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SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Title: SPLIT APPLICATIONS OF NITROGEN TRIAL 6400/22

Cat No.: 1317

Object : To determine the effects of different split applications of nitrogen to late season cane.

This crop : Plant Age : 11,2 months (18.12.80 to 23.11.81)

Location : ZSA Experiment Station, Block K4

Soil type : P.E. 1 sandy clay loam derived from gneiss

Design : Simple lattice, 4 replications

Variety/Spacing : NCo 376 in 1,5 m rows.

Fertiliser (kg/ha) : Nitrogen : 150 N applied as per treatment table.
Phosphate : 100 P₂O₅ broadcast.
Potash : 60 K₂O.

Treatments : Nitrogen splits applied as per the treatment table.

TREATMENTS	NITROGEN SPLITS			
	WEEKS AFTER PLANTING			
	2	6	10	14
1	2/3	1/2	0	0
2	0	1/3	1/3	1/3
3	0	1/3	2/3	0
4	1/2	1/2	0	0
5	0	1/2	0	1/2
6	0	2/3	1/3	0
7	2/3	0	1/3	0
8	1/3	2/3	0	0
9	0	1	0	0
10	1/3	1/3	1/3	0
11	1/2	0	0	1/2
12	1	0	0	0
13	1/3	0	2/3	0
14	0	1/2	1/2	0
15	0	2/3	0	1/3
16	1/2	0	1/2	0

Rainfall : 788 mm Irrigation : 770 mm

RESULTS

Relevant plant crop data are presented in the attached tables.

Cane yields. Trial yield levels were disappointingly low, particularly in terms of previous yields attained on block K4. This low performance level was partially attributable to the marked end of season yield decline exhibited throughout the industry.

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There were no significant treatment effects in the trial as a whole, although single nitrogen applications were consistently lower than other treatments. Data were grouped by: (i) number and order of magnitude of splits (independent of time of application) and (ii) time of application of nitrogen splits (independent of number of splits). In the former grouping split applications of nitrogen were statistically superior to single nitrogen applications (t test). In the latter grouping there were no significant effects, although yield trends indicated a benefit from delaying total nitrogen application until 10 weeks with very little extra benefit from holding back topdressings until 14 weeks after planting.

Quality effects. There were no significant treatment effects in terms of either ERC% cane or ERF% cane, although there were trends which indicated that more splits and delayed application of nitrogen tended to be detrimental to quality.

TERC/ha. The treatments had no statistically significant effect on TERC, although the grouped treatment means indicated: (i) double and triple applications were superior to single applications and (ii) increased benefit from delaying total N application until 10 weeks after planting, but with a slight TERC drop if nitrogen topdressings were held back until 14 weeks.

ERF yield. The same trends shown by TERC yield data were shown by ERF yield data, except that the superiority of double and triple nitrogen applications over single applications attained statistical significance.

Rainfall effects. Significant daily rainfall, in relation to nitrogen application dates are shown in the table below.

FERTILISER APPLICATION DATE	RAINFALL RECORD	
	DATE	mm
7.1.81	9.1.81	50,0
	12.1.81	19,2
	17.1.81	24,2
	18.1.81	93,4
3.2.81	5.2.81	43,2
	6.2.81	43,2
3.3.81	4.3.81	7,1
8.4.81	-	Nil

As can be seen the first two nitrogen applications were followed by heavy rainfall and would therefore have been far more susceptible to leaching than would the latter two applications which were followed by no significant falls. This rainfall data is consistent with the yield trends already described.

CONCLUSIONS

Although the data presented here were obtained from a plant crop at only 11,2 months, and are therefore somewhat unreliable, definite trends have emerged that have shown that heavy seasonal rainfall early in the crop cycle, i.e. up to 6 weeks after planting, can be detrimental to final yield if all, or most, of the crop's nitrogen has been applied within that period. Indications were that more frequent applications, with the total N being applied 10 weeks after planting, were beneficial to final yield.

JJR/Feb. '82.

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6400/22 SPLIT APPLICATIONS OF NITROGEN TRIALHARVEST DATA : PLANT CROP

