> <u>S</u> <u>Zn</u> <u>Mn</u>	
Varieties	: NCo376, N14, N17 N19	49 77 1062 214 25 1,1 -	
Fertilizer	: <u>N</u> <u>P</u> <u>K</u> (kg/ha)	Dates	: 12/5/1988 - 19/5/1989
Top-dress	: 160 - 150	Age	: 12,25 months
Total	160 - 150	Rainfall	: 528 mm
Micronutrients:	Zn Mn (kg/ha)	Irrigation:	503 mm
	9 8	Total	: 1031 mm

2. OBJECTIVES

- 2.1 To assess the performance of recently released varieties in an early season cycle on a duplex soil.
- 2.2 To assess their disease and pest tolerance.
- 2.3 To determine the ripening response of each variety to chemical ripeners applied early season.

2.4 To compare the nutrient content of the third leaf of the various varieties.

3. TREATMENTS

3.1 Varieties: NCo376, N14, N17, N19.

3.2 Fertilizer:

- * Nitrogen as ASN (27% N) at 60 kg N/ha and urea (46% N) at 100kg N/ha was applied at 1 day and 2.75 months after harvesting respectively.
- * Potassium as KCl (50% K) was top-dressed at a rate of 150 kg K/ha in August 15 weeks after harvesting.
- * Zinc as ZnSO₄ (40% Zn) and Manganese as MnSO₄ (36% Mn) were sprayed as a solution in November 7 months after harvesting.

3.3 Ripener: the trial was artificially ripened with Ethrel (1.5 l/ha) in mid February 3 months before harvest. Fusilade was not applied due to lodging.

4. RESULTS

4.1 Growth Data

Table 1: Crop Growth Measurements and Populations at 2.0; 7.75 and 9.0 Months of Age

VARIETY	STALK HEIGHTS (CM TO TVD)		POPULATIONS (X 1000/HA)		
	7,75M	9,0M	2,0M	7,75M	9,0M
NCo376	131	183	326	182	168
N14	131	175	227	143	129
N17	154	220	159	140	127
N19	153	213	258	131	132
MEAN	142	198	242	149	139

4.2 Harvest DataTable 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	107	110	108.5	12.2	13.05	12.6	13.0	14.4	13.7
N14	90	95	93.0	11.3	11.6	11.45	10.3	11.0	10.6
N17	102	113	108.0	11.4	13.1	12.3	11.7	14.9	13.3
N19	99	109	104.0	14.1	14.9	14.5	13.9	16.3	15.1
Mean	100	107	-	12.2	13.2	-	12.2	14.1	-
LSD Variety Mean (0,05)* (0,01)**		13 17			0.8 1.0			1.8 2.5	
Significance		NS			**			**	
LSD Ripener Mean (0,05)* (0,01)**		9.2 12.1			0.5 0.7			1.3 1.7	
Significance		NS			**			**	
Interaction		NS			NS			NS	
Trial Mean CV %		103 13.7			12.7 6.6			13.2 15.2	

Table 3: Cane Yield per Month and per 100 mm Water

VARIETY	TONS CANE/HA 100mm WATER	TON CANE/HA MTH
NCo376	8,9	10,5
N14	7,6	9,0
N17	8,8	10,4
N19	8,5	10,0
MEAN	8,4	10,0

4.3 EldanaTable 4: Eldana Damage at Harvest

VARIETY	% INTERNODES DAMAGED		
	Control	Ripened	Mean
NCo376	9,70	11,30	10,50
N14	25,80	24,40	25,10
N17	8,90	10,60	9,75
N19	10,00	10,80	10,40
Mean	13,60	14,28	13,94

4.4 Foliar AnalysisTable 5: Third Leaf Analysis at 5.5 Months of Age

VARIETY	N %	P %	K %	S %	Ca %	Mg %	Zn ppm	N/S	K
									K+Ca+Mg
NCo376	1.72	0.19	0.88	0.19	0.33	0.21	22.5	9.1	61.97
N14	1.69	0.17	0.74	0.21	0.41	0.28	22.6	8.0	51.75
N17	1.61	0.20	0.83	0.20	0.32	0.24	27.7	8.1	59.71
N19	1.52	0.18	0.83	0.18	0.35	0.20	19.9	8.4	60.14
LSD Variety									
Mean (0,05)*	0.12	0.009	0.087	0.011	0.030	0.022	3.17	0.80	-
(0,01)**	0.16	0.013	0.120	0.014	0.041	0.030	4.28	1.08	-
Significance	**	**	**	**	**	**	**	*	
Mean	1.64	0.18	0.82	0.20	0.35	0.23	23.2	8.4	

5. COMMENTS5.1 Cane Yield

Although the yield of N14 was apparently lower than that of the other varieties, there were no statistically significant differences between variety yields.

There was a tendency for the yields of all varieties to be marginally greater when Ethrel was applied although the response was not significant.

5.2 Cane Quality

There were highly significant differences in sucrose content between varieties. Sucrose content of N19 was significantly higher than the other varieties whilst that of N14 was significantly lower.

Application of Ethrel significantly enhanced cane quality. Differences in the magnitude of the response were not significant but tended to be greatest in the N17 and poorest in the N14.

5.3 Sucrose Yield

The highest sucrose yield was achieved by N19 followed in decreasing order by N17, NCo376, and N14. The difference between N19 and the other varieties was not quite significant at the 5% level whilst the difference between N14 and the other varieties was highly significant.

5.4 Eldana and Smut

Eldana levels were high this year and were particularly high in the N14 where cane quality and yield are likely to have been affected. Smut occurrence was negligible in this trial.

5.5 Foliar Analysis

Third leaf analysis at five and a half months of age revealed that both Nitrogen and Potassium were below threshold level. These deficiencies are likely to have been influenced by the unusually cold and wet conditions prevailing prior to and at the time of sampling.

The treatment with ZnSo₄ has been effective in increasing Zinc content in the third leaf which was below the threshold value of last year.

Once again this trial has revealed highly significant differences in Nutrient uptake between varieties. Levels of the major nutrients were generally higher in the standard NCo376 than in the other varieties, suggesting that different threshold values may be necessary for these varieties.

Nitrogen content was much lower in the case of N19 than the other varieties whilst that of Phosphorous was lowest in the N14. Potassium content was lowest in the N14 and this level was associated with high levels of Calcium in particular but also of Magnesium.

5.6 This trial has been re-established and is now in its third ratoon.

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 8/86/SW MHL Hom

CAT: 1659

TITLE: RELEASED VARIETIES ON A "H" SET SOIL

1. PARTICULARS OF PROJECT

This crop	: 3rd ratoon	<u>Soil Analysis</u>	: Date 01/06/1989					
Site	: Mhlume Sugar Co Ltd. Field 307	pH	OM %	Clay %	Silt %	Sand %		
Region	: Northern irrigated (Swaziland)	6.14	2.10	21	6	73		
Design	: Randomised Blocks Five replications	ppm						
Soil Set/ Series	: H/Homestead	P	K	Ca	Mg	S	Zn	Mn
Varieties	: NCo376, N14, N17 N19	45	89	866	221	22	1.0	-
Fertilizer	: N P K S (kg/ha)	CEC : 9.16 me/100 g soil						
Top-dress	: 260 40 100 96	KDI : 0.60						
		Dates : 19/05/1989-09/05/1990						
		Age : 12.25 months						
		Rainfall : 744 mm						
		Irrigation: 1035 mm						
		Total : 1779 mm						

2. OBJECTIVES

- 2.1 To assess the performance of recently released varieties in an early season cycle on a duplex soil.
- 2.2 To assess their disease and pest tolerance.
- 2.3 To determine the ripening response of each variety to chemical ripeners applied early season.
- 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.

3.2 Fertilizer:

- * Nitrogen as urea (46 % N) at 160 kg N ha⁻¹ and ASN (27 % N) at 100 kg N ha⁻¹ were applied at 2 weeks and at 4.75 months after harvesting respectively.
- * Phosphorus as single supers (10.5 % P) at 40 kg P ha⁻¹ was top-dressed 4 weeks after harvesting.
- * Potassium as KCl (50 % K) at 100 kg K ha⁻¹ was top-dressed 2 weeks after harvesting.

3.3 Ripener

Table 1: Details of Ripener treatments

	Ethrel	Fusilade	
Rates (l/ha)	1.5	0.45	0.60
Varieties	All	NCo376 N19	N14 N17
Date applied	12/2/90	17/3/90	
Age at spray	8.75 m	10 m	
Weeks before harvest	12	7	
Juice Purity: NCo376	51 %	63 %	
N14	60 %	70 %	
N17	56 %	65 %	
N19	62 %	73 %	

- * Ripeners were applied with a CO₂ constant pressure knapsack with hand held "T" boom. Delivery rate was +/- 49 l/ha through two T K 1.5 nozzles.

