FS

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

CODE : SIM VAR 3/84/Sw
CAT.NO: 1470

TITLE : RELEASED VARIETIES X RIPENER ON A 'R' SET SOIL

1. PARTICULARS OF PROJECT

This crop	:	Plant crop				
Site	:	Field 606, Simunye Estate				
Region	:	Northern Irrigated Swaziland				
Soil Set/Series	:	'R'/Rhebok + Rondspring (Some 'S' set pockets)				
Design	:	Randomised Blocks 8 reps				
Varieties	:	NCo 376, N14, N17				
Fertilizer	:	N	P	K		
Planting i.f. (Saaifos) (16)	:	26	82	-		
Top-dressing (Urea + KCl)	:	100	-	100		
Total kg/ha		126	82	100		

Soil analysis : Date 16/4/1984

pH	OM %	Clay %	P.D.I.
6,28	3,62	41	-

ppm

P	K	Cu	Mg	S	Zn
19	186	1800	220	21	1,7

Dates : 18/4/84 - 15/5/85
Age : 13 months
Rainfall : 885 mm (gross)
Irrigation : 970 mm (gross)
Total : 1855 mm(gross)

2. OBJECTIVES

2.1 To test the performance of recently released N17 compared to NCo 376 and N14 for an early season cycle.

2.2 To observe the pest and disease tolerance of the industries current varieties.

2.3 To determine the ripening effect on each variety of a standard rate of Fusilade when sprayed in Autumn.

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3. TREATMENTS

3.1 Varieties : NCo 376, N14 and N17.

3.2 675 kg/ha Saaiphos was placed into the furrow and lightly covered before planting.

3.3 4 l/ha Dieldrex was sprayed into the furrows.

3.4 Setts were cut into 3 bud setts and cold water dipped in a Bayleton solution for 5 minutes before being double stick planted.

3.5 Irrigation commenced 15 hours after planting.

3.6 Top-dressing was carried out 4 weeks after planting using Urea (46 % N) and KCl (50 % K).

3.7 306 ml/ha Fusilade was sprayed onto half the plots of each variety 8 weeks before harvesting.

4. RESULTS

Table 1 : Planting rates and % Germination

VARIETY	PLANTING RATE (BUDS X 1000/ha)	% GERMINATION	
		1 MONTH AFTER PLANT	1,2 MONTH AFTER PLANTING
N14	86	74	80
N17	84	56	64
NCo 376	101	50	58

Table 2 : Crop growth measurements and populations at 3,0, 4,5, 8,2 and 10,6 months of age

	STALK HEIGHTS (CM TO TVD)		POPULATIONS X 1000/HA			
VARIETY	8,2 MONTHS	10,6 MONTHS	3,0 MONTHS	4,5 MONTHS	8,2 MONTHS	10,6 MONTHS
N14	127	244	167	187	102	94
N17	136	257	96	160	108	106
NCo 376	124	244	138	213	125	115

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Table 3 : Cane yield, cane quality and sucrose yield

	CANE YIELD (TC/HA)		CANE QUALITY (SUCROSE % CANE)		SUCROSE YIELD (TS/HA)	
VARIETY	CONTROL	RIPENED	CONTROL	RIPENED	CONTROL	RIPENED
NCo 376	155	155	10,4	11,6	16,2	17,9
N14	138*	140*	10,1	10,2	13,9	14,3*
N17	125**	133**	10,0	11,2	12,6*	14,8
MEAN	139	143	10,2	11,0	14,2	15,7
CV %	9,0		10,8		1,57	
L.S.D. (0,05)*	13,0		1,7		3,5	
(0,01)**	19,0		2,4		4,9	

Table 4 : Yields per month and per 100 mm water (Gross)

VARIETY	TC/HA/MONTH	TC/HA/100 MM
NCo 376	11,9	8,4
N14	10,7	7,5
N17	9,9	7,0

Table 5 : Third leaf analysis at 4,5 months (August) and 6 months (October)

	4,5 MONTHS (AUGUST)				6,0 MONTHS (OCTOBER)			
VARIETY	N	P	K	S	N	P	K	S
NCo 376	2,15	0,25	1,45	0,18	1,79	0,22	1,32	0,14
N14	1,84	0,20	1,30	0,18	1,57	0,19	1,17	0,14
N17	1,95	0,22	1,58	0,19	1,81	0,21	1,32	0,15

Table 6 : Eldana damage

VARIETY	PERCENTAGE INTERNODES DAMAGED	
	CONTROL	RIPENED
NCo 376	3	4
N17	3	6
N14	18	14

/4.....

5. COMMENTS

5.1 * By 1,2 months after planting a greater proportion of buds in the N14 plots had germinated than for the other two varieties. Stalk mortality after ± 4 months of age was greatest in N14 in comparatively lower populations at 10,6 months of age. Stalk growth was better in N17 compared to the other varieties.

* Cane yields for the plant crop were generally high particularly for NCo376 which outyielded the other two varieties significantly (P = 0,05) for N14, (P = 0,01) for N17. The mixed soils at this site caused some stress in N14 and N17 which seem less adaptable to this condition than NCo376. This led to greater variability in yields for N14 and N17 at harvest. Cane yields were unaffected by spraying Fusilade Super.

* Sucrose % cane at harvest was very similar between varieties for unripened cane. Cane quality was increased non-significantly by Fusilade on NCo376 and N17 while responses on N14 were minimal. The usual visual Fusilade symptoms on the stalk leaves was less defined on N14 compared to the other varieties and possibly higher rates are required on this variety.

* Because of the high CV % in this trial, the sucrose yield increases due to Fusilade for each variety were non-significant but nevertheless appeared to be real. Ripened NCo376 produced the highest sucrose yields being significantly (P = 0,05) superior to ripened N14. Sucrose yields from non-ripened NCo376 were significantly (P = 0,05) better than unripened N17 confirming earlier findings that the latter is possibly more suitable for a late season cycle.

* Third leaf nutrient values were above threshold for all the varieties at 4,5 months of age in August. At 6,0 months in October, third leaf N % (dm) values was marginal in NCo376 and had declined to below threshold in N14 while P became marginal in N14.

* A few solitary smut whips were rogued from 4 of the NCo376 plots at ± 7,5 months of age. No smut was found in either of the other two varieties.

* Figures from Table 6 show a preference by eldana for N14 which could explain the dissapointing yields from this variety. Damage to ripened NCo376 and N17 was greater than in the unripened cane while N14 showed the opposite trend. This was due to some excessive damage (± 32% damaged internodes) in highly stressed non-ripened N14.

5.2 This trial has been re-established and is now in its 1st ratoon. It has germinated well but N17 was a slow starter and is comparatively sparsely populated at ± 2 months of age.

NOTE The report is based on samples analysed at the S.A.S.A. Pongola Field Station. Samples taken 1 week prior to harvesting and sent to Mhlume showed a far larger response to Fusilade especially for NCo376 and N17.

NBL /SN
9 September 1985

FS

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE : VAR 3/84/SW SIM'R'
CAT: 1470

TITLE : RELEASED VARIETIES X RIPENER ON A 'R' SET SOIL

1. PARTICULARS OF PROJECT

This crop	:	2nd Ratoon
Site	:	Field 606 Simunye
Region	:	Northern Irrigated (Swaziland)
Soil Set/ Series	:	'R'/Rhebok & Rondspring (with some 'S' set pockets)
Design	:	Randomised Blocks 8 Replications
Varieties	:	NCo 376 N14 N17
Fertilizer (Top dress with Urea and KCL)	:	N P K(kg/ha) 170 - 300
Total		170 - 300

Soil Analysis : 25/5/87

pH	OM%	CLAY %	PDI
6,66	-	30	-

ppm

P	K	Ca	Mg	S
20	162	3783	928	19

Crop dates	:	28/4/86-20/5/87
Age	:	12,7 months
Rainfall	:	694 mm
Irrigation	:	1000mm
Total	:	1694mm

2. OBJECTIVES

2.1 To continue observing the performance of N14 and N17 compared to NCo 376 for an early cycle on a mixed 'R' set soil.

2.2 To observe the pest and disease tolerance of the industry's most important varieties.

2.3 To test standard rates of Fusilade Super when spraying early season to confirm optimum spray to harvest delay periods for each variety.