TREATMENTS					CANE YIELD t/ha	ERC % CANE	ERF % CANE	TERC t/ha	ERF YIELD t/ha
No.	SPLITS								
13	1/3	0	2/3	0	128,72	11,04	12,34	14,36	16,00
2	0	1/3	1/3	1/3	127,16	10,79	12,18	13,76	15,50
5	0	1/2	0	1/2	126,18	10,81	12,21	13,53	15,28
8	1/3	2/3	0	0	125,74	11,28	12,57	14,20	15,84
10	1/3	1/3	1/3	0	125,24	11,05	12,31	13,90	15,50
14	0	1/2	1/2	0	122,17	11,16	12,51	13,76	15,40
3	0	1/3	2/3	0	120,12	10,83	12,17	12,92	14,52
4	1/2	1/2	0	0	119,53	10,85	12,14	13,03	14,57
7	2/3	0	1/3	0	118,55	11,24	12,46	13,15	14,62
15	0	2/3	0	1/3	118,42	10,65	12,07	12,56	14,25
6	0	2/3	1/3	0	116,42	11,10	12,43	12,86	14,42
1	2/3	1/3	0	0	115,92	11,20	12,57	12,93	14,50
16	1/2	0	1/2	0	112,92	11,30	12,54	12,94	14,33
11	1/2	0	0	1/2	112,80	11,31	12,52	12,69	14,04
12	1	0	0	0	108,24	11,06	12,34	11,99	13,38
9	0	1	0	0	106,41	11,47	12,60	12,16	13,34
L.S.D. P = 0,05					17,86	0,45	0,34	2,12	2,32
P = 0,01					23,85	0,60	0,46	2,83	3,09
Trial mean					119,03	11,07	12,37	13,17	14,72
S.E. plot \pm					12,54	0,31	0,25	1,49	1,63
S.E. mean \pm					6,27	0,16	0,12	0,74	0,81
C.V. %					10,54	2,82	2,02	11,31	11,05

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIALGROUPING OF YIELD DATA1. Number and order of magnitude of splits

GROUPING	No. OF TREATMENTS	CANE YIELD t/ha	TERC t/ha	ERF YIELD t/ha
A : Single application	2	107,33	12,36	13,36
B : Double application, 2/3, 1/3	4	117,33	12,88	14,45
C : " " 1/2, 1/2	5	118,72	13,19	14,73
D : " " 1/3, 2/3	3	124,86	13,83	15,45
E : Triple application	2	126,20	13,83	15,50
Mean	-	119,03	13,17	14,72
Significance	-	AB*, AC* AD*, AE*, BE*	N.S.	AB*, AC* AD*, AE*

2. Time of application of nitrogen splits

GROUPING	No. OF TREATMENTS	CANE YIELD t/ha	TERC t/ha	ERF YIELD t/ha
F : All N applied by 2 wks.	1	108,24	11,99	13,38
G : " " " " 6 "	4	116,90	13,08	14,56
H : " " " " 10 "	7	120,59	13,41	14,97
I : " " " " 14. "	4	121,14	13,14	14,78
Mean	-	119,03	13,17	14,72
Significance	-	N.S.	N.S.	N.S.

NOTES :

1. In the first set of grouped data the assumption was made that the frequency and magnitude of the applied nitrogen top dressings was more important than the time of application of the splits. The converse assumption was made in the second grouping viz. time of application of nitrogen was more important than the number of splits.
2. It is important to note that grouping by number and order of magnitude of splits did not group the same treatments, but only the same number of splits, independent of the time of application of the splits. The same is true in the second instance, where the grouping was by time of application, independent of the number of splits.
3. Significance was tested with the t test, using treatment totals, not treatment means.

Rainfall: 442,8mm

Irrigation: 1 008mm

RESULTS

Relevant first ratoon harvest data are presented in the attached tables.

(a) Cane yields: Trial yield data were considerably better than those exhibited in the plant crop. There were no statistically significant treatment effects in the trial as a whole although those treatments receiving a nitrogen application at 2 weeks showed a marginal trend towards greater yields than those treatments that did not. Data were grouped by: (i) number and order of magnitude of splits (independent of time of application), and (ii) time of application of nitrogen splits (independent of number of splits). Neither of these groupings produced any statistically significant effects although it was apparent that split applications were superior to single applications and that applying all the crop's nitrogen at two weeks was detrimental to ultimate yield.

(b) ERC % cane: The previously reported pattern of increased splits and delayed applications of nitrogen being detrimental to ERC % cane was present. When grouped by number and order of magnitude of splits the data showed that the three-way N split gave the lowest ERC % cane. The only significant comparison (t test) was between single applications and $\frac{1}{2}$; $\frac{1}{2}$ splits. Grouping of data by time of application of nitrogen splits indicated that delaying the application of N until 14 weeks caused a significant decline in ERC % cane when compared with 2, 6 and 10 week applications.

(c) ERF % cane: The patterns exhibited by ERC % cane data were shown by ERF % cane figures. There were no statistically significant effects when data were grouped by number and order of magnitude of N splits. Grouping of data by time of application of nitrogen splits showed the same trends and degree of statistical significance and was shown by ERC % cane data except that delayed N application had slightly less effect on ERF % cane.

(d) TERC/ha: The TERC data followed similar patterns to those shown by ERC % cane data. Grouped data indicated that: (i) double and triple applications were superior to single applications and, (ii) earlier applications of nitrogen were superior to later applications. Only the all N by 6 weeks group/all N by 14 weeks group comparison was statistically significant.