4. RESULTS

4.1 Harvest Data

Table 1: 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	129	129	129	10.81	13.48	12.15	13.9	17.4	15.7
N14	110	106	108	12.30	13.29	12.80	13.5	14.1	13.8
N17	103	114	109	11.73	12.34	12.04	12.0	14.2	13.1
N19	104	109	106	13.54	14.42	13.98	14.0	15.7	14.9
Mean	111	115	113	12.10	13.39	12.74	13.4	15.4	14.4
Interaction	NS			NS/*			NS		
LSD Variety (0,05) (0,01)	12 16			0.79 1.06			1.8 2.4		
Significance	**			**			**		
LSD Ripener (0,05) (0,01)	8.5 11.5			0.56 0.75			1.3 1.7		
Significance	NS			**			**		
LSD Treatment (0.05) (0.01)	17 23			1.11 1.50			2.5 3.4		
CV %	12			6.8			13.6		

Table 2: Mean differences between Ripened and Unripened treatments

Variety	Tons Cane/ha	Sucrose % Cane	Tons Sucrose/ha
NCo376	0	2.67**	3.5**
N14	-4	0.99	0.6
N17	11	0.61	2.2
N19	5	0.88	1.7

* Significant P = 0.05

** Highly significant P = 0.01

4.2 Leaf AnalysisTable 3: Third leaf analysis in September at 4.25 months of age

Variety	% dm						Zn ppm
	N	P	K	S	Ca	Mg	
NCo376	1.62	0.22	0.67	0.20	0.42	0.26	19.3
N14	1.69	0.20	0.53	0.23	0.54	0.39	15.0
N17	1.54	0.23	0.71	0.20	0.40	0.31	19.4
N19	1.63	0.21	0.70	0.20	0.49	0.20	18.0
LSD Variety							
Mean (0,05)	0.13	0.012	0.079	0.011	0.062	0.029	2.4
(0,01)	0.18	0.016	0.11	0.015	0.084	0.039	3.3
Significance	NS	**	**	**	**	**	**
Mean	1.62	0.22	0.65	0.21	0.46	0.31	17.9
CV %	9.0	5.9	13.3	5.9	14.7	10.3	14.8

4.3 Eldana DamageTable 4: Eldana damage at harvest

Variety	% Internodes damaged		
	Control	Ripened	Mean
NCo376	2.8	3.2	3.0
N14	4.5	5.7	5.1
N17	4.1	8.0	6.0
N19	1.7	4.3	3.0
Mean	3.3	5.3	4.3

5. COMMENTS

5.1 Cane Yield

The yield of NCo376 was significantly higher than the other varieties on this poor Duplex soil. There were no significant differences between the yields of N14, N17 and N19.

Effects of the ripening treatment on cane yield were variable and not significant.

5.2 Cane Quality

There were highly significant differences in sucrose content between varieties. Sucrose content of unripened cane was highest in the N19 and lowest in the NCo376.

The combination ripening treatment increased cane quality in all varieties. Despite the fact that the response to ripeners was greatest in NCo376, sucrose content of ripened N19 was higher than all other varieties in this trial.

5.3 Sucrose Yield

The relatively high cane yield and good response of NCo376 to chemical ripeners resulted in significantly higher sucrose yields than the other varieties.

In the unripened situation, NCo376 and N19 produced the highest sucrose yields while the performance of N14 and particularly N17 were disappointing.

5.4 Leaf analysis

Third leaf analysis in September showed both Nitrogen and Potassium to be below threshold level. Additional topdressing of Nitrogen was made in October to correct this deficiency. Low leaf K levels are a common occurrence in spring sampled cane but must have been accentuated by the relatively low soil K status.

There were significant differences in third leaf nutrient content between varieties for all nutrients except Nitrogen. The results are generally in agreement with previous trials and show that Phosphorus and Potassium levels were lower in N14 than other varieties. The low Potassium levels were associated with high levels of Calcium and Magnesium.

5.5 Eldana and Smut

Levels of Eldana damage were considerably lower than last year and appeared to be higher in the N14 and N17 than in the other varieties. Ripening appeared to increase levels of internode damage in all varieties.

Smut levels were very low in this trial and smut was only observed in NCo376.

7. CONCLUSION

- * In previous years, N19 has always produced significantly higher sucrose yields than the other varieties at this site. The superiority of NCo376 this year has resulted from excellent responses to the combination ripening treatment as well as the maintenance of relatively high cane yields. Cane yield of NCo376 was considerably higher than the other varieties in this 3rd Ratoon crop and may reflect its stronger ratooning ability under difficult conditions.
- * Significant differences in leaf nutrient levels between varieties once again confirms the need for adjusting the leaf threshold levels for individual varieties.
- * This trial has been continued into the 4th Ratoon to study the ratooning ability of N19 on these difficult soils.

AGK/PCH/fjs
22 April 1991

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 8/86/Sw MHL Hom

CAT.NO.: 1659

TITLE: RELEASED VARIETIES ON A "H" SET SOIL

1. PARTICULARS OF PROJECT

This crop	: 4th ratoon	Soil Analysis	: Date 22/10/1990
Site	: Mhlume Sugar Co Ltd Field 307	pH	OM % Clay % Silt % Sand %
Region	: Northern irrigated (Swaziland)	6.2	2.10 21 6 73
Design	: Randomised Blocks Five replications	ppm	
Soil Set/ Series	: H/Homestead	P K Ca Mg (Ca + Mg)/K	
Varieties	: NCo376, N14, N17 N19	62 144 1041 281	9
Fertilizer	: N P K (kg/ha)	CEC	: 9.16 me/100 g soil
Top-dress	: 160 40 300	KDI	: 0.60
		Dates	: 02/05/1990-15/05/1991
		Age	: 12.25 months
		Rainfall	: ?
		Irrigation	: Full
		Total	:

2. OBJECTIVES

- 2.1 To assess the performance of recently released varieties in an early season cycle on a duplex soil.
- 2.2 To assess their disease and pest tolerance.
- 2.3 To determine the ripening response to chemical ripeners applied early season.
- 2.4 To compare the nutrient content of the third leaf of the various varieties.

3. TREATMENTS

3.1 Varieties: NCo376, N14, N17, N19.

3.2 Fertilizer:

* Nitrogen as Urea (46 % N) at 80 kg N ha⁻¹ was top-dressed on the cane row in June and August at 4 weeks and 3.8 months after harvest respectively.

* Phosphorus as single supers (10.5 % P) at the rate of 40 Kg P ha⁻¹ was surface broadcast in June, 4 weeks after cutting.

* Potassium as KCl (50 % K) at the rate of 300 Kg K ha⁻¹ was surface broadcast in June, 4 weeks after cutting.

3.3 Ripener

Table 1: Details of Ripening Treatments

Variety	Treatment	Date Applied	Age (months)	Spray - Harvest (weeks)	Purity at Spraying (%)
NCo376	Control	-	-	-	54
	Ethrel 1.5 l ha ⁻¹ + Fusilade 0.45 l ha ⁻¹	12/02/91 26/03/91	9.25 10.75	12.5 7	50 76
N14	Ethrel 1.5 l ha ⁻¹ + Fusilade 0.6 l ha ⁻¹	12/02/91 13/03/91	9.25 10.25	12.5 8	60 70
	Fusilade 0.6 l ha ⁻¹	13/03/91	10.25	8	66
N17	Ethrel 1.5 l ha ⁻¹	12/02/91	9.25	12.5	57
	Fusilade 0.6 l ha ⁻¹	13/03/91	10.25	8	61
N19	Ethrel 1.5 l ha ⁻¹	12/02/91	9.25	12.5	60
	Ethrel 1.5 l ha ⁻¹ + Fusilade 0.45 l ha ⁻¹	12/02/91 11/04/91	9.25 11.25	12.5 4.5	66 85

* Ripeners were applied with a CO₂ 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 in the early morning. The weather conditions at spraying were sunny and calm.