3. TREATMENTS

3.1 Varieties : NCo 376 N17 N14

3.2 Nitrogen as urea was top-dressed in three applications at 3, 14,5 and 23 weeks after cutting. Total nitrogen applied was 170kg N/ha with the additional amount to rectify nitrogen deficiency symptons that were evident during October 1986.

3.3 Potassium at a high rate of 300kg K/ha was top-dressed 25,5 weeks after cutting in October. K levels were increased as soil values were marginal and N14 in particular was very deficient in foliar K during the previous crop.

3.4 Fusilade Super at 650ml (NCo 376) and 700ml (N14 & N17) product/ha was sprayed to half the plots of each variety 7 weeks before harvesting. These ripener rates were higher than intended. Sucrose sampling commenced at time of spraying and continued at intervals up to harvest.

4. RESULTS

4.1 Growth Data

Table 1. Crop stalks heights (at 9 ; 9,5 ; 12,7) and populations (at 1,7 ; 5 ; 6,4 ; 9 ; 9,5 ; 11) months of age.

TREATMENT	STALK HEIGHTS (MM TO TVD)			POPULATIONS (X1000/ha)					
	9m	9,5m	12,7m	1,7m	5m	6,4m	9m	9,5m	11m
NCo 376	1840	2120	2550	218	326	159	166	167	145
NCo 376 (Ripened)	1790	2090	2130	243	321	157	157	160	143
N14	1900	2170	2590	184	277	131	135	129	110
N14 (Ripened)	1890	2220	2300	196	243	136	127	126	109
N17	1920	2200	2580	118	248	134	158	140	123
N17 (Ripened)	2010	2350	2480	134	254	148	145	159	124

NOTE: Ripener applied at ±11 months of age.

4.2 Harvest Data.

Table II. Tons cane/ha, Sucrose % cane and tons Sucrose/ha.

VARIETY	TONS CANE/HA			SUCROSE % CANE			TONS SUCROSE/HA		
	UNRIPENED	RIPENED	MEAN	UNRIPENED	RIPENED	MEAN	UNRIPENED	RIPENED	MEAN
NCo 376	156	154	155	13,5	15,2	14,4	21,1	23,4	22,3
N14	147	147	147	14,6	15,5	15,1	21,4	22,7	22,1
N17	118	125	122	14,4	14,7	14,6	17,0	18,4	17,7
MEAN	140	142	-	14,2	15,1	-	19,8	21,5	-
LSD Variety (0,05)*		12			0,5			1,6	
(0,01)**		16			0,7			2,2	
S.E. Variety		3,9			0,2			0,2	
Significance		**			**			**	
LSD Treatment (0,05)*		16			0,7			2,3	
(0,01)**		23			0,9			3,2	
S.E. Treatment		5,4			0,2			0,8	
Interaction		N.S						N.S	
Trial Mean		141			14,7			20,7	
S.E. Plot		10,9			0,4			1,5	
CV%		7,7			3,1			7,4	

Table III. Estimated recoverable sucrose % cane and tons ERS/ha.

VARIETY	ERS % CANE			TONS ERS/HA		
	UNRIPENED	RIPENED	MEAN	UNRIPENED	RIPENED	MEAN
NCo 376	12,2	13,9	13,1	19,0	21,3	20,2
N14	13,3	14,3	13,8	19,5	20,9	20,2
N17	13,0	13,3	13,2	15,3	16,8	16,1
MEAN	12,8	13,9	-	17,9	19,7	-
LSD (0,05)*		0,5			1,5	
(0,01)**		0,7			2,0	
S.E. Variety		0,2			0,5	
Significance		**			**	
LSD Treatments (0,05)*		0,7			2,1	
(0,01)**		0,9			2,8	
S.E. Treatments		0,2			0,7	
Significance		**			**	
Interaction		Significant			N.S.	
Trial Mean		13,3			18,8	
S.E. Plot		0,5			1,4	
CV %		3,4			7,3	

Table IV. Yields per hectare per month (3 crops) and per 100mm water (2nd ratoon only) for unripened treatments only.

VARIETY	TONS CANE/HA/MONTH			TONS CANE/HA PER 100mm WATER
	PLANT CROP	1st RATOON	2nd RATOON	
NCo 376	11,9	13,0	12,3	9,2
N14	10,6	12,6	12,0	8,7
N17	9,6	10,4	9,3	7,0
MEAN	10,7	12,0	11,2	8,3

4.3 Foliar Analysis

Table V. Third leaf (%dm) values at 3,6 months (August) and at 6 months (October).

	3,6 MONTHS - AUGUST			6.0 MONTHS - OCTOBER		
VARIETY	N	P	K	N	P	K
NCo 376	2,00	0.20	0.70**	1.34**	0,19	0,96**
N14	2,03	0.20	0.64**	1,44**	0,18*	0,93**
N17	2,14	0.24	0.90**	1,42**	0,19	1,04*

* Marginal
** Low - using S.A.S.A thresholds.

4.4 Eldana levels

Table VI. Eldana damage at harvest (% internodes damaged)

	PERCENTAGE INTERNODES DAMAGED	
VARIETY	CONTROL	RIPENED
NCo 376	0,07	0,49
N14	1,79	1,57
N17	0,54	0,55

Table VII. Eldana damage at 2,5 months of age (% dead hearts)

	PERCENTAGE 'DEAD' HEARTS	
VARIETY	CONTROL	RIPENED
NCo 376	0,6	0,6
N14	1,1	1,3
N17	0,9	0,9

(Note : Ripener treatment refers to previous crop).

4.5 Ripener Responses.

Table VIII. Trend of cane quality from time of spraying ripener to harvesting (for ripened cane only).

Weeks after Spraying	NCo 376		N14		N17	
	ERS % C	RESPONSE	ERS % C	RESPONSE	ERS % C	RESPONSE
0	9,7	-	9,8	-	10,8	-
3	11,0	+1,2	11,8	+0,8	11,5	+0,4
5	12,7	+1,5	12,5	-0,2	13,2	+0,4
7	13,9	+1,7	14,3	+1,0	13,4	+0,4

Table IX. Differences in gms. Ers/stalk between normal sampling (topped at natural breaking point) and commercially topped cane.

VARIETY	NON-RIPENED	RIPENED
NCo 376	- 3,6	-23,6
N14	6,7	-23,3
N17	-23,6	-27,9

Table X. Ripener effect on subsequent ratoon regrowth. Populations (x1000/ha) at 6, 15 and 34 weeks and canopy factors at 19 weeks after harvesting.

VARIETY	POPULATIONS x1000/HA						CANOPY FACTORS	
	6 WEEKS		15 WEEKS		34 WEEKS		19 WEEKS	
	NON-RIPENED	RIPENED	NON-RIPENED	RIPENED	NON RIPENED	RIPENED	NON-RIPENED	RIPENED
NCo 376	145	218	389	416	285	278	0,60	0,64
N14	107	138	261	280	160	173	0,65	0,75
N17	60	80	172	208	157	176	0,58	0,67

5. COMMENTS

5.1 Varieties

* NCO 376 had the highest stalk populations throughout the growing period whilst growth measurements taken at harvest showed little difference in length between varieties.

* Cane yields were highest for NCo 376 with N14 averaging 9 tonnes cane less (Table II). Both the varieties yielded significantly more than N17 which emulates results from the previous two crops.

* Cane quality for unripened N14 was significantly higher than that of NCo 376 which is unusual for this time of the year (Table II & III).

* Both NCo 376 and N14 outyielded N17 in tonnes sucrose and Ers/ha which is a repeat performance of the plant and 1st ratoon crop results.

5.2 Effect of ripener on harvest results.

* Cane yields were on the whole uneffected by the high rate of Fusilade as the spray to harvest period was reduced compared to that of the previous season.

* Fusilade increased sucrose and Ers % cane in NCO 376 and N14 but not in N17 where only a slight improvement (N.S.) was evident. Cane quality of the controls was high for early season cane and indicates that the cane was somewhat mature at spraying and less susceptible to ripener induced cane yield losses. Table VIII illustrates how each variety reacted to the ripener from time of application to harvest with NCo 376 showing the best response and most consistent trend over the period.

* Fusilade Super increased sucrose yields for all three varieties but only attained significance for NCo 376. However, had the spray to harvest delay period been extended to cater for each variety, response on N14 may have been greater.