(e) ERF yield: The same trends shown by TERC data were shown by the ERF yield data, with the same degree of statistical significance.

3/(f)Rainfall.....

(f) Rainfall effects: Significant daily rainfall in relation to nitrogen application dates are shown below.

Fertiliser Application Dates	Rainfall Record	
	Date	mm
8.12.81 (2 weeks)	3.1.82	11,5
	4.1.82	25,3
7.1.82 (6 weeks)	23.1.82	12,4
3.2.82 (10 weeks)	4.2.82	22,4
	11.2.82	13,2
	17.2.82	28,0
	18.2.82	53,4
	19.2.82	19,0
	28.4.82	28,4
5.3.82 (14 weeks)	-	NIL

There was significant rainfall only after the 10 weeks nitrogen application but the 22,4mm recorded was unlikely to have caused significant leaching losses. In general terms the seasonal rainfall pattern was not likely to have caused any significant yield reductions, which is consistent with the grouped yield data.

CONCLUSIONS

The first ratoon harvest data from this trial site, obtained after relatively low seasonal rainfall have shown that delaying nitrogen applications as late as 14 weeks after harvest can cause sugar and fermentable losses as a result of the adverse effects on cane quality. There were no significant differences caused by the different split applications.

The ideal practice would, therefore, be to split nitrogen applications two or three ways to avoid possible losses of N as a result of seasonal rainfall, and to ensure that the crops' total nitrogen requirements are applied by about 10 weeks after harvest.

JJR/Feb'83
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6400/22

SPLIT APPLICATIONS OF NITROGEN TRIAL

HARVEST DATA : FIRST RATOON

TREATMENTS					CANE YIELD t/ha	ERC % CANE	ERF % CANE	TERC t/ha	ERF YIELD t/ha
NO.	SPLITS								
13	1/3	0	2/3	0	150,60	12,09	13,08	18,24	19,68
4	1/2	1/2	0	0	148,81	12,05	13,05	18,00	19,46
1	2/3	1/3	0	0	147,14	12,06	13,04	17,76	19,19
10	1/3	1/3	1/3	0	146,25	11,89	12,94	17,39	18,92
7	2/3	0	1/3	0	145,00	12,23	13,28	17,69	19,26
16	1/2	0	1/2	0	144,64	12,40	13,45	17,95	19,46
8	1/3	2/3	0	0	143,44	12,49	13,50	17,90	19,38
11	1/2	0	0	1/2	142,95	11,44	12,42	16,28	17,72
14	0	1/2	1/2	0	141,12	11,90	12,88	16,83	18,20
12	1	0	0	0	139,68	12,33	13,25	17,21	18,51
2	0	1/3	1/3	1/3	139,58	11,82	12,97	16,49	18,08
9	0	1	0	0	139,38	12,31	13,26	17,15	18,47
15	0	2/3	0	1/3	137,00	11,76	12,82	16,11	17,58
3	0	1/3	2/3	0	136,94	11,81	12,78	16,18	17,52
5	0	1/2	0	1/2	135,52	11,80	12,83	15,98	17,36
6	0	2/3	1/3	0	125,91	11,85	12,80	14,93	16,13
L.S.D. P = 0,05					11,65	0,61	0,58	1,70	1,81
P = 0,01					15,66	0,82	0,77	2,29	2,44
Trial mean					141,50	12,01	13,02	17,00	18,43
S.E. Plot \pm					8,10	0,43	0,41	1,19	1,26
S.E. Mean \pm					4,05	0,21	0,20	0,59	0,63
C.V. %					5,72	3,58	3,12	6,96	6,83

1. Number and order of magnitude of splits

GROUPING	NO. OF TREATMENTS	CANE YIELD t/ha	ERC % CANE	ERF % CANE	TERC t/ha	ERF YIELD t/ha
A: Single application	2	139,53	12,32	13,26	17,18	18,49
B: Double application : 2/3 ; 1/3	4	138,76	11,97	12,99	16,62	18,04
C: " " : 1/2 ; 1/2	5	142,61	11,92	12,93	17,01	18,44
D: " " : 1/3 ; 2/3	3	142,51	12,13	13,12	17,43	18,86
E: Triple application	2	142,92	11,86	12,95	16,94	18,50
MEAN	-	141,50	12,01	13,02	17,00	18,43
SIGNIFICANCE	-	N.S.	AC*	N.S.	N.S.	N.S.