4. RESULTS

4.1 Growth Data

Table 2: Growth Measurements

Variety/ Treatment	Stalk Height (cm to TVD)		Stalk Populations (x 1000/ha)
	8.5 mths	12.0 mths	12.0 mths
NCo376 Unripened	271	248	190
NCo376 + E 1.5 + F 0.45	238	213	197
N14 + E 1.5 + F 0.6	220	207	146
N14 + F 0.6	217	195	155
N17 + E 1.5	212	234	159
N17 + E 0.6	222	229	159
N19 + E 1.5	190	248	133
N19 + E 1.5 + F 0.45	185	229	135
Mean	219	225	159

4.2 Harvest Data

Table 3: Cane Yield, Sucrose % and Sucrose Yield

Variety/ Treatment	Tons Cane/ha	Sucrose % Cane	Tons Sucrose/ha
NCo376 C	141	12.35	17.3
NCo376 + E 1.5 + F 0.45	136	13.31	18.1
N14 + E 1.5 + F 0.6	106	13.66	14.3
N14 + F 0.6	112	13.01	14.5
N17 + E 1.5	132	13.91	18.4
N17 + F 0.6	117	13.89	16.3
N19 + E 1.5	123	13.77	16.9
N19 + E 1.5 + F 0.45	135	14.67	19.8
Mean	125	13.57	16.9
LSD (0.05)	16	1.23	2.05
(0.01)	21	1.66	2.8
Significance	**	*	**
SE one plot	12	0.95	1.6
CV %	10	7.01	9.4

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

4.3 Leaf Analysis

Table 4a: Third Leaf Analysis in August (3.5 mths)

Variety	% dm						ppm
	N	P	K	S	Ca	Mg	Zn
NCo376	2.16	0.24	0.69	0.21	0.48	0.34	21.7
N14	2.16	0.22	0.53	0.23	0.59	0.44	15.5
N17	2.17	0.26	0.72	0.21	0.48	0.41	21.4
N19	2.00	0.22	0.76	0.21	0.56	0.33	18.1
LSD Variety							
(0,05)	0.060	0.009	0.11	0.015	0.040	0.038	1.7
(0,01)	0.081	0.012	0.14	0.021	0.055	0.051	2.3
Significance	**	**	**	*	**	**	**
Mean	2.12	0.23	0.67	0.21	0.56	0.33	19.2
SE one plot	0.066	0.009	0.12	0.017	0.044	0.042	1.8
CV %	3.1	4.1	17.2	7.9	8.4	11.0	9.6

Table 4b: Third Leaf Analysis in October (5.8 mths)

Variety	% dm						ppm
	N	P	K	S	Ca	Mg	Zn
NCo376	1.78	0.21	0.78	0.18	0.37	0.28	19.6
N14	1.86	0.19	0.64	0.21	0.50	0.39	16.8
N17	1.74	0.20	0.74	0.19	0.41	0.33	19.2
N19	1.65	0.20	0.84	0.18	0.40	0.25	16.7
LSD Variety							
(0,05)	0.11	0.012	0.15	0.021	0.044	0.040	2.6
(0,01)	0.16	0.017	0.20	0.029	0.060	0.054	3.6
Significance	**	**	**	**	**	**	**
Mean	1.76	0.20	0.75	0.19	0.42	0.31	18.1
SE one plot	0.089	0.010	0.12	0.016	0.036	0.031	2.04
CV %	5.1	4.9	15.4	8.7	8.2	10.0	11.3

4.4 Eldana Damage

Table 5: Eldana Damage at Harvest

Variety/ Treatment	% Internodes Damaged	
	Treatment Means	Variety Mean
NCo376 Control	6.66	6.85
E + F	7.05	
N14 E + F	15.98	16.39
E	16.80	
N17 E	8.01	7.11
F	6.20	
N19 E	6.05	4.63
E + F	3.20	

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 Soil Analysis

Soil-K levels in June 1989 at the beginning of the 3rd ratoon were low (89 ppm). A liberal application of potash was made at the onset of the 4th ratoon and the cumulated addition of potash since June 1989 have increased soil-K levels to a value of 144 ppm, which is higher than the current threshold for soils with less than 30 % clay.

5.3 Cane Yield

Cane yield of N14 was significantly lower than NCo376 on this poor duplex soil (Table 3) and resulted from a combination of lower population and shorter stalks together with higher eldana damage. The best of the two treatments in the other varieties yielded similarly to NCo376.

There were non-significant differences in cane yield between ripening treatments in each variety. The differences were apparent in the sample data before the application of Ethrel and Fusilade (Appendix 1).

5.4 Cane Quality

The sucrose content of N19 ripened with the combination treatment was significantly higher than the other varieties. Sucrose content of the best treatment of each of the other varieties was higher than ripened NCo376.

There were no significant differences in sucrose content between ripening treatments in each variety although the combination treatments tended to be better than single treatments in N14 and N19 (Table 3, Fig. 1).

5.5 Sucrose Yield

The combination treatment applied to N19 gave the highest sucrose yield and tended to be better than ripened NCo376. Where cane yield was relatively high, N17 gave comparable sucrose yield to ripened NCo376. The poor growth in N14 resulted in significantly lower sucrose yield than the other varieties.

There were significant differences in sucrose yield between ripening treatments in N17 and N19. In N17 the difference reflected effects on cane yield and in N19 it reflected both cane yield and sucrose content.

5.6 Leaf Analysis

Potassium content in spring was below threshold despite a generous application of potash and an apparently high status of soil K. Levels of soil Ca and Mg, however, were high in relation to potassium ($\text{Ca} + \text{Mg}/\text{K} = 9$) and are likely to have lowered the availability of potassium. Levels of the other nutrients in October were above threshold with the exception of N in N19.

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

Variety	% NCo376 (% dm Oct.)						ppm
	N	P	K	S	Ca	Mg	Zn
N14	104	90**	82*	117**	135**	139**	86*
N17	98	95	95	105	111	118*	98
N19	93	95	108	100	108	89	85**

* Significant at P = 0.05

** Significant at P = 0.01

5.7 Eldana

The incidence of Eldana in this trial has increased since last year. Damage was least severe in N19 and most severe in N14.

6. CONCLUSIONS

- * N19 ripened with a combination treatment produced the highest sucrose yield on this poor duplex soil. The superiority of N19 over NCo376 resulted from a higher sucrose content.
- * This trial showed that N17 could perform surprisingly well when harvested early in the season. It is, however, doubtful whether the high cane yield observed in the Ethrel treatment was representative of the potential of N17 growing in Duplex soils.
- * Results of this trial showed that the combination treatment increased the sucrose content of N19 more than Ethrel alone.
- * This trial has been continued and is in its 5th ratoon.

AGK/PCH/fkd
05/02/92

Appendix 1

Sample Data

Variety/ Treatment	Date of Sample (weeks before harvest)											
	11/2/91 (12.5)				11/3/91 (8)				25/3/91 (7)			
	P/C	g/st	ERC%	gERC/st	P/C	g/st	ERC%	gERC/st	P/C	g/st	ERC%	gERC/st
NCo376 C	53.7	579	2.80	16					71.2	755	6.21	47
E + F	50.1	544	2.14	12					75.8	769	7.76	60
N14 E + F	60.1	534	3.80	20	70.2	719	6.13	44				
F	53.8	604	2.68	16	66.2	728	4.93	36				
N17 E	56.7	674	3.21	22	69.8	798	6.30	50				
F	54.3	553	2.74	15	61.1	667	4.13	28				
N19 E	60.9	778	4.26	33								
E + F	66.55	762	5.32	41								

Variety/ Treatment	11/4/91 (4.5)				30/4/91 (2)				7/5/91 (1)			
	P/C	g/st	ERC%	gERC/st	P/C	g/st	ERC%	gERC/st	P/C	g/st	ERC%	gERC/st
NCo376 C					78.5	910	9.40	86	78.9	847	9.65	82
E + F					83.8	921	11.43	105	84.1	821	11.96	98
N14 E + F	83.4	784	10.12	79					87.1	830	11.88	99
F	80.4	794	8.98	71					85.6	872	11.44	100
N17 E	81.9	915	10.00	91					86.1	977	12.29	120
F	77.6	765	8.80	67					82.3	849	11.41	97
N19 E	83.8	1043	10.79	113	86.1	1114	12.48	139	84.56	1012	12.02	122
E + F	85.3	1149	11.41	131	86.5	1177	12.37	146	87.56	1155	12.99	150