* Table IX gives an indication of the sugar losses that can be incurred by the low topping of ripened cane, particularly in varieties NCo 376 and N14.

* Observations in the subsequent 3rd ratoon were carried out to determine ripener effects on regrowth after continual use. Marked visual differences were noted in growth and especially tiller populations in favour of plots previously treated with Fusilade Super, but the effect had largely disappeared by about 8 months of age. This was not evident in the earlier crops and may have been brought about by the unintentionally high rate of Fusilade used on the latest ratoon.

5.3 General

* Third leaf N (%dm) values were deficient in all varieties at 6,0 months in October and additional N was appled soon afterwards. P (%dm) may have been influenced by low N (%dm) values as they do become marginal to low in October in spite of adequate P reserves in the soil. Third leaf K (%dm) values were below threshold for both samplings but were taken before the late K application in October which apparently would have

been too late to prevent the apparently normal third leaf K (%dm) depression in spring.

* Eldana damage at harvest was slight with the highest infestation in N14 and minor differences between ripened and unripened cane. (Table VI). A survey of dead hearts was carried out on the subsequent ratoon to determine whether previously ripened cane is more prone to eldana damage compared to unripened cane. N14 was again more infected that the other two varieties but differences between previously ripened and unripened cane were not significant (Table VII).

* The incidence of smut is very low in this trial as only a trace of the disease was present in NCO 376.

* The trial has been re-established and is now in its 3rd ratoon.

NBL/cg
27/2/88

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

CODE: VAR 3/84/Sw SIM 'R'
CAT : 1470

TERMINAL REPORT

TITLE: RELEASED VARIETIES x RIPENER ON A 'R' SET SOIL

1. PARTICULARS OF PROJECT

This crop : 3rd Ratoon
Site : Field 606 Simunye
Region : Northern Irrigated (Swaziland)
Soil Set/Series : 'R'/Rhebok and Rondspring with some 'S' set pockets
Design : Randomised blocks 8 replications
Variety : NCo376, N14, N17

Fertilizer :

	N	P	K	S(Kg/ha)
(Top dress with Urea ASN and Single Supers)	160	40	-	45
Total	160	40	-	45

Soil Analysis : 25/5/1987

pH	OM%	Clay %	PDI
6,66	-	>30	-

ppm

P	K	Ca	Mg	S	Zn
20	162	3783	928	19	-

Dates : 20/5/87 - 28/4/88
Age : 11,3 months
Rainfall :
Irrigation : No records available
Total :

2. OBJECTIVES

2.1 To continue observing the performance of the major varieties for an early cycle on a mixed 'R' set soil.

2.2 To monitor the pest and disease tolerance of the industry's most important varieties.

2.3 To test standard rates of Fusilade Super when sprayed early season.

3. TREATMENTS

3.1 Varieties : NCo376, N14, N17

3.2 Nitrogen as Urea (46%N) and ammonium sulphate nitrate (27%N + 13,5%S) was top-dressed at 1, 3 and 12 weeks after harvesting.

3.3 Potassium was not applied to this ratoon as 300 Kg K/ha was top-dressed the previous year and the soil K status was above the threshold for this soil.

3.4 40 Kg P/ha as single superphosphate (10,5 % P) was applied 1, 3 weeks after harvesting.

3.5 A ripener was not applied to this crop as it was decided to assess residual effects on an unsprayed ratoon after the continuous use of Fusilade Super over a number of seasons.

4. RESULTS (3rd Ratoon)

4.1 Growth data

Table I. Crop stalk heights at 5,7 and 11 months and populations at 1,3 3,4 5,2 5,7 and 11 months of age.

TREATMENT	STALK HEIGHTS (MM TO TVD)		POPULATIONS (x 1000/HA)				
	5,7m	11,0m	1,3m	3,4m	5,2m	5,7m	11,0m
NCo376	139	285	145	389	285	184	141
NCo376 + Ripener *	137	291	218	416	278	190	141
N14	129	273	107	261	160	141	107
N14 + Ripener *	130	277	138	280	173	141	112
N17	134	283	60	172	157	156	124
N17 x Ripener *	149	284	80	208	176	154	125

* Previous 3 crops ripened artificially.

Table II. Crop % canopy at 4,7 months of age in October.

TREATMENT	PERCENT CANOPY
NCo376	60
NCo376 x Ripener	64
N14	65
N14 x Ripener	75
N17	58
N17 x Ripener	67

4.2 Harvest Data

Table III. Tons cane/ha, Sucrose % cane, tons Sucrose/ha.

VARIETY	TONS CANE / HA			SUCROSE % CANE			TONS SUCROSE / HA		
	UNRIPENED	PREVIOUSLY RIPENED	MEAN	UNRIPENED	PREVIOUSLY RIPENED	MEAN	UNRIPENED	PREVIOUSLY RIPENED	MEAN
NCo376	133	136	135	10,75	10,95	10,85	14,3	14,9	14,6
N14	118	114	116	11,41	11,69	11,55	13,5	13,3	13,4
N17	92	106	99	12,61	12,32	12,47	11,6	13,0	12,3
MEAN	114	119	-	11,59	11,65	-	13,1	13,7	-
LSD Varieties (0,05) *		13			0,48			1,3	
(0,01)**		18			0,66			1,8	
SE Variety		4,2			0,16			0,4	
Significance		**			**			**	
LSD Ripener (0,05)*		10			0,39			1,1	
(0,01)**		14			0,54			1,5	
SE Ripener		3,5			0,12			0,4	
Significance		N.S			N.S			N.S	
LSD Treatment (0,05)*		18			0,7			1,9	
(0,01)**		25			0.9			2,6	
SE Treatments		5,9			0,2			0,6	
Significance		**			**			**	
Trial Mean		116			11,6			13,4	
SE		12,0			0,4			1,2	
CV %		10,3			3,9			9,2	

Table IV. Estimated recoverable sucrose % cane and tons ers/ha.

VARIETY	ERS % CANE			TONS ERS / HA		
	UNRIPENED	PREVIOUSLY RIPENED	MEAN	UNRIPENED	PREVIOUSLY RIPENED	MEAN
NCo376	8,78	9,08	8,93	11,66	12,34	12,00
N14	9,61	9,81	9,71	11,34	11,14	11,24
N17	10,69	10,32	10,51	9,83	10,90	10,36
MEAN	9,69	9,74	-	10,94	11,46	-
LSD Varieties (0,05)*		0,58			1,10	
(0,01)**		0,81			1,52	
S E Varieties		0,19			0,37	
Significance		**			**	
LSD Ripeners (0,05)*		0,48			0,90	
(0,01)**		0,66			1,24	
S E Ripeners		0,16			0,30	
Significance		N.S			N.S	
LSD Treatments (0,05)*		0,83			1,55	
(0,01)**		1,14			2,15	
S E Treatments		0,27			0,52	
Significance		**			*	
Trial Mean		9,72			11,20	
S E Plot		0,55			1,03	
CV %		5,6			9,2	

Table V. Yields per hectare per month.

VARIETY	TONS CANE/HA/MONTH
NCo376	11,7
N14	10,3
N17	8,8
MEAN	10,3

4.3 Foliar analysis

Table V. Third leaf (%dm) values at 4,0, 4,9, 5,4 and 6,8 months of age.

	4,0m SEPTEMBER			4,9m OCTOBER			5,4m NOVEMBER			6,8M DECEMBER		
VARIETY	N	P	K	N	P	K	N	P	K	N	P	K
NCo376	2,67	0,26	0,96*	2,05	0,21	0,88*	1,83	0,23	1,03*	1,88	0,23	1,09
N14	2,48	0,24	0,79*	2.06	0,20	0,79*	1,78*	0,20	0,96*	1,86	0,23	0,97*
N17	2,46	0,27	1,10	1,94	0,21	0,96*	1,88	0,22	1,13	1,73*	0,22	1,14

* = Below SASA Thresholds.

4.4 Eldana levels

Table VI. Eldana damage at harvest (% internodes damaged)

VARIETY	PERCENTAGE INTERNODES DAMAGED
NCo376	0,24
N14	0,56
N17	0,24

4.5 Smut

Table VII. Smut levels (% whips) at 3,5 months of age in September.