2. Time of application of nitrogen splits

GROUPING	NO. OF TREATMENTS	CANE YIELD t/ha	ERC % CANE	ERF % CANE	TERC t/ha	ERF YIELD t/ha
F: All N applied by 2 weeks	1	136,98	12,33	13,25	17,21	18,51
G: " " " " 6 "	4	144,69	12,23	13,21	17,70	19,13
H: " " " " 10 "	7	141,49	12,02	13,03	17,03	18,45
I: " " " " 14 "	4	138,76	11,71	12,76	16,22	17,69
MEAN	-	141,50	12,01	13,02	17,00	18,43
SIGNIFICANCE	-	N.S.	FI,HI:*	FI,HI *	GI**	GI**

6400/22 : SPLIT APPLICATIONS OF NITROGEN TRIALYIELD DATA SUMMARY : PLANT AND FIRST RATOON

TREATMENTS					CANE YIELD t/ha			ERC YIELD t/ha			ERF YIELD t/ha		
No	SPLITS				Plant	1R	Mean	Plant	1R	Mean	Plant	1R	Mean
12	1	0	0	0	108,24	139,68	127,96	11,99	17,21	14,60	13,38	18,51	15,95
9	0	1	0	00	106,41	139,38	122,90	12,16	17,15	14,66	13,34	18,47	15,91
1	2/3	1/3	0	0	115,92	147,14	131,53	12,93	17,76	15,35	14,50	19,19	16,85
7	2/3	0	1/3	0	118,55	145,00	131,78	13,15	17,69	15,42	14,62	19,26	16,94
6	0	2/3	1/3	0	116,42	125,91	121,17	12,86	14,93	13,90	14,42	16,13	15,28
15	0	2/3	0	1/3	118,42	137,00	127,71	12,56	16,11	14,31	14,25	17,58	15,92
4	1/2	1/2	0	0	119,53	148,81	134,17	13,03	18,00	15,52	14,57	19,46	17,02
16	1/2	0	1/2	0	112,92	144,64	128,78	12,94	17,95	15,45	14,33	19,46	16,90
11	1/2	0	0	1/2	112,80	142,95	127,88	12,69	16,28	14,49	14,04	17,72	15,88
14	0	1/2	1/2	0	122,17	141,12	131,65	13,76	16,83	15,30	15,40	18,20	16,80
5	0	1/2	0	1/2	126,18	135,52	130,85	13,53	15,98	14,76	15,28	17,36	16,32
8	1/3	2/3	0	0	125,74	143,44	134,59	14,20	17,90	16,05	15,84	19,38	17,61
13	1/3	0	2/3	0	128,72	150,60	139,66	14,36	18,21	16,29	16,00	19,68	17,84
3	0	1/3	2/3	0	120,12	136,94	128,53	12,92	16,18	14,55	14,52	17,52	16,02
10	1/3	1/3	1/3	0	125,24	146,25	135,75	13,90	17,39	15,65	15,50	18,92	17,21
2	0	1/3	1/3	1/3	127,16	139,58	133,37	13,76	16,49	15,13	15,50	18,08	16,79
L.S.D. P = 0,05					17,86	11,65	-	2,12	1,70	-	2,32	1,81	-
P = 0,01					23,85	15,66	-	2,83	2,29	-	3,09	2,44	-
Trial Mean					119,03	141,50	130,27	13,17	17,00	15,09	14,72	18,43	16,58
S.E. Plot \pm					12,54	8,10	-	1,49	1,19	-	1,63	1,26	-
S.E. Mean \pm					6,27	4,05	-	0,74	0,59	-	0,81	0,63	-
C.V. %					10,54	5,72	-	11,31	6,96	-	11,05	6,63	-

6400/22 : SPLIT APPLICATIONS OF NITROGEN TRIAL
QUALITY ANALYSIS DATA SUMMARY : PLANT AND FIRST RATOON

TREATMENTS					ERC % CANE			ERF % CANE		
No.	SPLITS				Plant	1R	Mean	Plant	1R	Mean
12	1	0	0	0	11,06	12,33	11,70	12,34	13,25	12,80
9	0	1	0	0	11,47	12,31	11,89	12,60	13,26	12,93
1	2/3	1/3	0	0	11,20	12,06	11,63	12,57	13,04	12,81
7	2/3	0	1/3	0	11,24	12,23	11,74	12,46	13,28	12,87
6	0	2/3	1/3	0	11,10	11,85	11,48	12,43	12,80	12,62
15	0	2/3	0	1/3	10,65	11,76	11,21	12,07	12,82	12,45
4	1/2	1/2	0	0	10,85	12,05	11,45	12,14	13,05	12,60
16	1/2	0	1/2	0	11,30	12,40	11,85	12,54	13,45	13,00
11	1/2	0	0	1/2	11,31	11,44	11,38	12,52	12,42	12,47
14	0	1/2	1/2	0	11,16	11,90	11,53	12,51	12,88	12,70
5	0	1/2	0	1/2	10,81	11,80	11,31	12,21	12,83	12,52
8	1/3	2/3	0	0	11,28	12,49	11,89	12,57	13,50	13,04
13	1/3	0	2/3	0	11,04	12,09	11,57	12,34	13,08	12,71
3	0	1/3	2/3	0	10,83	11,81	11,32	12,17	12,76	12,48
10	1/3	1/3	1/3	0	11,05	11,89	11,47	12,31	12,94	12,63
2	0	1/3	1/3	1/3	10,79	11,82	11,31	12,18	12,97	12,58
L.S.D.	P = 0,05 P = 0,01				0,45 0,60	0,61 0,82	- -	0,34 0,46	0,58 0,77	- -
Trial Mean					11,07	12,01	11,54	12,37	13,02	12,70
S.E. Plot \pm					0,31	0,43	-	0,25	0,41	-
S.E. Mean \pm					0,16	0,21	-	0,12	0,20	-
C.V. %					2,82	3,58	-	2,02	3,12	-