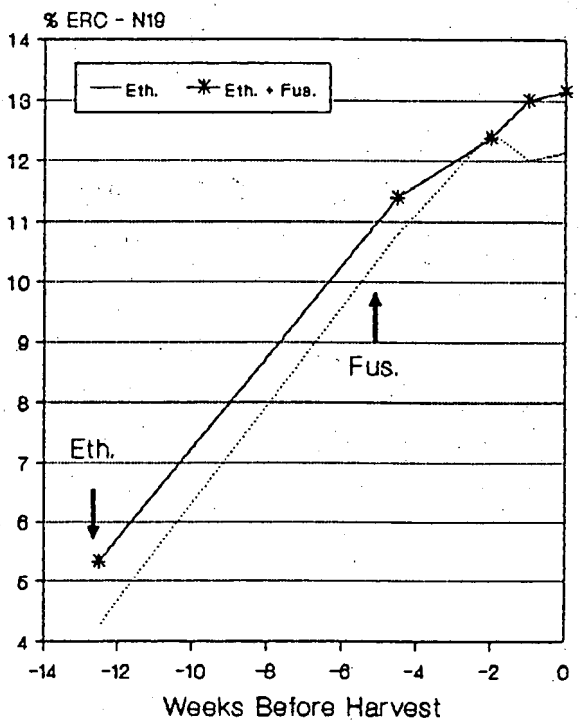
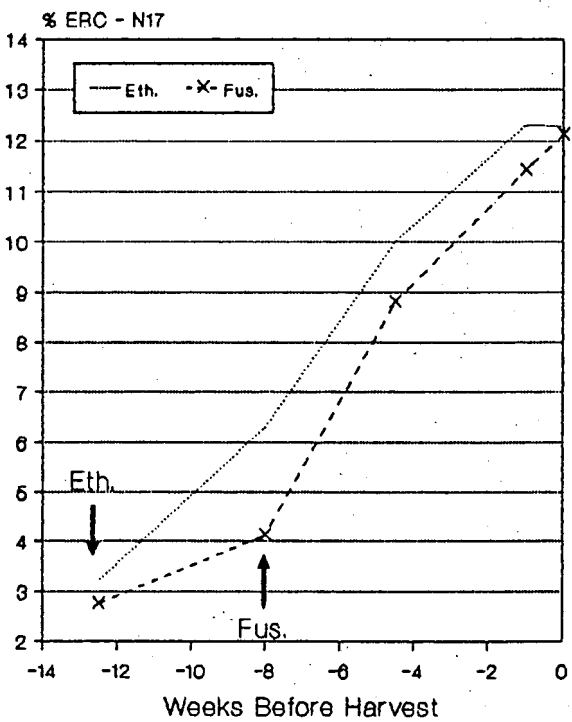
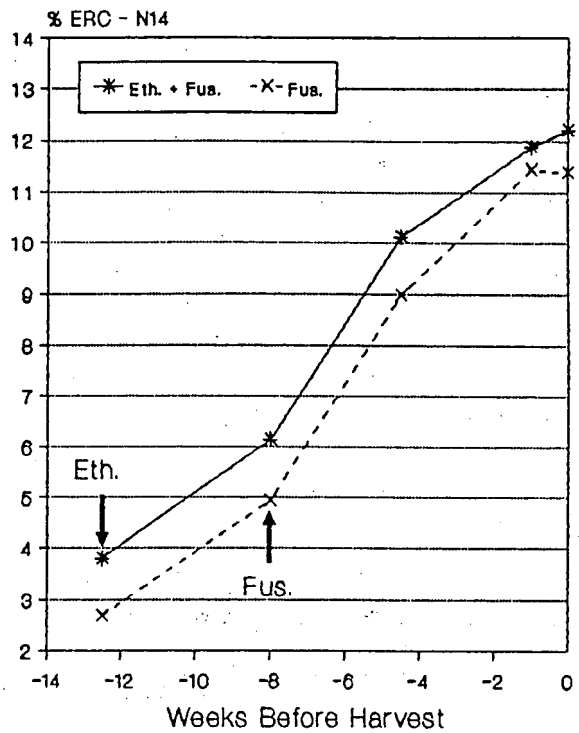
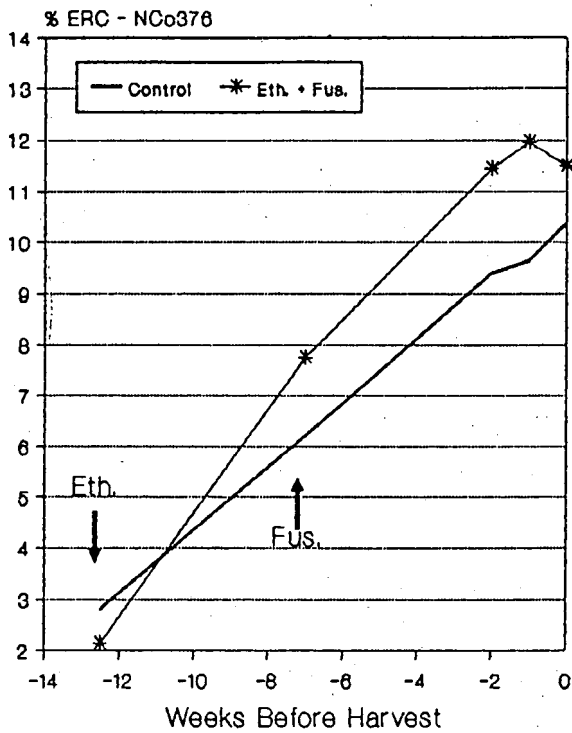
Variety/ Treatment	15/5/91 (0)			
	P/C	g/st	ERC%	gERC/st
NCo376 C	81.2	927	10.39	96
E + F	84.2	979	11.50	113
N14 E + F	88.2	921	12.21	112
F	85.5	998	11.38	114
N17 E	86.8	946	12.28	116
F	85.1	892	12.10	108
N19 E	86.4	1171	12.13	142
E + F	88.4	1369	13.14	180

Note on Sampling Method

† Each variety was sampled for sucrose five times. Samples were taken at Ethrel and Fusilade application, at harvest and twice between Fusilade spraying and harvest.

† Samples comprised 20 stalks taken from 4 localities in the net lines.

Figure 1: Effects of ripening on ERC % Cane



3. TREATMENTS

3.1 Varieties: NCo376, N14, N17, N19.

3.2 Fertilizer:

- * Nitrogen as Ammonium Sulphate (21% N) at the rate of 60kg N ha⁻¹ was topdressed on the cane row in May, 2 weeks after harvest, followed by an additional 80 kg N ha⁻¹ as urea (46% N) in August 3.5 months after harvest.
- * Sulphur as Ammonium Sulphate (24% S) at the rate of 68kg S ha⁻¹ was topdressed on the cane row in May, 2 weeks after harvest.
- * Potassium as KCl (50% K) at the rate of 100 Kg K ha⁻¹ was topdressed on the cane row in May, 2 weeks after harvest.

3.3 Ripener

Table 1: Details of Ripening Treatments

Variety	Treatment	Date Applied	Age (months)	Spray - Harvest (weeks)	Purity at Spraying (%)
NCo376	Control	-	-	-	60
	Ethrel 1.5 l ha ⁻¹ + Fusilade 0.45 l ha ⁻¹	13/02/92	8.9	14	60
		26/03/92	10.4	8	77
N14	Ethrel 1.5 l ha ⁻¹ + Fusilade 0.6 l ha ⁻¹	13/02/92	8.9	14	60
		12/03/92	9.8	10	71
	Fusilade 0.6 l ha ⁻¹	12/03/92	9.8	10	74
N17	Ethrel 1.5 l ha ⁻¹	13/02/92	8.9	14	55
	Fusilade 0.6 l ha ⁻¹	12/03/92	9.8	10	73
N19	Ethrel 1.5 l ha ⁻¹	13/02/92	8.9	14	64
	Ethrel 1.5 l ha ⁻¹ + Fusilade 0.45 l ha ⁻¹	13/02/92	8.9	14	62
		26/03/92	10.4	8	80

* Ripeners were applied with a CO₂ 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 in the early morning. The weather conditions at spraying were sunny and calm.

4. RESULTS4.1 Growth DataTable 2: Growth Measurements

Variety/ Treatment	Stalk Height (cm to TVD)				Stalk Populations (x 1000/ha)	
	7.9 mths	8.6 mths	10.4 mths	11.9 mths	7.9 mths	11.9 mths
NCo376 Unripened	143	216	198	212	354	225
NCo376 + E 1.5 + F 0.45	137	208	222	234	308	232
N14 + E 1.5 + F 0.6	135	199	175	199	141	221
N14 + F 0.6	141	217	174	188	254	164
N17 + E 1.5	145	202	213	227	160	253
N17 + F 0.6	149	217	223	232	199	153
N19 + E 1.5	156	218	226	251	193	160
N19 + E 1.5 + F 0.45	145	212	222	233	172	235
Mean	144	211	207	222	223	205

4.2 Harvest DataTable 3: Cane Yield, Sucrose % and Sucrose Yield

Variety/ Treatment	T Cane/ha		Sucrose % Cane		TSuc/ha	
	Treatment	Variety Mean	Treatment	Variety Mean	Treatment	Variety Mean
NCo376 Unripened	114	111	12.35	12.90	13.8	14.3
NCo376 + E 1.5 + F 0.45	108		13.56		14.7	
N14 + E 1.5 + F 0.6	82	82	12.79	13.12	10.6	10.9
N14 + F 0.6	82		13.45		11.1	
N17 + E 1.5	93	98	13.40	13.89	12.5	13.7
N17 + F 0.6	103		14.38		14.8	
N19 + E 1.5	116	110	14.21	14.56	16.5	16.0
N19 + E 1.5 + F 0.45	103		14.91		15.4	
LSD (0.05)	17		1.23		2.6	
Significance	*		*		*	
Mean	100		13.62		13.7	
SE Difference	8.2		0.60		1.3	
CV %	12.9		7.0		14.7	

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

4.3 Leaf AnalysisTable 4a: Third Leaf Analysis (% dm) in August (3.4 mths)

Variety	% dm				
	N	P	K	Ca	Mg
NCo376	2.28	0.24	0.79	0.57	0.30
N14	2.22	0.24	0.60	0.53	0.41
N17	2.30	0.25	0.72	0.53	0.40
N19	2.21	0.24	0.80	0.81	0.30
LSD (0.05)	0.10	0.01	0.16	0.23	0.06
Significance	NS	NS	NS	*	**
Mean	2.25	0.24	0.73	0.61	0.35
SE Difference	0.05	0.005	0.08	0.11	0.03
CV %	4.9	4.6	23.3	41.3	20.5

Table 4b: Third Leaf Analysis (% dm) in October (5.4 mths)