VARIETY	PERCENTAGE SMUT WHIPS
NCo376	0,08
N14	0,02
N17	0,01

5. COMMENTS

5.1 NCo376 had the highest populations as well as slightly longer stalks at harvest. There was evidence of greater tillering in the previously ripened plots, particularly for NCo376 which produced a 4,2% increase at 1,3 months of age. This improvement was present in all varieties but had dissappeared later on in the cycle (Table I). Stalk height differences were marked during the early growth stage but like populations, declined into the season.

5.2 Although the 3rd ratoon was not chemically ripened, results have been seperated to determine whether the early growth differences associated with previous ratoon ripening effected eventual yields. Yields for NCo376 were significantly higher than the other two varieties and differences between N14 and N17 were also significant

5.3 Cane quality for both N17 and N14 was significantly higher than for NCo376 while that for N17 was also significantly better than N14. Overall cane quality did not appear to be influenced by residual ripener effects.

5.4 NCo376 produced significantly better sucrose yields compared to N17.

5.5 Ers % cane and Ers tons/ha yields (Table IV) were similar to the sucrose yield pattern.

5.6 Third leaf (% dm) data (Table V) from 4 to 6,8 months of age shows N (% dm) values to be above the threshold up until November after which it became slightly deficient in N14 and N17. P (%dm) values were well within the limit for all varieties during the sampling period. Potassium (% dm) values were low in N14 from September to December. The remaining two varieties were both below the threshold in October but had improved by December which is the usual K (% dm) pattern in the third leaf.

5.7 Eldana damage was slight at harvest with N14 tending to have slightly more damaged internodes than NCo376 and N17.

5.8 The incidence of smut was low for this ratoon (Table VII) with NCo376 slightly above the other two varieties.

6. SUMMARY (Plant to 3rd ratoon inclusive)

6.1 Harvest data.

Table VIII. Tons cane/ha for ripened and unripened cane.

	TONS CANE/HA									
	PLANT CROP		1st RATOON		2nd RATOON		3rd RATOON		MEAN	
VARIETY	UNRIPENED	RIPENED	UNRIPENED	RIPENED	UNRIPENED	RIPENED	UNRIPENED	RIPENED	UNRIPENED	RIPENED
NCo376	155	155	149	126	156	154	135	-	149	145
N14	138	140	144	137	147	147	116	-	136	141
N17	125	133	118	125	118	125	99	-	115	128
MEAN	139	143	137	129	140	142	117	-	-	-

Table IX. Sucrose % cane for ripened and unripened cane.

	SUCROSE % CANE									
	PLANT CROP		1st RATOON		2nd RATOON		3rd RATOON		MEAN	
VARIETY	UNRIPENED	RIPENED	UNRIPENED	RIPENED	UNRIPENED	RIPENED	UNRIPENED	RIPENED	UNRIPENED	RIPENED
NCo376	10,4	11,6	11,3	15,3	13,5	15,2	10,9	-	11,5	14,0
N14	10,1	10,2	11,1	13,8	14,6	15,5	11,6	-	11,9	13,2
N17	10,0	11,2	12,5	13,4	14,4	14,7	12,5	-	12,4	13,1
MEAN	10,2	11,0	11,6	14,2	14,2	15,1	11,7	-	-	-

Table X. Tons sucrose/ha yields for ripened and unripened cane.

	TONS SUCROSE/HA									
	PLANT CROP		1st RATOON		2nd RATOON		3rd RATOON		MEAN	
VARIETY	UNRIPENED	RIPENED	UNRIPENED	RIPENED	UNRIPENED	RIPENED	UNRIPENED	RIPENED	UNRIPENED	RIPENED
NCo376	16,2	17,9	16,8	19,3	21,1	23,4	14,6	-	17,2	20,2
N14	13,9	14,3	16,0	18,9	21,4	22,7	13,4	-	16,2	18,6
N17	12,6	14,8	14,8	16,7	17,0	18,4	12,3	-	14,2	16,6
MEAN	14,2	15,7	15,9	18,3	19,8	21,5	13,4	-	-	16,6

Table XI. Eldana damage at harvest - percentage internodes damaged.

	PERCENTAGE INTERNODES DAMAGED	
VARIETY	NON-RIPENED	RIPENED
NCo376	0,94	3,16
N14	5,73	5,52
N17	1,36	3,32
MEAN	3,34	4,00

6.2 VARIETIES

* NCo376 produced the highest tons cane yield in each crop (Table V111) while N17 was by far the poorest yielder. N14's high yield potential during the early season was restricted by occasional water stress conditions of this site.

* Cane quality averages for unripened cane in the four crops showed N17 to be above the other varieties. Cane quality for N14 was higher than NCo376 in the 2nd and 3rd ratoons, which may have been brought about by higher pith levels in N14 (ie. more low quality juice in the top internodes of less pithy NCo376).

* Sucrose yields for unripened cane is shown in Table X and Fig I expressed in tons sucrose/ha/month. Yields for N14 were inconsistant compared to NCo376 owing to the formers' susceptability to stress. Sucrose yields for N17 were well below that of the other two varieties.

* Third leaf (% dm) values for samples taken over the three crops showed minor variances between varieties except for potassium which was invarieably lower for N14.

* Average Eldana damage for the four crops are shown in Table XI with the highest damage recorded in N14.

* Smut levels were very low in this trial with only traces being found in NCo376 by the second ratoon. Evidence of smut was found in all the varieties by the third ratoon.

6.3 Effect of Ripeners

* Cane yields were largely unaffected for varieties NCo376 and N14 when the spray to harvest delay period was around 7 - 8 weeks (Plant crop and 2nd ratoon). Heavy cane yield losses resulted when the period was extended to ± 11 weeks, especially in NCo376. (Table VIII). Cane yields for N17 appeared to increase slightly for ripened cane in the crops that received Fusilade but the unripened 3rd ratoon produced similar trends indicating that site variability was possibly responsible.

* Cane quality increase by ripening with Fusilade Super were on average higher for NCo376 and lowest in N17. Subsequent investigatory work on ripeners has indicated better responses for N14 and N17 when higher Fusilade rates are used and when spray to harvest periods are extended.

* Sucrose yields (tons cane/ha/month) for the three crops artificially ripened is shown in Fig II. Yields for N14 and N17 in the plant crop should be ignored as a low rate of Fusilade was used which prevented optimum ripening of these varieties.

* Chemical ripening on average, caused an increase in eldana infestation. (Table X).

6.4 Conclusion

* The soil of this site is inclined to produce yields similar to those from 'S' set soils which are prone to water stress. Varietal choice for 'R' sets of this category should conform with that for 'S' sets where NCo376 has proved to be the most suited of these varieties.

* Fusilade Super applied at a standard rate of 450 ml/ha is extremely effective as a ripener on NCo376 very early in the season.

6.5 This trial has been terminated as a released variety trial but is to be continued for further research purposes.

NBL/cg
August 1988.