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

Cat. 1317

Object: To determine the effects of different split applications of nitrogen on late season cane.

This crop: Second ratoon Age: 12,0 months (23.11.82 to 22.11.83)

Location: ZSA Experiment Station, Block K4.

Soil type: PE.1 sandy clay loam derived from gneiss.

Design: Simple lattice with 2 replications each of X and Y groups.

Variety/spacing: NCo 376 in 1,5m rows.

<u>Fertiliser</u> (kg/ha)	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
P	150	100	60
1R	180	100	60
2R	180	100	60
	Application: see treatments	at 4 weeks	at 4 weeks

Treatments: Nitrogen splits were applied as per treatment table:

TREATMENTS	NITROGEN SPLITS			
	WEEKS AFTER CUTTING			
	2	6	10	14
1	2/3	1/3	0	0
2	0	1/3	1/3	1/3
3	0	1/3	2/3	0
4	1/2	1/2	0	0
5	0	1/2	0	1/2
6	0	2/3	1/3	0
7	2/3	0	1/3	0
8	1/3	2/3	0	0
9	0	1	0	0
10	1/3	1/3	1/3	0
11	1/2	0	0	1/2
12	1	0	0	0
13	1/3	0	2/3	0
14	0	1/2	1/2	0
15	0	2/3	0	1/3
16	1/2	0	1/2	0

Rainfall: 359,0mm

Irrigation: 1 101,0mm

2/RESULTS.....

RESULTS

Relevant crop data are presented in the attached tables.

a) Cane yields: There were no statistically significant responses to treatments in the trial as a whole. Data were grouped by (i) number and order of magnitude of splits (independent of time of application), and (ii) time of application of nitrogen splits (independent of number of splits). These groupings did not produce any statistically significant treatment effects. However, the treatments that received nitrogen in a single application gave marginally higher yields than those that did not. Applying all the crop's nitrogen by 2 weeks also resulted in marginally higher yields than obtained with continued applications of nitrogen after 2 weeks.

b) ERC % cane: There were no significant treatment effects.

c) ERF % cane: There were no significant responses to treatment.

d) TERC/ha: The ERC yield trend was similar to that exhibited by cane yield figures.

e) ERF yield: The same trends shown by cane yield were shown by ERF yield data. There were no significant treatment effects.

f) Rainfall effects: Significant daily falls of rain in relation to nitrogen application dates are shown in the table below:

Fertiliser Application Dates	RAINFALL RECORD	
	Date	mm
7.12.82 (2 weeks)	8.12.82	43,9
	4.12.82	8,4
	19.12.82	6,0
4.1.83 (6 weeks)	6.1.83	12,6
	23.1.83	8,8
4.2.83 (10 weeks)	12.2.83	10,9
	13.2.83	21,4
1.3.83 (14 weeks)	4.3.83	17,6
	9.3.83	31,0

The first (2 weeks) and fourth (14 weeks) applications of nitrogen were followed by heavy rainfall. The second and third applications of nitrogen (6 and 10 weeks respectively), were followed by less heavy falls.

CONCLUSIONS

It was apparent that the season's rainfall pattern did not cause any significant losses of applied nitrogen, as indicated by the complete lack of any significant treatment responses. Thus applying all the nitrogen in one application soon after harvest proved to be satisfactory in a season of below average rainfall. However, earlier results from this trial and from other similar trials have demonstrated the necessity for split applications to guard against potential loss of nitrogen when heavy rain falls soon after it has been applied.