Variety	% dm						ppm
	N	P	K	S	Ca	Mg	Zn
NCo376	2.01	0.22	0.79	0.22	0.46	0.25	17.6
N14	1.95	0.20	0.69	0.24	0.54	0.30	15.0
N17	1.94	0.22	0.82	0.22	0.48	0.28	17.4
N19	1.88	0.20	0.89	0.23	0.54	0.23	16.1
LSD (0,05)	0.10	0.01	0.11	0.01	0.07	0.03	1.87
Significance	NS	**	**	**	*	**	*
Mean	1.94	0.21	0.80	0.22	0.51	0.27	16.5
SE Difference	0.05	0.06	0.05	0.01	0.03	0.02	0.91
CV %	5.9	6.6	14.7	5.1	14.3	13.9	12.3

4.4 Eldana DamageTable 5: Eldana Damage at Harvest

Variety/ Treatment	% Internodes Damaged	
	Treatment	Variety Mean
NCo376 Control	2.65	3.88
E + F	5.12	
N14 E + F	11.38	10.69
E	10.00	
N17 E	3.99	3.05
F	2.10	
N19 E	5.02	4.42
E + F	3.82	
Mean	5.51	-
LSD (0.05)	4.03	2.85
SE Difference	1.97	1.39
CV %	56.42	-

5. COMMENTS5.1 General

Varieties N14, N17 and N19 received two ripener treatments with NCo376 receiving only one. Trial layout was changed from that of 1991/92 in the sense that plots receiving Fusilade previously, now received Ethrel + Fusilade and vice versa. Cane yields were considerably lower than last year at this site and may have reflected the water restrictions enforced since January 1992.

5.2 Cane Growth

NCo376 produced the highest mean stalk population followed by N17 and N19. The best growth in terms of stalk height was observed in N19 followed by N17 and NCo376 (table 2).

5.3 Harvest Results5.3.1 Cane Yield

Cane yields of NCo376 and N19 were superior to the other varieties in this trial. Yields of N17 were intermediate while those of N14 were very poor.

Ripening with the combination treatment tended to reduce yields in NCo376 and N19 but the effect was not statistically significant.

5.3.2 Cane Quality

Sucrose content of N19 was higher than the other varieties in this trial while that of N14 was the lowest.

Sucrose content was increased significantly by ripening with the combination treatment in the case of NCo376. There were no statistically significant differences between the two treatments on the other varieties although the combination treatment tended to be more effective than Ethrel on N19 and Fusilade was more effective than Ethrel on N17.

5.3.3 Sucrose yield

Sucrose yields were highest in N19 and lowest in N14. The highest sucrose yields were recorded in Ethrel ripened N19 and combination ripened N19. Fusilade treated N17 and combination treated NCo376 produced the next highest yields. Yields of N14 were poor in this trial due mainly to poor cane yields but also to relatively low sucrose content.

5.4 Leaf Analysis

Third leaf nutrient analysis at 3.4 months and 5.4 months of age (August and October) showed all nutrients, except Potassium, to be at satisfactory levels. There were differences in nutrient content between varieties and most of these differences were statistically significant, particularly at the later sampling date.

N content of N19 tended to be lower than the other varieties, P content of N14 and N19 was lower than NCo376 and N17, K content was lower in N14 and higher in N19 than in NCo376. Consistent differences were also evident in the case of Ca and Mg.

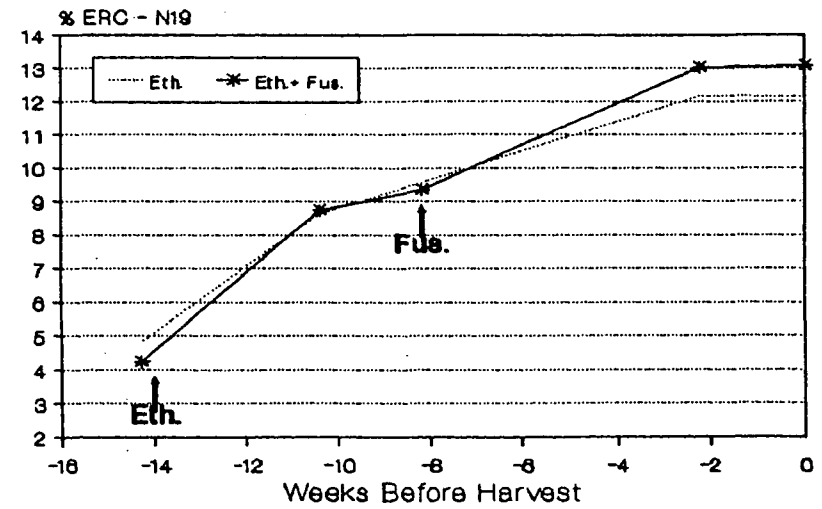
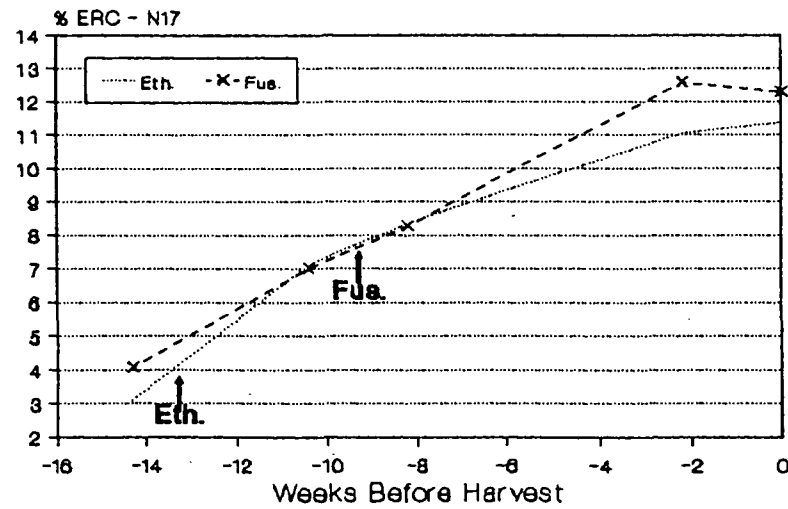
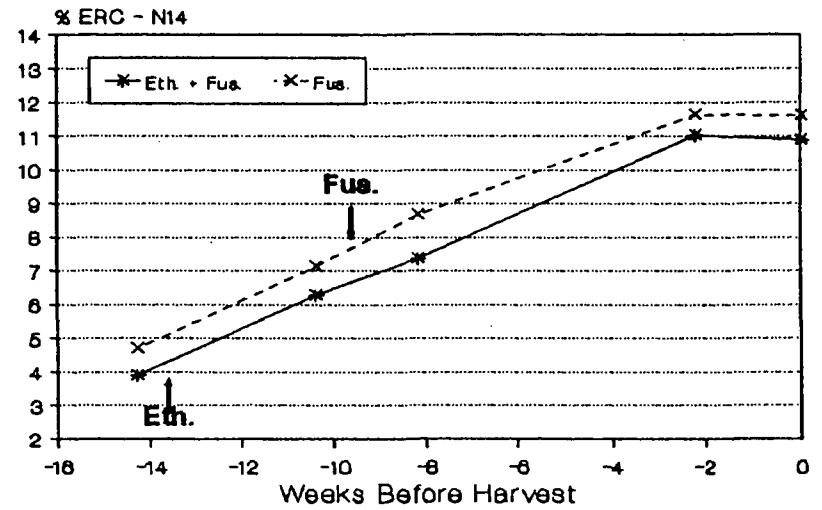
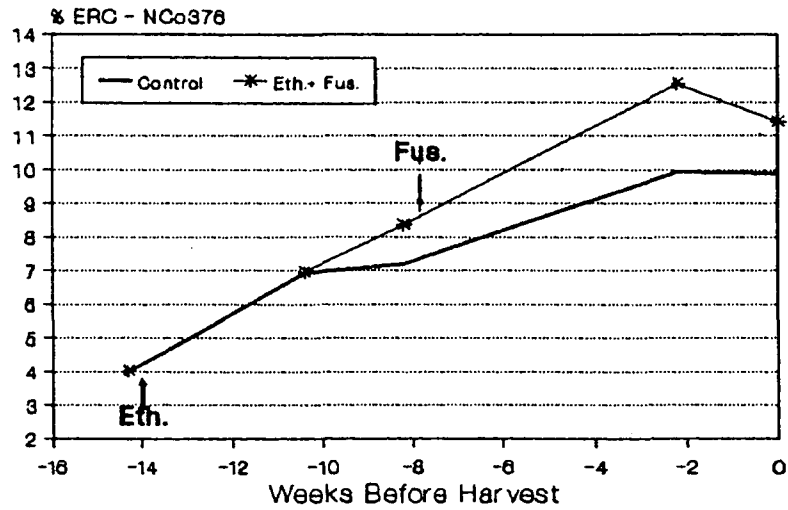
5.5 Eldana

Eldana damage levels were relatively high in this trial but infestations were variable. Levels of damage were noticeably higher in N14 than in other varieties which were similarly affected. There were no consistent effects of ripening treatments on levels of eldana damage.