FIG I. TONS SUCROSE/HA/MONTH FOR UNRIPENED CANE

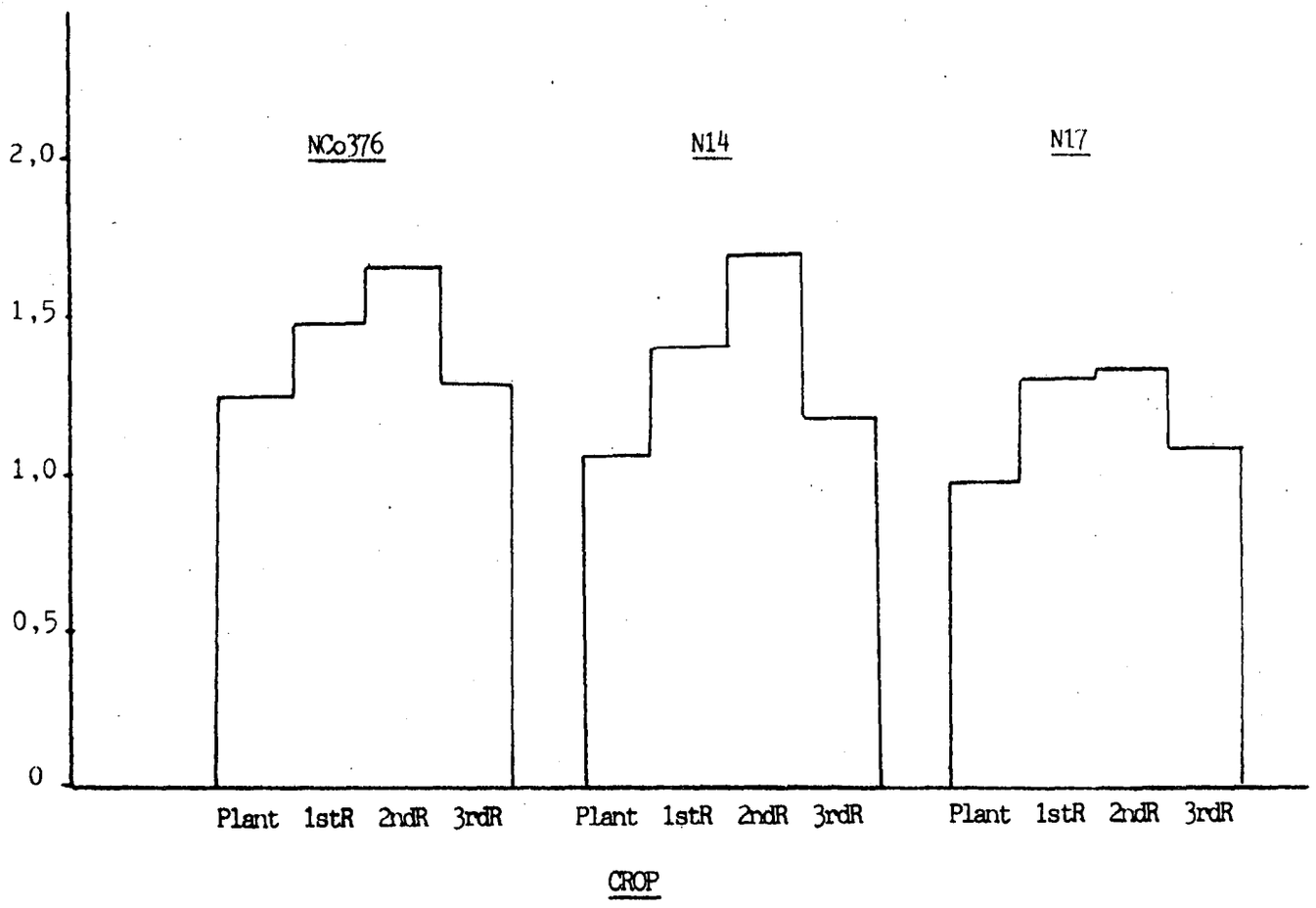
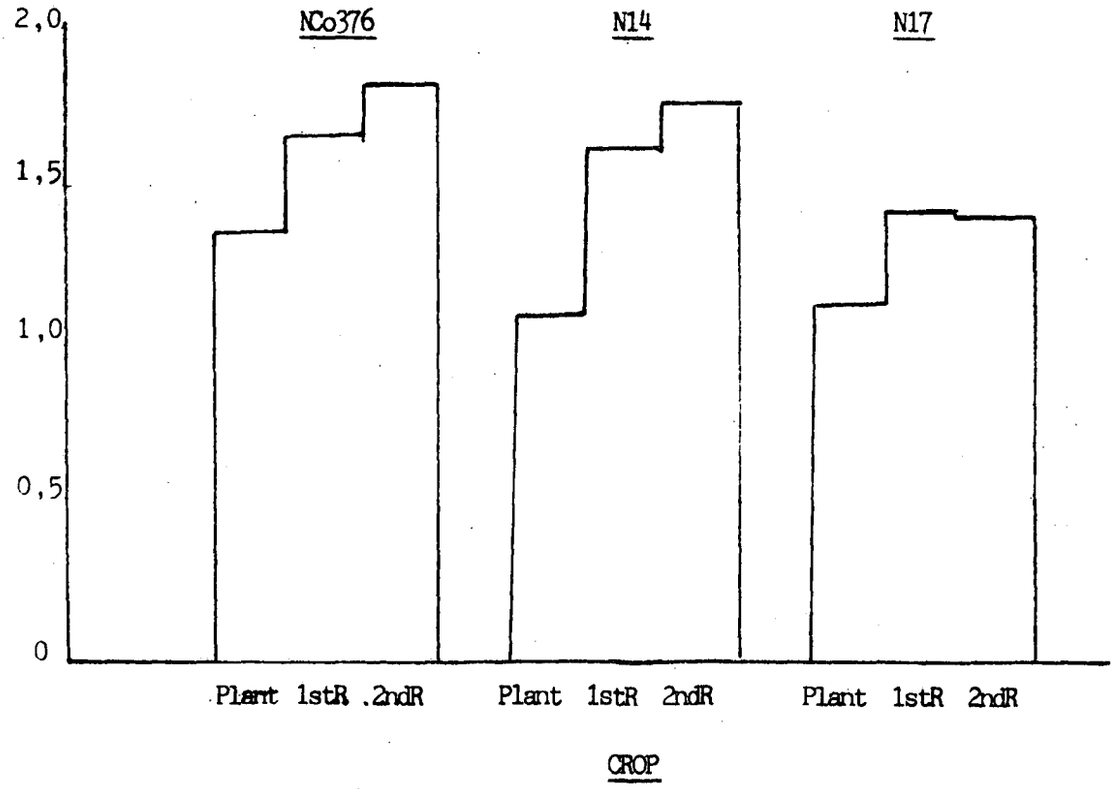


FIG II. TONS SUCROSE/HA/MONTH FOR RIPENED CANE



SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 3 * N Rate/84/Sw SIM 'R'

CAT.NO.: 1470

TITLE: RELEASED VARIETIES * NITROGEN RATE ON A 'R' SET SOIL

1. PARTICULARS OF PROJECT

This crop	: 4th Ratoon				
Site	: Field 606 Simunye				
	: Northern Irrigated (Swaziland)				
Soil Set/Series	: 'R'/ Rhebok and Ronspring with some 'S' set pockets				
Design	: Complete Randomised Blocks with Split Plots, 8 Reps				
Variety	: NCo376, N14, N17				
Fertiliser (kg/ha)	:	N	P	K	S
		See Treatment	40	150	45

Soil Analysis: 11/05/1988

pH	OM%	Clay%	PDI
6.44	-	30	-

ppm

P	K	Ca	Mg	S	Zn
55	169	2642	642	30	4.0

Dates : 28/4/88 - 29/4/89

Age : 12 months

Rainfall : 807 mm
Irrigation: 690 mm
Total : 1497 mm

2. OBJECTIVES

2.1 To continue observing the performance of the major varieties for an early cycle on a mixed 'R' set soil.

2.2 To test the effect of different rates of Nitrogen application on variety performance.

2.3 To monitor the pest and disease tolerance of released varieties.

3. TREATMENTS

3.1 Whole Plots

NCo376; N14; N17

3.2 Split Plots

Whole plots were split in two. Sub-plot treatments consist of two rates of Nitrogen applications. One sub-plot received a total of 140 kg N/Ha while the other received 160 kg N/Ha.

Notes on treatments

* June (1.8 months) All plots received 90 kg N/ha applied over the cane row in the form of ASN (27 % N + 13.5 % S).

* September (5 months) Split plots received either 50 or 70 kg N/ha applied over the cane row in the form of Urea (46 % N).

3.3 Fertilisers

3.3.1 Phosphorus

Phosphate as single supers (10.5 % P) was applied at the rate of 40 kg P/Ha in June, 1.25 months after harvest.

3.3.2 Potassium

Potassium as muriate of potash (50% K) was applied at the rate of 150 kg K/Ha in August, 3.25 months after harvest.