BM/Jan'84

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

HARVEST DATA: Second ratoon

No.	TREATMENTS				CANE YIELD t/ha	ERC % CANE	ERF % CANE	TERC t/ha	ERF YIELD t/ha
	SPLITS								
14	0	1/2	1/2	0	128,14	12,67	13,85	16,25	17,84
13	1/3	0	2/3	0	127,14	12,99	14,34	16,54	18,29
12	1	0	0	0	127,11	13,07	14,33	16,55	18,10
10	1/3	1/3	1/3	0	126,56	13,17	14,50	16,64	18,34
11	1/2	0	0	1/2	126,28	12,88	14,05	16,23	17,72
9	0	1	0	0	123,78	12,06	14,08	15,87	17,38
4	1/2	1/2	0	0	122,76	13,03	14,27	15,97	17,48
15	0	2/3	0	1/3	120,96	13,10	14,41	15,97	17,48
16	1/2	0	1/2	0	120,88	13,21	14,39	15,95	17,36
6	0	2/3	1/3	0	120,61	12,65	14,02	15,31	16,95
1	2/3	1/3	0	0	119,77	13,12	14,22	15,73	17,06
5	0	1/2	0	1/2	119,73	13,10	14,48	15,71	17,32
2	0	1/3	1/3	1/3	118,82	12,87	14,04	15,36	16,80
7	2/3	0	1/3	0	118,64	13,07	14,40	15,55	17,07
8	1/3	2/3	0	0	116,94	12,89	14,30	15,11	16,66
3	0	1/3	2/3	0	116,45	13,11	14,20	15,29	16,66
Trial mean					122,16	12,99	14,25	15,88	17,41
S.E. plot \pm					7,49	0,45	0,42	1,19	1,22
S.E. mean \pm					5,30	0,32	0,30	0,84	0,86
C.V.%					6,13	3,48	2,96	7,49	7,01
SIGNIFICANCE					N.S.	N.S.	N.S.	N.S.	N.S.

6400/22 : SPLIT APPLICATIONS OF NITROGEN TRIAL

GROUPING OF HARVEST DATA

1. Number and order of magnitude of splits

GROUPING	NO. OF TREATMENTS	CANE YIELD t/ha	ERC % CANE	ERF % CANE	TERC t/ha	ERF YIELD t/ha
A : Single application	2	125,45	12,97	14,21	16,21	17,74
B : Double application: 2/3;1/3	4	120,00	13,01	14,26	15,64	17,14
C : " " 1/2;1/2	5	123,56	12,98	14,21	16,02	17,54
D : " " 1/3;2/3	3	120,18	13,00	14,31	15,65	17,20
E : Triple application	2	122,69	13,02	14,27	16,00	17,57
MEAN	-	122,16	12,99	14,25	15,88	17,41
SIGNIFICANCE	-	N.S.	N.S.	N.S.	N.S.	N.S.

2. Time of application of nitrogen splits

GROUPING	NO. OF TREATMENTS	CANE YIELD t/ha	ERC % CANE	ERF % CANE	TERC t/ha	ERF YIELD t/ha
F: All N applied by 2 weeks	1	127,11	13,07	14,33	16,55	18,10
G : " " " " 6 "	4	120,01	12,98	14,22	15,67	17,15
H : " " " " 10 "	7	122,63	12,98	14,25	15,93	17,50
I : " " " " 14 "	4	121,45	13,01	14,25	15,82	17,33
MEAN	-	122,16	12,99	14,25	15,88	17,41
SIGNIFICANCE	-	N.S.	N.S.	N.S.	N.S.	N.S.

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

YIELD DATA SUMMARY: PLANT, FIRST AND SECOND RATOON

TREATMENTS					CANE YIELD t/ha				ERC YIELD t/ha				ERF YIELD t/ha			
NO.	SPLITS				P	1R	2R	MEAN	P	1R	2R	MEAN	P	1R	2R	MEAN
12	1	0	0	0	108,24	139,68	127,11	125,01	11,99	17,21	16,55	15,25	13,30	18,51	18,10	16,66
9	0	1	0	0	106,41	139,38	123,78	123,19	12,16	17,15	15,87	15,06	13,34	18,47	17,38	16,40
1	2/3	1/3	0	0	115,92	147,14	119,77	127,61	12,93	17,76	15,73	15,47	14,50	19,19	17,06	16,92
7	2/3	0	1/3	0	118,55	145,00	118,64	127,40	13,15	17,69	15,55	15,46	14,62	19,26	17,07	16,98
6	0	2/3	1/3	0	116,42	125,91	120,61	120,98	12,86	14,93	15,31	14,37	14,42	16,13	16,95	15,83
15	0	2/3	0	1/3	110,42	137,00	120,96	125,46	12,56	16,11	15,97	14,88	14,25	17,58	17,48	16,44
4	1/2	1/2	0	0	119,53	148,81	122,76	130,37	13,03	18,00	15,97	15,67	14,57	19,46	17,48	17,17
16	1/2	0	1/2	0	112,92	144,64	120,88	126,15	12,94	17,95	15,95	15,61	14,33	19,46	17,36	17,05
11	1/2	0	0	1/2	112,80	142,95	126,20	127,34	12,69	16,28	16,23	15,07	14,04	17,72	17,72	16,49
14	0	1/2	1/2	0	122,17	141,12	128,14	130,48	13,76	16,83	16,25	15,61	15,40	18,20	17,84	17,15
5	0	1/2	0	1/2	126,18	135,52	119,73	127,14	13,53	15,98	15,71	15,07	15,20	17,36	17,32	16,65
8	1/3	2/3	0	0	125,74	143,44	116,94	128,71	14,20	17,90	15,11	15,74	15,84	19,38	16,66	17,29
13	1/3	0	2/3	0	128,72	150,60	127,14	135,49	14,36	18,21	16,54	16,37	16,00	19,68	18,29	17,99
3	0	1/3	2/3	0	120,12	136,94	116,45	124,50	12,92	16,18	15,29	14,80	14,52	17,52	16,66	16,23
10	1/3	1/3	1/3	0	125,24	146,25	126,56	132,68	13,90	17,39	16,64	15,98	15,50	18,92	18,34	17,59
2	0	1/3	1/3	1/3	127,16	139,58	118,82	128,52	13,76	16,49	15,36	15,20	15,50	18,00	16,80	16,79
Trial Mean					119,03	141,50	122,16	127,56	13,17	17,00	15,88	15,35	14,72	18,43	17,41	16,85
S.E. plot ±					12,54	8,10	7,49	-	1,49	1,19	1,19	-	1,63	1,26	1,22	-
S.E. mean ±					6,27	4,05	5,30	-	0,74	0,59	0,84	-	0,81	0,63	0,86	-
C.V.%					10,54	5,72	6,13	-	11,31	6,96	7,49	-	11,05	6,83	7,01	-
SIGNIFICANCE					N.S.	N.S.	N.S.	-	N.S.	N.S.	N.S.	-	N.S.	N.S.	N.S.	-