6. CONCLUSIONS

- * The highest sucrose yields were produced by both ripened treatments of N19 in this trial and this resulted from good cane yields and superior cane quality.
- * Ripened NCo376 and N17 produced intermediate yields while N14 performed poorly and was heavily infested with Eldana.
- * This trial is being continued to study the ratooning ability of these varieties under difficult soil conditions.

Figure 1: Effects of Ripening on ERC % Cane



Appendix 1

Sample Data

Variety/ Treatment	Date of Sample (weeks before harvest)											
	10/2/92 (14.3)				11/3/92 (10.4)				25/3/92 (8.2)			
	PXC	g/st	ERC%	gERC/st	PXC	g/st	ERC%	gERC/st	PXC	g/st	ERC%	gERC/st
NCo376 C	59.5	378	3.99	18	72.2	447	6.93	30	73.6	501	7.19	35
B + F	60.3	402	4.02	16	71.0	500	6.97	35	76.6	536	8.37	44
N14 B + F	59.7	353	3.91	14	71.0	483	6.29	29	75.1	567	7.36	41
F	64.2	421	4.70	20	74.5	489	7.12	35	79.6	518	8.67	45
N17 B	55.0	366	3.10	11	72.0	573	7.12	40	76.3	537	8.36	45
F	60.9	454	4.07	19	72.7	547	7.01	38	76.8	531	8.26	43
N19 B	64.4	522	4.81	25	77.7	678	8.64	59	79.2	865	9.56	83
B + F	60.8	506	4.23	21	77.8	760	8.75	66	79.8	736	9.35	69
LSD (0.05)	9.83	79	1.73	7	4.96	120	1.21	10	4.06	155	1.17	16
Significance	NS	**	NS	*	*	**	**	**	*	**	**	**
Mean	60.6	425	4.10	18	73.6	559	7.35	42	77.1	599	8.39	51
SE Diff.	4.80	38.4	0.84	3.5	2.42	58.7	0.59	4.7	1.98	75.6	0.57	7.7
CV %	12.5	14.3	32.5	30.9	5.2	16.6	12.7	17.7	4.1	20.0	10.8	24.1

	6/5/92 (2.2)				21/5/92 (0)			
	PXC	g/st	ERC%	gERC/st	PXC	g/st	ERC%	gERC/st
NCo376 C	79.1	602	9.94	58	77.6	674	9.89	66
B + F	85.0	561	12.56	71	81.1	707	11.41	81
N14 B + F	85.1	603	11.04	67	83.0	691	10.89	75
F	84.8	588	11.64	68	84.4	662	11.61	77
N17 B	83.4	605	11.06	67	82.6	718	11.37	81
F	86.8	580	12.58	73	83.4	725	12.29	89
N19 B	85.1	961	12.16	117	83.1	876	12.15	107
B + F	86.7	821	13.04	106	85.9	880	13.07	115
LSD (0.05)	3.74	128	1.34	17	5.17	162	1.56	22
Significance	**	**	**	**	NS	*	*	**
Mean	84.5	665	11.75	79	82.6	741	11.58	86
SE Diff.	1.83	62.5	0.65	8.3	2.52	79.2	0.76	10.8
CV %	3.4	14.9	8.8	16.6	4.8	16.9	10.4	19.9

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

Cat. No.: 1659

CODE: VAR 8/86/Sw/MHL Ho

TITLE: RELEASED VARIETIES ON A "H" SET SOIL EARLY SEASON

1. PARTICULARS OF PROJECT

This crop	: 6th Ratoon	Soil Analysis:	08/06/92		
Site	: Mhlume Sugar Co. Ltd. Field 307	pH	OM%	Clay %	KDI
		5.3	1.71*	25*	0.61*
Region	: Northern Irrigated (Swaziland)	ppm			
		P	K	Ca	Mg (Ca+Mg)/K
		53	75	885	262 15
Soil Set/Series	: 'H'/Homestead	CEC	: 8.2* meq/100g soil		
Design	: Randomised Blocks 5 replications	Date	: 21/05/92 - 13/05/93		
Variety	: NCo376, N14, N17, N19	Age	: 11.7 months		
Fertilizer	: N P K	Rainfall	: 852 mm		
Total (kg/ha)	: 160 40 150	Irrigation	: 440 mm (furrow)		
		Total	: 1292 mm		

* Sampled 21/03/91

2. OBJECTIVES

- 2.1 To assess the performance of recently released varieties in an early season cycle on a duplex soil.
- 2.2 To assess their disease and pest tolerance.
- 2.3 To determine the response to chemical ripeners applied early season.
- 2.4 To compare the nutrient content of the third leaf of the various varieties.

3. TREATMENTS

3.1 Varieties: NCo376, N14, N17, N19

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 CO₂ 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 (months)	Spray-Harvest (weeks)	Purity at Spraying (%)
NCo376	U	Control	-	-	-	64
	C	E 1.5 l/ha & F 0.45 l/ha	11/02/93 25/03/93	8.7 10.1	13 7	64 80
N14	C	E 1.5 l/ha & F 0.6 l/ha	11/02/93 11/03/93	8.7 9.6	13 9	67 75
	F	F 0.6 l/ha	11/03/93	9.6	9	76
N17	E	E 1.5 l/ha	11/02/93	8.6	13	62
	F	F 0.6 l/ha	11/03/93	9.6	9	78
N19	E	E 1.5 l/ha	11/02/93	8.7	13	69
	C	E 1.5 l/ha & F 0.45 l/ha	11/02/93 25/03/93	8.7 10.1	13 7	73 83

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

3.2 Fertilizer:

Nitrogen (Urea, 46% N), was applied on the cane row in two dressings: 53kg N/ha, two weeks after harvest and 107kg N/ha, 10 weeks after harvest.

Phosphorus (Superphosphate, 10.5% P) and Potassium (KCl, 50% K) were applied on the cane row at 40kg P and 150kg K/ha, 2 weeks after harvest.

4. RESULTS

4.1 Leaf Analysis

Table 2: Third leaf analysis (% dm) in October and November

Variety	October (5.1 months)					November (6.0 months)				
	N	P	K	Ca	Mg	N	P	K	Ca	Mg
NCo376	1.64	0.19	0.61	0.73	0.36	1.62	0.23	0.76	0.45	0.25
N14	1.66	0.20	0.66	0.91	0.35	1.60	0.22	0.76	0.50	0.35
N17	1.67	0.20	0.78	0.50	0.37	1.62	0.23	0.83	0.43	0.28
N19	1.62	0.20	0.65	0.65	0.31	1.57	0.23	0.83	0.42	0.22
LSD (0.05)	0.07	0.01	0.09	0.23	0.06	0.10	0.01	0.11	0.09	0.05
Significance	NS	NS	**	**	NS	NS	NS	NS	NS	**
Mean	1.65	0.20	0.70	0.70	0.35	1.60	0.23	0.79	0.45	0.27
SE Diff. ±	0.03	0.04	0.11	0.11	0.03	0.05	0.004	0.06	0.04	0.02
CV %	4.6	6.2	35.7	35.7	18.9	6.6	4.7	15.7	20.9	18.5

4.2 Growth DataTable 3: Growth measurements

Variety/Treatment	Stalk Height (cm to TVD)				Stalk Populations (~1000/ha)			
	January (8.2 mths)		March (9.8 mths)		January (8.2 mths)		March (9.8 mths)	
	Treatment	Mean	Treatment	Mean	Treatment	Mean	Treatment	Mean
NCo376 U	149	151	194	195	128	123	106	109
NCo376 C	153		196		119		112	
N14 C	142	146	195	189	116	113	72	76
N14 F	150		182		110		81	
N17 E	162	157	183	192	112	112	88	91
N17 F	161		201		113		94	
N19 E	157	148	204	208	106	108	85	83
N19 C	139		212		109		81	
Mean	151	-	196	-	114	-	90	-

4.3 Lodging and EldanaTable 4: Lodging scores in April and Eldana damage at harvest

Variety/ Treatment	Lodged stalks		% Internodes Damaged	
	Treatment	Mean	Treatment	Mean
NCo376 U	6	7	1.72	1.58
NCo376 C	8		1.44	
N14 C	3	2	4.69	5.41
N14 F	1		6.13	
N17 E	5	6	2.28	2.51
N17 F	6		2.75	
N19 E	7	8	3.35	2.34
N19 C	9		1.33	
Mean	6	-	2.96	-

NB: A score of 9 represents
heavy lodging

4.4 Harvest DataTable 5: Cane yield, sucrose % cane and sucrose yield

Variety/ Treatment	TCane/ha		Sucrose % Cane		TSuc/ha	
	Treatment	Mean	Treatment	Mean	Treatment	Mean
NCo376 U	108	108	13.73	14.43	14.8	15.5
NCo376 C	108		15.14		16.3	
N14 C	80	77	13.43	13.49	10.8	10.4
N14 F	74		13.55		10.1	
N17 E	89	93	13.96	14.54	12.4	13.6
N17 F	98		15.13		14.9	
N19 E	109	103	14.76	15.22	16.1	15.6
N19 C	97		15.67		15.2	
LSD (0.05)	15	11	0.87	0.52	2.3	1.8
Significance	**	**	**	**	**	**
Mean	95	-	14.42	-	13.8	-
SE Difference ±	7.4	5.4	0.42	0.25	1.1	0.9
CV %	12.2	-	4.64	-	13.1	-

5. COMMENTS

5.1 General

The maturity status of all the varieties was conducive to ripening with Ethrel in February (table 1). Juice purities in March varied between 75 and 83 % indicating that responses to Fusilade could be expected in all but the most mature variety (N19). There was heavy lodging after the application of ripeners in late March particularly in N19, NCo376 and N17 (table 4).