3.3.3 Sulphur

4. RESULTS

4.1 Growth Data

Table 1: Growth Measurements - Stalk Height and Population at 7, 8,5 and 11,3 Months of Age

VARIETY	Stalk (mm to TVD)						Population (X 1000/Ha)					
	7m		8.5m		11.3m		7m		8.5m		11.3m	
	N1	N2	N1	N2.	N1	N2	N1	N2	N1	N2	N1	N2
NCo376	740	720	1310	1340	2480	2550	278	291	192	201	129	130
N14	750	740	1350	1370	2530	2610	226	222	149	145	113	117
N17	750	780	1420	1460	2590	2680	225	211	147	160	124	127

4.2 Harvest Data

Table 2: Means of Yield of Cane, % Sucrose and Yield of Sucrose

Variety	Tons Cane/Ha			Sucrose % Cane			Tons Sucrose/Ha		
	N1	N2	Mean	N1	N2	Mean	N1	N2	Mean
NCo376	125	129	127	10.57	10.38	10.47	13.2	13.5	13.3
N14	118	120	119	10.64	10.38	10.51	12.6	12.4	12.5
N17	102	113	107	11.73	11.26	11.50	12.0	12.8	12.4
Mean	115	121	-	10.98	10.68	-	12.6	12.9	-
LSD Variety 0.05 * 0.01**	8 11			0.46 0.64			1.7 2.4		
Significance	**			**			NS		
LSD N 0.05 * 0.01**	3 4			0.21 0.28			0.4 0.6		
Significance	**			**			NS		
Trial Mean CV %	118 3.9			10.83 3.21			12.7 5.4		

Table 3: Mean differences between N2 and N1 (N2 - N1) treatments: Cane Yield, Sucrose % Cane and Sucrose Yield

Variety	Tons Cane/Ha	Sucrose % Cane	Tons Sucrose/Ha
NCO376	4^{NS}	-0.19^{NS}	0.3^{NS}
N14	2^{NS}	-0.26^{NS}	-0.2^{NS}
N17	11**	-0.475*	0.8*
LSD			
0.05*	5	0.36	0.7
0.01**	6.5	0.49	1.0

^{NS}: Not Significant

4.3 Foliar Analysis

Table 4: Third leaf analysis of sample taken in October at 6.25 months of age (% dm)

VARIETY	N			P			K			Ca			Mg			S		
	N1	N2	MEAN	N1	N2	MEAN	N1	N2	MEAN	N1	N2	MEAN	N1	N2	MEAN	N1	N2	MEAN
NCO376	1.89	1.98	1.94	0.22	0.23	0.23	0.99	1.04	1.02	0.31	0.30	0.31	0.21	0.20	0.21	0.15	0.16	0.15
N14	1.97	2.06	2.01	0.20	0.21	0.21	0.87	0.84	0.86	0.36	0.37	0.37	0.26	0.27	0.26	0.17	0.18	0.18
N17	1.92	1.99	1.95	0.24	0.23	0.23	1.09	1.03	1.06	0.28	0.29	0.29	0.23	0.23	0.23	0.16	0.16	0.16
MEAN	1.93	2.01		0.22	0.22		0.98	0.97		0.32	0.32		0.23	0.23		0.16	0.16	
Significance Variety	**			**			**			**			**			**		
Significance N	**			NS			NS			NS			NS			NS		

5. COMMENTS

5.1 Stalk and population

* NCo376 stalks tended to be shorter than those of both N14 and N17.

* Stalk heights were marginally greater where the highest rate of N had been applied.

* Increasing the rate of N application did not seem to have any significant effect on the stalk populations of any of the varieties. This was not unexpected since the varying rates of N were only applied at 5 months of age when tillering was near completion.

5.2 Cane yield

* There were significant differences in the cane yield of the different varieties which decreased in the order NCo376 > N14 > N17 (Table 2)

* Cane yields of all varieties tended to be increased by increasing the rate of N. This increase was significant in the case of N17 (Table 3).

5.3 Cane quality

* The quality of N14 was not significantly different from that of NCo376. However, the quality of both these varieties was significantly lower than that of N17

* Increasing the rate of N application resulted in a reduction in Sucrose content in all varieties. The decrease was only significant in the case of N17.

5.4 Sucrose Yield

* There was no significant difference in the yield of sucrose between varieties although NCo376 tended to produce higher sucrose yields than N14 or N17.

* Increasing the rate of N application had no effect on the sucrose yield of NCo376 or N14, but resulted in an apparent increase in that of N17.

5.5 Foliar analysis

* Leaf samples were taken at 6.5 months of age to assess the effect of the second application of N which was applied at 5 months of age.

* There were no differences between the nutrient content of N17 and NCo376 (Table 4), although differences existed between both of these varieties and N14.

* The content of N, Ca, Mg and S in the N14 was significantly higher than the other varieties while that of P and K was significantly lower.

* Increasing the rate of applied N resulted in an increase in uptake of N in all varieties. This was only associated with a significant yield increase in the case of N17.

6. CONCLUSION

* The results of this trial have shown that varieties may have differing requirements for nitrogen.

* The recommended rate of N for ratoon cane on an 'R' set soil is 140 kg/ha and this rate was apparently sufficient for NCo376 and N14. There were significant increases in the cane yield of N17 to additional N, however, although this was accompanied by a reduction in sucrose content.

* The 2nd application of nitrogen in this trial occurred later than planned and this may have had some influence on the results.

* This trial is being continued but treatments have been changed so as to assess the effect of timing of N applications on variety performance.

PCH/aw/ynm
3 May 1990

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 3 * N Rate/84/Sw SIM 'R'

CAT. NO.: 1470

TITLE: RELEASED VARIETIES * NITROGEN RATE ON A 'R' SET SOIL

1. PARTICULARS OF PROJECT

This crop	:	5th Ratoon
Site	:	Field 606 Simunye
Region	:	Northern Irrigated (Swaziland)
Soil Set/Series:		'R' /Rhebok and Ronspring with some 'S' set pockets
Design	:	Complete Randomized Blocks with split plots, 8 Reps
Variety	:	NCo376, N14, N17
Fertilizer (kg/ha)	:	N: See Treatment; P: 40; K: 100

Soil Analysis: 10/05/1989

pH	OM	Clay%	Silt%	Sand%
6.8	3.6	43	14	43

ppm

P	K	Ca	Mg	S	Zn
29	144	3217	890	26	2.8

CEC : 26.4 me/100g soil
KDI : 0.57

Dates : 29/04/89-7/05/90

Age : 12.25 months

Rainfall : 978 mm
Irrigation: 864 mm
Total : 1842 mm

2. OBJECTIVES

2.1 To continue observing the performance of the major varieties for an early cycle on a mixed 'R' set soil.

2.2 To test the effect of splitting Nitrogen application on variety performance.

2.3 To monitor the pest and disease tolerance of released varieties.

4.1 Harvest Data

Table 1: Means of Yield of Cane, % Sucrose and Yield of Sucrose

Variety	Tons Cane/ha			Sucrose % Cane			Tons Sucrose/ha		
	N1	N2	Mean	N1	N2	Mean	N1	N2	Mean
NCo376	152	154	153	11.27	11.26	11.265	17.1	17.3	17.2
N14	139	141	140	12.31	12.06	12.19	17.0	17.0	17.0
N17	123	129	126	12.48	12.73	12.61	15.3	16.3	15.8
Mean	138	141	140	12.02	12.02	12.02	16.5	16.9	16.7
LSD Variety (0.05)	6			0.44			1.1		
(0.01)	9			0.62			1.5		
Significance	**			**			*		
LSD Nitrogen (0.05)	6			0.37			0.7		
(0.01)	8			0.50			1.0		
Significance	NS			NS			NS		
Interaction Var. x N	NS			NS			NS		
LSD Subplot (0.05)	10			0.64			1.3		
Same whole plot(0.01)	13			0.87			1.75		
LSD Subplot (0.05)	9			0.87			1.4		
Diff. whole plot(0.01)	12.5			1.19			1.8		
SE	8.0			0.61			1.2		
CV %	6.7			5.1			7.4		

Table 2: Mean differences between N2 and N1 (N2 - N1) treatments: Cane Yield, Sucrose % Cane and Sucrose Yield

Variety	Tons Cane/ha	Sucrose % Cane	Tons Sucrose/ha
NCo376	2	-0.01	0.2
N14	2	-0.25	0
N17	6	0.25	1

4.2 Leaf Analysis

Table 3: Third leaf analysis of samples taken in October at 5 months of age (% dm)