6400/22. SPLIT APPLICATIONS OF NITROGEN TRIAL

QUALITY ANALYSIS DATA SUMMARY : PLANT, FIRST AND SECOND RATOON

TREATMENTS					ERC % CANE				ERF % CANE			
NO.	SPLITS				P	1R	2R	MEAN	P	1R	2R	MEAN
12	1	0	0	0	11,06	12,33	13,07	12,15	12,34	13,25	14,33	13,31
9	0	1	0	0	11,47	12,31	12,86	12,21	12,60	13,26	14,00	13,31
1	2/3	1/3	0	0	11,20	12,06	13,12	12,13	12,57	13,04	14,22	13,28
7	2/3	0	1/3	0	11,24	12,23	13,07	12,18	12,46	13,28	14,40	13,38
6	0	2/3	1/3	0	11,10	11,85	12,65	11,87	12,43	12,80	14,02	13,08
15	0	2/3	0	1/3	10,65	11,76	13,13	11,86	12,07	12,82	14,41	13,10
4	1/2	1/2	0	0	10,85	12,05	13,03	11,98	12,14	13,05	14,27	13,15
16	1/2	0	1/2	0	11,30	12,40	13,21	12,30	12,54	13,45	14,39	13,46
11	1/2	0	0	1/2	11,31	11,44	12,80	11,88	12,52	12,42	14,05	13,00
14	0	1/2	1/2	0	11,16	11,90	12,67	11,91	12,51	12,88	13,85	13,08
5	0	1/2	0	1/2	10,81	11,80	13,10	11,90	12,21	12,83	14,48	13,17
8	1/3	2/3	0	0	11,28	12,49	12,89	12,22	12,57	13,50	14,30	13,46
13	1/3	0	2/3	0	11,04	12,09	12,99	12,04	12,34	13,08	14,34	13,25
3	0	1/3	2/3	0	10,83	11,81	13,11	11,92	12,17	12,78	14,20	13,08
10	1/3	1/3	1/3	0	11,05	11,89	13,17	12,04	12,31	12,94	14,50	13,25
2	0	1/3	1/3	1/3	10,79	11,82	12,87	11,83	12,18	12,97	14,04	13,06
Trial Mean					11,07	12,01	12,99	12,03	12,37	13,02	14,25	13,21
S.E. plot ±					0,31	0,43	0,45	-	0,25	0,41	0,42	-
S.E. mean ±					0,16	0,21	0,32	-	0,12	0,20	0,30	-
C.V.%					2,82	3,58	3,48	-	2,02	3,12	2,96	-
SIGNIFICANCE					N.S.	N.S.	N.S.	-	N.S.	N.S.	N.S.	-

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

Cat. No. 1317

Object: To determine the effects of different split applications of nitrogen on late-season cane.

This crop: Third ratoon Age: 11,9 months(22.11.83 to 19.11.84)

Location: ZSA Experiment Station, Block K4.

Soil type: PE.1 sandy clay loam derived from gneiss.

Design: A 4 x 4 lattice in 4 replications.

Variety/spacing: NCo 376 in 1,5m rows.