5.2 Cane Growth

NCo376 produced the highest mean stalk populations followed by N17 and N19 while those of N14 were exceptionally low. Differences in stalk heights were less marked but N19 apparently produced the longest stalks (table 3).

5.3 Harvest Results

NCo376 produced the highest cane yield followed by N19 and N17, whilst that of N14 was significantly lower than all the other varieties (table 5). There were no statistically significant differences in cane yields between chemical ripening treatments.

The sucrose content of N19 was significantly higher than that of the other varieties, whilst that of N14 was significantly lower (table 5).

Ripening with the combination treatment significantly improved the sucrose content of NCo376 (10.2%). The combination treatment was also more effective on N19 than Ethrel alone. Fusilade was more effective than Ethrel on N17 while there were no apparent differences in the responses to Ethrel and Fusilade applied alone on N14.

N19 and NCo376 produced the highest mean sucrose yields, while N14 produced significantly lower yields than the other varieties.

The highest sucrose yields in this trial were produced by NCo376 ripened with the combination treatment and by N19 ripened with Ethrel alone. The sucrose yield of Fusilade treated N17 was significantly higher than that of the Ethrel treatment while the differences between the two ripening treatments on N14 were relatively small and non significant.

5.4 Leaf Analysis

Third leaf nutrient analysis at 2.5, 4.0, 5.1 and 6 months of age between August and November showed that levels of P, Ca and Mg were above threshold in all varieties. Nitrogen was deficient in October and November, while K was apparently deficient throughout this period. There were no statistically significant differences in N and P content between varieties, even though N19 was consistently lower in N content than NCo376. Differences were significant between varieties in the content of K (August and October), Mg (August, September and November) and Ca in October (table 2).

5.5 Eldana and Smut

Eldana damage at harvest was highest in N14 followed by N17 and N19 and the lowest damage was recorded in NCo376 (table 4). Different ripening treatments had no statistically significant effects on levels of damage.

Smut levels were very low in all varieties in this trial.

6. CONCLUSIONS

- N19 produced comparable yields to NCo376 in this sixth ratoon crop thus confirming it's potential on poor soils when harvested early in the season.
- The sucrose yield of N17 was intermediate while that of N14 was very poor thus confirming it's unsuitability on these duplex soils.
- This trial has been terminated and tables of results for the 7 crops are attached to this report

DMZ/AJD/fkn
17.01.94

Appendix 1: Sucrose sample data

Variety/ Treatment	Date of Sample (weeks before harvest)															
	10/02/93 (13.0)				08/03/93 (9.5)				22/03/93 (7.4)				13/05/93 (0)			
	P%C	g/st	ERC%	gERC/st	P%C	g/st	ERC%	gERC/st	P%C	g/st	ERC%	gERC/st	P%C	g/st	ERC%	gERC/st
NCo376 U	64	452	4.75	22	73	484	6.64	32	76	556	7.60	42	89	743	12.29	92
NCo376 C	64	472	4.63	22	76	519	7.74	40	80	546	9.45	51	90	741	13.72	101
N14 C	67	425	5.15	23	75	466	6.72	31	76	538	7.76	44	89	767	12.05	93
N14 F	67	416	5.22	22	76	506	7.06	36	80	511	8.66	44	88	764	12.10	92
N17 E	62	549	4.32	24	72	544	6.75	38	79	641	9.04	61	90	804	12.60	102
N17 F	67	568	5.34	30	78	581	8.27	48	81	686	9.32	64	91	861	13.78	118
N19 E	69	624	5.80	36	79	754	8.63	65	83	896	10.38	93	91	962	13.50	130
N19 C	73	713	6.72	48	79	666	8.88	58	83	793	10.21	81	91	940	14.29	134
LSD (0.05)	5.2	146	1.17	10	7.5	127	1.77	13	4.9	132	1.60	18	3	125	0.99	17
Significance	**	**	**	**	NS	**	NS	**	*	**	**	**	NS	**	**	**
Mean	66.8	527	5.24	28	76	565	7.59	44	80	646	9.05	60	90	823	13.04	108
SE Diff. \pm	2.5	71.1	0.57	4.8	3.6	62	0.86	6	2.4	64	0.78	8.7	1.3	61	0.48	8.4
CV %	6.0	21.3	17.3	27.2	7.6	7.4	18.0	22.3	4.7	15.7	13.7	22.8	2.3	11.7	5.9	12.4

TERMINAL REPORT: TRIAL VAR 8/86/Sw/MHL 'H'**Plant to 6th ratoon****Table 1: Details of ripening treatments - 2nd to 6th ratoon**

Ripening treatments 1988/89 2nd Ratoon				
Variety	Treatment	Age (mths)	Spray-Harv. (weeks)	Purity at spraying (%)
NCo376	Control	9.1	13.7	58
	Ethrel. 1.5l/ha	"	"	56
N14	Control	"	"	58
	Ethrel. 1.5l/ha	"	"	65
N17	Control	"	"	59
	Ethrel. 1.5l/ha	"	"	60
N19	Control	"	"	69
	Ethrel. 1.5l/ha	"	"	70

Ripening treatments 1989/90 3rd Ratoon				
NCo376	Control			51
	Ethrel. 1.5l/ha	8.8	12	51
	Fusilade. 0.45l/ha	10.0	7	63
N14	Control			60
	Ethrel. 1.5l/ha	8.8	12	60
	Fusilade. 0.61l/ha	10.0	7	70
N17	Control			56
	Ethrel. 1.5l/ha	8.8	12	56
	Fusilade. 0.6l/ha	10.0	7	65
N19	Control			62
	Ethrel. 1.5l/ha	8.8	12	62
	Fusilade. 0.45l/ha	10.0	7	73

Ripening treatments 1991 - 1993 4th to 6th Ratoons				
NCo376	Control			59
	Ethrel. 1.5l/ha	8.9	12.5	59
	Fusilade. 0.45l/ha	10.4	7	78
N14	Ethrel. 1.5l/ha	8.9	12.5	62
	Fusilade. 0.6l/ha	9.8	8	72
	Fusilade. 0.6l/ha	9.8	"	72
N17	Ethrel. 1.5l/ha	8.9	12.5	58
	Fusilade. 0.6l/ha	9.8	8	71
N19	Ethrel. 1.5l/ha	8.9	12.5	64
	Ethrel. 1.5l/ha	8.9	"	67
	Fusilade. 0.45l/ha	10.4	4.5	83

Table 2: Third leaf analysis at various ages - plant to 6th ratoon

Season	Crop	Mth/ Age (m)	NCo376 (%dm)					N14 (%dm)					N17 (%dm)					N19 (%dm)				
			N	P	K	Ca	Mg	N	P	K	Ca	Mg	N	P	K	Ca	Mg	N	P	K	Ca	Mg
1986/87	Plant	Aug (4.5)	2.04	0.23	0.86	-	-	1.93	0.21	0.72	-	-	1.86	0.22	0.84	-	-	1.77	0.21	0.97	-	-
		Oct (6.8)	1.63	0.24	1.15	-	-	1.65	0.21	1.02	-	-	1.56	0.22	1.15	-	-	1.51	0.23	1.19	-	-
1987/88	1st R	Oct (4.7)	2.37	0.24	0.86	-	-	2.22	0.24	0.82	-	-	2.27	0.26	0.89	-	-	2.13	0.24	0.97	-	-
		Nov (5.7)	1.90	0.25	1.04	-	-	1.81	0.22	0.85	-	-	1.82	0.23	0.93	-	-	1.69	0.24	1.10	-	-
1988/89	2nd R	Oct (5.5)	1.72	0.19	0.88	0.33	0.21	1.69	0.17	0.74	0.41	0.20	1.61	0.20	0.83	0.32	0.24	1.52	0.18	0.83	0.35	0.20
1989/90	3rd R	Sept (4.3)	1.62	0.22	0.67	0.42	0.26	1.69	0.20	0.53	0.54	0.39	1.54	0.23	0.71	0.40	0.31	1.63	0.21	0.70	0.49	0.20
1990/91	4th R	Aug (3.5)	2.16	0.24	0.69	0.40	0.34	2.16	0.22	0.53	0.59	0.44	2.17	0.26	0.72	0.48	0.41	2.00	0.22	0.76	0.56	0.33
		Oct (5.8)	1.70	0.21	0.70	0.37	0.28	1.86	0.19	0.64	0.50	0.39	1.74	0.20	0.74	0.41	0.33	1.65	0.20	0.84	0.40	0.25
1991/92	5th R	Aug (3.4)	2.28	0.24	0.79	0.57	0.30	2.22	0.24	0.60	0.53	0.41	2.30	0.25	0.72	0.53	0.48	2.21	0.24	0.80	0.81	0.30
		Oct (5.4)	2.01	0.22	0.79	0.46	0.25	1.95	0.20	0.69	0.54	0.30	1.94	0.22	0.82	0.48	0.28	1.88	0.20	0.89	0.54	0.23
1992/93	6th R	Oct (5.1)	1.64	0.19	0.61	0.73	0.36	1.66	0.20	0.66	0.91	0.35	1.67	0.20	0.78	0.50	0.37	1.62	0.20	0.65	0.65	0.31
		Nov (6.0)	1.62	0.23	0.76	0.45	0.25	1.60	0.22	0.76	0.50	0.35	1.62	0.23	0.83	0.43	0.28	1.57	0.23	0.83	0.42	0.22
Mean			1.90	0.23	0.83	0.40	0.30	1.06	0.21	0.72	0.54	0.38	1.84	0.23	0.83	0.45	0.36	1.70	0.22	0.87	0.53	0.20