Variety	N			P			K			Ca			Mg			S		
	N1	N2	Mean	N1	N2	Mean	N1	N2	Mean	N1	N2	Mean	N1	N2	Mean	N1	N2	Mean
NCo376	1.83	1.89	1.86	0.19	0.19	0.19	0.71	0.73	0.72	0.48	0.47	0.48	0.33	0.32	0.33	0.18	0.19	0.185
N14	1.94	1.98	1.96	0.18	0.18	0.18	0.68	0.71	0.70	0.52	0.53	0.53	0.38	0.37	0.37	0.19	0.19	0.19
N17	1.82	1.93	1.87	0.21	0.22	0.215	0.82	0.84	0.83	0.48	0.47	0.48	0.37	0.38	0.37	0.18	0.19	0.185
Mean	1.86	1.93	1.90	0.19	0.20	0.19	0.74	0.76	0.75	0.50	0.49	0.49	0.36	0.36	0.36	0.18	0.19	0.185
Interaction Variety * N	NS			NS			NS			NS			NS			NS		
LSD (0.05)	0.063			0.0090			0.083			0.034			0.034			0.0064		
Variety(0.01)	0.088			0.012			0.11			0.047			0.047			0.0089		
Significance	**			**			**			**			**			**		
LSD(0.05)	0.046			0.010			0.066			0.046			0.033			0.0072		
N (0.01)	0.063			0.014			0.089			0.063			0.045			0.0098		
Significance	NS/*			NS			NS			NS			NS			NS		
LSD Subplot (0.05)	0.080			0.0058			0.038			0.027			0.019			0.0042		
Same whole plot(0.01)	0.11			0.0080			0.052			0.036			0.026			0.0057		
SE +/-	0.0077			0.0090			0.060			0.020			0.023			0.0073		
CV %	4.1			4.7			8.0			8.2			6.5			3.9		

4.4 Eldana and Smut

Table 4: Eldana Damage and Smut Infection

Variety	% Internodes Damaged		Av. % Smut (whips/ha)
	N1	N2	
NCo376	1.2	1.4	0.04
N14	0.8	3.1	0.02
N17	1.0	0.6	-

3. TREATMENTS

3.1 Whole plots

NCo376; N14; N17

3.2 Subplots

1. Nitrogen applied in a single Topdressing (N1).
2. Nitrogen application split (N2).

3.3 Notes on treatments

Nitrogen was applied in the form of Urea (46 % N) at 140 kg/ha. The single dressing and 50 kg/ha of the split application were applied on 2/06/89 and the balance of 90 kg/ha of the split application was applied on 18/08/89.

3.4 Fertilizer

Potassium was broadcast at 100 kg K/ha in the form of KCl (50 % K) on 6/06/89.

Phosphorous was broadcast at 40 kg P/ha in the form of Single Supers (10.5 % P) on 15/06/89.

3.5 Ripening

No chemical ripeners were applied to this trial.

5. COMMENTS

5.1 Cane Yield

There were significant differences in cane yield between varieties which decreased in the order NCo376 > N14 > N17. (Table 1)

Splitting N generally induced small differences except in the case of N17 where there was a trend towards increased yields. (Table 2)

5.2 Cane Quality

There were significant differences in sucrose content between varieties. In this unripened trial sucrose content was lowest in NCo376, intermediate in N14 and highest in N17 (Table 1). This was the exact inverse of the ranking of cane yields. The effect of splitting N on sucrose content was variable and non significant (Table 2).

5.3 Sucrose Yield

The yield of sucrose of NCo376 was not statistically different from N14, while N17 yielded significantly less.

Splitting N had no significant effect on the sucrose yield of the different varieties, although in the case of N17 the response was larger than in the other varieties (Table 2).

5.4 Leaf Analysis

Nutrient contents were above the NCo376 thresholds for all nutrients except K. There were statistically significant differences between varieties for all major nutrients except S. The differences compared to NCo376 can be summarized as follows:

	N	P	K	Ca	Mg
N14	+	-	-	+	+
N17	0	+	+	0	+

Nitrogen content tended to higher where N was split although the increase was only significant in the case of N17. Content of other nutrients appeared to be unaffected by splitting N applications.

Potassium levels were very low in this trial and confirm the inadequacy of the old soil threshold level for these soils (ie. 150ppm).

5.5 Eldana and Smut

Levels of Eldana damage were relatively low in this trial and were generally similar for all varieties. Splitting nitrogen application did not have a significant effect on level of damage although it appeared to increase in the case of N14.

Smut levels remain low in this trial and the highest levels were recorded in NCo376.

6. CONCLUSIONS

* NCo376 continues to produce the highest cane yields on this shallow 'R' set soil. Sucrose content in this unripened cane was low, however, with the result that sucrose yields were similar to N14.

* N17 was the only variety that responded significantly to split application of the recommended rate of Nitrogen for this soil (140 kg N/ha).

* The relative sensitivity of N17 to split applications of N tends to suggest that the total N used in this trial was suboptimal for N17. This confirms last year's results which indicated that N17 tended to respond to a higher rate of N than the other varieties.

* This trial has been continued to confirm the the apparent requirement for higher rates of Nitrogen by N17.

PCH/AGK/fjs
14 May 1991

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

EXPERIMENT RESULT

CODE: VAR 3* N Rate/84/Sw SIM 'R'
CAT.NO.: 1470

TITLE: RELEASED VARIETIES * NITROGEN RATE ON A 'R' SET SOIL

1. PARTICULARS OF PROJECT

This Crop	: 6th ratoon
Site	: Field 606 Simunye
Region	: Northern Irrigated (Swaziland)
Soil Set/Series	: 'R'/Rhebok and Ronspring with some 'S' set pockets
Design	: Complete Randomized blocks with split plots 8 Reps. 8 Reps.
Variety	: NCo376, N14, N17
Fertilizer (kg/ha)	: N P K See 40 200 Treatment

Soil Analysis : 19.09.90

pH	OM	Clay%	Silt%	Sand%
6.7	3.6	43	14	43

ppm

P	K	Ca	Mg	(Ca + Mg)/K
73	239	2978	786	16

CEC : 26.4 me/100g soil
KDI : 0.57

Dates : 07.05.90 - 07.06.91

Age : 13.0 months

Rainfall : ?
Irrigation: Full
Total :

2. OBJECTIVES

2.1 To continue observing the performance of the major varieties for an early cycle on a mixed 'R' set soil.

2.2 To test the effect of two rates of Nitrogen application on variety performance.

2.3 To monitor the pest and disease tolerance of released varieties.

3. TREATMENTS

3.1 Whole plots: NCo376, N14 and N17

3.2 Subplots:
1. Nitrogen at the rate of 140 kg N ha^{-1}
2. Nitrogen at the rate of 160 kg N ha^{-1}

3.3 Notes on treatments

* Nitrogen was applied in the form of Urea (46% N)

* Applications were split with first top dressing of 42 kg N ha^{-1} and 48 kg N ha^{-1} for N_1 and N_2 respectively applied on 31.05.90, 3.5 weeks after harvest.

  The balance of 98 kg N ha^{-1} and 112 kg N ha^{-1} for N_1 and N_2 respectively was applied on 07.09.90, 4.0 months after harvest.

3.4 Fertilizer

* Phosphorous as single supers (10.5% P) at the rate of 40 kg P ha^{-1} and potassium as KCL (50% K) at the rate of 200 kg K ha^{-1} were broadcast 4 weeks after harvest.

3.5 Ripening

No chemical ripeners were applied to this trial

4. RESULTS

4.1 Harvest Data

Table 1: Cane Yield, % Sucrose and Yield of Sucrose

Variety	Tons Cane/ha			Sucrose % Cane			Tons Sucrose/ha		
	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean
NCo376	139	145	143	12.95	13.00	12.97	18.0	19.0	18.5
N14	132	129	131	12.36	12.37	12.37	16.4	15.9	16.2
N17	127	127	127	14.09	13.49	13.79	17.8	17.3	17.5
Mean	133	134	134	13.13	12.95	13.04	17.4	17.4	17.4
LSD Var 0.05		14			0.43			1.8	
0.01		20			0.60			2.5	
Significance		NS			**			*	
LSD N 0.05		6			0.22			0.8	
0.01		7			0.26			0.9	
Significance		NS			NS			NS	
Interaction Var x N		NS			*			NS	
LSD Subplot (005)		10			0.37			1.4	
same whole plots (001)		12			0.45			1.6	
LSD Subplot (005)		16			0.51			2.0	
Diff. whole plot (001)		21			0.68			2.7	
SE one plot		9.4			0.36			1.3	
CV%		7			2.8			7.5	

Table 2: Differences between N_2 and N_1 treatments N_2-N_1

Variety	Tons Cane/ha	Sucrose % Cane	Tons Sucrose/ha
NCo376	6	0.05	1.0
N14	-3	0.01	-0.5
N17	0	-0.60**	-0.5

4.2 Eldana

Table 3: Percent Internodes Damaged at Harvest

Variety	% Internodes Damaged	
	N_1	N_2
NCo376	0.58	1.10
N14	3.10	2.30
N17	0.60	0.58

5. COMMENTS

5.1 Soil Analysis

Soil K level in May 1989 at the beginning of the 5th ratoon was low (144 ppm). A high rate of potash application was made at the onset of 6th ratoon and the cumulated additions of potash since May 1989 have increased soil-K levels to a value of 239 ppm. This is higher than the current threshold for soils with more than 40% clay.