Table 3: Third leaf nutrient levels of varieties as a % of NCo76 plant to 6th ratoon

Season	Crop	Mth/Age	N14 % of 376					N17 % of 376					N19 % of 376				
			N	P	K	Ca	Mg	N	P	K	Ca	Mg	N	P	K	Ca	Mg
1986/87	Plant	Aug (4.5)	95	91	84	-	-	91	96	98	-	-	87	91	113	-	-
		Oct (6.8)	101	88	89	-	-	96	92	100	-	-	93	96	103	-	-
1987/88	1st R	Oct (4.7)	94	100	95	-	-	96	108	103	-	-	90	100	113	-	-
		Nov (5.7)	95	88	82	-	-	96	92	89	-	-	89	96	106	-	-
1988/89	2nd R	Oct (5.5)	90	89	84	124	133	94	105	94	97	114	88	95	94	106	95
1989/90	3rd R	Sept (4.3)	104	91	79	129	150	95	105	106	95	119	101	95	104	117	77
1990/91	4th R	Aug (3.5)	100	92	77	123	129	100	108	104	100	121	93	92	110	117	97
		Oct (5.4)	104	90	82	135	139	98	95	95	111	118	93	95	108	108	89
1991/92	5th R	Aug (3.4)	97	100	76	93	137	101	104	91	93	133	97	100	101	142	100
		Oct (5.4)	97	91	87	117	120	97	100	104	104	112	94	91	113	117	92
1992/93	6th R	Oct (5.1)	101	105	100	125	97	102	100	120	68	103	99	105	107	89	86
		Nov (6.0)	99	96	100	111	140	100	100	109	96	112	97	100	109	93	88
Mean			90	94	88	114	130	97	100	102	96	122	94	97	106	111	92

Table 4: Growth measurements at various ages - plant to 6th ratoon

Season	Crop	Month	Age (mths)	Stalk Height (cm to TVD)					Stalk Population (* 1000/ha)				
				NCo376	N14	N17	N19	Mean	NCo376	N14	N17	N19	Mean
1986/87	Plant	Jun	2.6	-	-	-	-	-	158	129	132	134	138
		Oct	6.3	-	-	-	-	-	138	149	110	135	133
		Nov	9.1	176	198	199	202	194	144	120	126	118	127
1987/88	1st R	Jun	1.5	-	-	-	-	-	114	116	58	108	99
		Sept	4.0	-	-	-	-	-	156	116	98	152	131
		Mar	11.5	242	244	267	279	258	148	112	135	112	127
1988/89	nd R	Jul	2.0	-	-	-	-	-	326	227	159	258	243
		Jan	7.75	131	131	154	153	142	182	143	140	131	149
		Feb	9.0	183	175	220	213	198	168	129	127	132	139
1989/90	3rd R	Dec	6.8	105	89	109	112	104	273	208	177	183	210
		Mar	10.0	243	224	261	247	244	183	151	148	151	158
1990/91	4th R	May	12.0	231	201	232	239	226	194	151	159	134	160
1991/92	5th R	Jan	7.9	140	138	147	151	144	331	198	180	183	223
		May	11.9	223	194	230	242	222	229	193	203	198	206
1992/93	6th R	Jan	8.2	151	146	157	148	151	123	113	112	108	114
		Mar	9.8	195	189	192	208	196	109	76	91	83	90
Mean			7.5	191	180	200	201	193	202	155	145	153	164

Table 5: Rainfall and irrigation figures - plant to 6th ratoon

Season	Crop	Period	Rainfall (mm)	Irrigation (mm)	Total (mm)
1986/87	Plant	03/04/86-13/05/87	433	1920	2353
1987/88	1st R	13/05/87-12/05/88	678	720	1398
1988/89	2nd R	12/05/88-19/05/89	528	508	1031
1989/90	3rd R	19/05/89-09/05/90	744	1035	1779
1990/91	4th R	09/05/90-15/05/91	-	-	-
1991/92	5th R	15/05/91-21/05/92	380	600	980
1992/93	6th R	21/05/92-13/05/93	852	440	1292

Table 6: Cane yield, sucrose % cane and sucrose yield - plant to 6th ratoon

Year	Crop	T cane /ha								Sucrose % cane								T sucrose/ha							
		NCo376		N14		N17		N19		NCo376		N14		N17		N19		NCo376		N14		N17		N19	
		U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R
1986/87	Plant	181		187		154		173		11.3		12.7		12.6		14.0		20.3		23.7		19.2		24.1	
1987/88	1 R		129		125		120		134		12.3		11.7		12.0		13.7		15.8		14.7		14.6		18.3
1988/89	2 R	107	110	90	95	102	113	99	109	12.2	13.1	11.3	11.6	11.4	13.1	14.1	14.9	13.0	14.4	10.3	11.0	11.7	14.9	13.9	16.3
1989/90	3 R	129	129	110	106	103	114	104	109	10.8	13.5	12.3	13.3	11.7	12.3	13.5	14.4	13.9	17.4	13.5	14.1	12.0	14.2	14.0	15.7
1990/91	4 R	141	136	106	112	132	117	123	135	12.4	13.3	13.7	13.0	13.9	13.9	13.8	14.7	17.3	18.1	14.3	14.5	18.4	16.3	16.9	19.8
1991/92	5 R	104	108	82	82	93	103	116	103	12.4	13.6	12.8	13.5	13.4	14.4	14.2	14.9	13.8	14.7	10.6	11.1	12.5	14.8	16.5	15.4
1992/93	6 R	108	108	80	74	89	98	109	97	13.7	15.1	13.4	13.6	14.0	15.1	14.8	15.7	14.8	13.6	10.8	10.1	12.4	14.9	16.1	15.2
Mean		128	120	109	99	112	111	121	115	12.1	13.4	12.7	12.8	12.8	13.5	14.1	14.7	15.5	15.6	13.9	12.6	14.4	15.0	16.9	16.8

NB: U = unripened

R = ripened

Table 7 Smut infestation levels - plant to 6th ratoon

Season	Crop	Month	Age (m)	NCo376	N14	N17	N19
1986/87	Plant	October	5.0	0.10	0.00	0.00	0.00
1987/88	1st R	September	5.0	0.73	0.00	0.00	0.00
1988/89	2nd R	November	6.1	2.28	0.00	0.00	0.00
1989/90	3rd R	December	6.8	0.08	0.00	0.00	0.00
1990/91	4th R	-	-	-	-	-	-
1991/92	5th R	-	-	-	-	-	-
1992/93	6th R	September	4.3	0.17	0.33	0.12	0.00

Table 8 Eldana damage at harvest - plant to 6th ratoon

Season	Crop	Variety/ Treatment	% Internodes Damaged	
			Treatment Mean	Variety Mean
1986/87	Plant	NCo376	Unripened	1.17
		N14	"	2.94
		N17	"	2.46
		N19	"	1.90
Mean				2.12
1987/88	1R	NCo376	Ethrel	5.08
		N14	"	0.05
		N17	"	10.46
		N19	"	3.63
Mean				7.01
1988/89	2R	NCo376 Control	9.70	10.50
		" Ripened	11.30	
		N14 Control	25.00	25.10
		" Ripened	24.40	
		N17 Control	8.90	9.95
		" Ripened	10.60	
		N19 Control	10.00	10.40
		" Ripened	10.80	
Mean				14.00
1990/91- 92/93	4R	NCo376 Control	3.68	3.81
		" Ethrel + Fusilade	4.54	
		N14 Ethrel + Fusilade	10.6	10.82
		" Fusilade	10.7	
		N17 Ethrel	4.70	4.24
		" Fusilade	3.70	
N19 Ethrel	4.83	3.78		
" Ethrel + Fusilade	2.52			
Mean			9.74	5.50