5.2 Cane Yield

Cane yield decreased in the order NCo376 > N14 > N17 and the difference between NCo376 and N17 was significant.

The effects of increasing the rate of Nitrogen were variable and were non significant. Cane yield tended to increase in NCo376, decrease in N14 and remain unchanged in N17.

5.3 Cane Quality

There were significant differences in sucrose content between varieties. Sucrose content decreased in the order N17 > NCo376 > N14

Varieties responded differently to increasing the rate of N and hence the interaction term of the ANOVA was significant. Sucrose content in N17 was reduced with the higher rate of N while it had no effect in NCo376 and N14.

5.4 Sucrose Yield

The best yield of sucrose was achieved by NCo376 while N14 was poorest and N17 intermediate. The difference between NCo376 and N14 was significant.

Differences in sucrose yield between N rates in NCo376 and N14 reflected the non significant effect of N on cane yield while in N17 it reflected the significant adverse effect of N on quality.

5.5 Leaf Analysis

Nutrient contents at 4 and 5.5 months of age were above threshold for all nutrients except K. Potassium content in spring was below threshold despite the high rate of potash addition and an apparently high status of soil-K. Levels of soil Ca and soil Mg were high in relation to potassium (Ca + Mg/K = 16) and are likely to have lowered the availability of potassium. K levels had characteristically increased to near threshold value in December.

Increasing the rate of N resulted in no significant differences in nutrient content except a decrease in the Mg content in NCo376 in September. There were significant differences in nutrient content between NCo376 and the other two varieties which are summarized as follows:

Variety	% NCo376 (% dm Oct.)				
	N	P	K	Ca	Mg
N14	96**	83**	76**	126**	118**
N17	97*	104*	100	97	106

* Significant at P = 0.05
** Significant at P = 0.01

5.6 Eldana

Incidence of Eldana was low in this trial although N14 appeared to be more sensitive than the other varieties.

Increasing the rate of N did not have a significant effect on levels of damage although it appeared to increase in the case of NCo376.

6. CONCLUSIONS

* NCo376 produced the highest yield of sucrose and the results of this 6th ratoon confirm the good ratooning ability of this variety. The performance of N14 was poor and this is the first year in which it was out-yielded by N17.

* Increasing the rate of N from the recommended rate of 140 kg N ha^{-1} to 160 kg N ha^{-1} appeared to increase yields of NCo376 and reduce yields of N17.

* Responses to N are typically variable and this is illustrated by the year to year variability in N responses in this trial over the last three crops. It has become apparent, however, that 140 kg N ha^{-1} is close to the optimum for this soil provided it is split and the second dressing is applied within the first four months of harvest.

* This trial has been terminated.

10.02.92
PCH/fkd

Appendix 1 Third leaf analysis (% dm) of samples taken in September (4.0 mths)

Variety	N			P			K			Ca			Mg		
	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean
NCo376	2.15	2.18	2.16	0.22	0.22	0.22	0.57	0.60	0.58	0.49	0.49	0.49	0.37	0.35	0.36
N14	2.16	2.12	2.14	0.22	0.22	0.22	0.55	0.53	0.54	0.51	0.50	0.51	0.41	0.41	0.41
N17	2.09	2.11	2.10	0.24	0.24	0.24	0.77	0.78	0.77	0.42	0.42	0.42	0.37	0.36	0.36
Mean	2.13	2.14	2.14	0.23	0.23	0.23	0.63	0.62	0.63	0.47	0.47	0.47	0.39	0.37	0.38
Interaction Var x N	NS			NS			NS			NS			NS		
LSD (0.05)	0.087			0.009			0.067			0.036			0.034		
Variery (0.01)	0.13			0.012			0.093			0.050			0.047		
Significance	NS			**			**			**			*		
LSD (0.05)	0.048			0.006			0.035			0.013			0.011		
N (0.01)	0.066			0.008			0.048			0.018			0.015		
Significance	NS			NS			NS			NS			*		
LSD S-plot (0.05)	0.084			0.010			0.061			0.023			0.019		
Same Whole (0.01)	0.11			0.014			0.083			0.032			0.025		
plot															
LSD S-plot (0.05)	0.11			0.011			0.081			0.040			0.037		
Diff Whole (0.01)	0.15			0.016			0.11			0.055			0.051		
plot															
SE sub-plot	0.081			0.010			0.059			0.022			0.018		
CV %	3.8			4.2			9.3			4.8			4.7		

Appendix 2 Third leaf analysis of samples taken in October (5.5 mths)

Variety	N			P			K			Ca			Mg		
	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean
NCo376	2.07	2.08	2.08	0.24	0.24	0.24	0.92	0.91	0.915	0.34	0.35	0.35	0.34	0.33	0.34
N14	1.98	2.00	1.99	0.20	0.20	0.20	0.71	0.69	0.70	0.44	0.44	0.44	0.40	0.40	0.40
N17	2.03	1.99	2.01	0.25	0.25	0.25	0.95	0.89	0.92	0.33	0.34	0.34	0.35	0.37	0.36
Mean	2.03	2.02	2.02	0.23	0.23	0.23	0.86	0.83	0.85	0.37	0.38	0.37	0.36	0.37	0.37
Interaction Var x N	NS			NS			NS			NS			NS		
LSD (0.05)	0.058			0.008			0.13			0.036			0.034		
Variety (0.01)	0.081			0.011			0.18			0.050			0.047		
Significance	*			**			**			**			**		
LSD (0.05)	0.044			0.003			0.051			0.014			0.014		
N (0.01)	0.060			0.004			0.069			0.019			0.019		
Significance	NS			NS			NS			NS			NS		
LSD S-plot (0.05) Same Whole (0.01) plot	0.076			0.005			0.088			0.025			0.024		
	0.10			0.007			0.12			0.034			0.033		
LSD S-plot (0.05) Diff Whole (0.01) plot	0.081			0.009			0.14			0.040			0.038		
	0.11			0.012			0.20			0.056			0.053		
SE one plot	0.072			0.005			0.085			0.024			0.023		
CV %	3.6			2.2			10.0			6.4			6.3		

Appendix 3 Third leaf analysis (%dm) of samples taken in December (7.1 mths)

Variety	N			P			K			Ca			Mg		
	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean	N_1	N_2	Mean
NCo376	1.66	1.60	1.63	0.23	0.23	0.23	1.02	1.08	1.05	0.29	0.29	0.29	0.25	0.25	0.25
N14	1.71	1.70	1.71	0.21	0.21	0.21	0.83	0.89	0.86	0.34	0.34	0.34	0.36	0.32	0.34
N17	1.71	1.71	1.71	0.23	0.22	0.23	1.04	1.01	1.02	0.30	0.30	0.30	0.29	0.27	0.28
Mean	1.69	1.67	1.68	0.22	0.22	0.22	0.96	0.99	0.98	0.31	0.31	0.31	0.30	0.28	0.29
Interaction Var x N	NS			NS			NS			NS			NS		
LSD (0.05)	0.096			0.013			0.10			0.021			0.023		
Variety (0.01)	0.13			0.018			0.14			0.030			0.035		
Significance	NS			**			**			**			**		
LSD (0.05)	0.074			0.006			0.074			0.015			0.019		
N (0.01)	0.10			0.008			0.10			0.021			0.026		
Significance	NS			NS			NS			NS			*		
LSD S-plot (0.05)	0.13			0.010			0.13			0.027			0.033		
Same Whole (0.01 plot	0.17			0.013			0.17			0.036			0.045		
LSD S-plot (0.05)	0.13			0.015			0.14			0.029			0.034		
Diff Whole (0.01) plot	0.18			0.020			0.19			0.040			0.048		
SE one plot	0.12			0.009			0.12			0.026			0.032		
CV%	7.3			4.3			12.6			8.3			11.1		