<u>Fertiliser</u>	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
Amount kg/ha	180	100	60
<u>Application</u>	see treatments	all at 4 weeks	$\frac{1}{2}$ at 2 weeks $\frac{1}{2}$ at 6 weeks

Treatments: Nitrogen splits were applied as per treatment table.

TREATMENTS	NITROGEN SPLITS			
	WEEKS AFTER CUTTING			
	2	6	10	14
1	2/3	1/3	0	0
2	0	1/3	1/3	1/3
3	0	1/3	2/3	0
4	1/2	1/2	0	0
5	0	1/2	0	1/2
6	0	2/3	1/3	0
7	2/3	0	1/3	0
8	1/3	2/3	0	0
9	0	1	0	0
10	1/3	1/3	1/3	0
11	1/2	0	0	1/2
12	1	0	0	0
13	1/3	0	2/3	0
14	0	1/2	1/2	0
15	0	2/3	0	1/3
16	1/2	0	1/2	0

Rainfall: 456,1mm

Irrigation: 1 275mm

RESULTS:

Relevant harvest data are presented in the attached tables.

a) Cane yield. There were significant differences between treatments ($P = 0,05$) in the trial as a whole. However, when the data was grouped according to the number and order of magnitude of splits; and according to the time of application of nitrogen splits, no significant differences emerged.

b) ERC % cane. No significant responses were obtained.

c) ERF % cane. There were no significant treatment effects.

d) ERC yield. Differences between treatments were significant ($P = 0,05$). The grouped data exhibited the same trend as cane yield data.

e) ERF yield. Responses to treatments were similar to that shown by ERC yield data.

f) Rainfall effects. Significant daily falls of rain in relation to nitrogen application dates are shown in the table below:-

FERTILISER APPLICATION DATE	RAINFALL RECORD	
	DATE	mm
8.12.83 (2 weeks)	18.12.83	39,0
	3.1.84	17,4
4.1.84 (6 weeks)	12.1.84	25,2
	14.1.84	21,8
	1.2.84	14,9
2.2.84 (10 weeks)	3.2.84	49,2
1.3.84 (14 weeks)	14.3.84	14,8
	22.3.84	16,4

The first and third applications of nitrogen were followed by heavy falls of rain.

CONCLUSIONS

The relatively heavy falls of rain received after the first and third applications of nitrogen did not produce consistent treatment responses when the data was grouped by number and order of magnitude of splits, and, by the time of application of nitrogen splits. It is hoped that much heavier falls of rain will be received in subsequent ratoons so that the effects of heavy losses of applied nitrogen by leaching may be ascertained.

BM/Jan'85

DFG

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

HARVEST DATA: third ratoon

TREATMENTS					Cane yield (t/ha)	ERC % cane	ERF % cane	ERC Yield (t/ha)	ERF Yield (t/ha)
No.	SPLITS								
8	1/3	2/3	0	0	124,43	12,44	13,31	15,50	16,61
2	0	1/3	1/3	1/3	123,88	12,17	13,19	15,15	16,43
1	2/3	1/3	0	0	123,30	12,36	13,42	15,26	16,58
14	0	1/2	1/2	0	122,18	12,49	13,36	15,25	16,30
13	1/3	0	2/3	0	121,82	12,58	13,50	15,27	16,36
6	0	2/3	1/3	0	120,96	12,42	13,29	15,13	16,19
3	0	1/3	2/3	0	120,26	12,70	13,49	15,35	16,32
5	0	1/2	0	1/2	120,14	12,00	12,94	14,44	15,56
4	1/2	1/2	0	0	119,99	12,49	13,33	14,98	16,02
9	0	1	0	0	119,77	12,85	13,65	15,30	16,23
12	1	0	0	0	118,81	12,54	13,31	14,81	15,71
10	1/3	1/3	1/3	0	117,67	11,93	13,03	13,97	15,24
16	1/2	0	1/2	0	113,06	12,75	13,65	14,35	15,37
15	0	2/3	0	1/3	111,97	12,66	13,58	14,12	15,15
7	2/3	0	1/3	0	103,23	12,59	13,33	13,13	13,89
11	1/2	0	0	1/2	101,05	12,17	12,94	12,22	12,99
Significance					*	N.S.	N.S.	*	*
L.S.D. P = 0,05					13,75	-	-	1,75	1,86
P = 0,01					-	-	-	-	-
Trial mean					117,66	12,45	13,33	14,64	15,68
S.E. plot \pm					9,56	0,40	0,40	1,21	1,29
S.E. mean \pm					4,78	0,20	0,20	0,61	0,65
C.V.%					8,12	3,21	3,03	8,29	8,25

6400/22 : SPLIT APPLICATIONS OF NITROGEN TRIAL

GROUPING OF HARVEST DATA : third ratoon

1. Number and order of magnitude of splits

Grouping	No. of treatments	Cane yield (t/ha)	ERC % cane	ERF % cane	ERC yield (t/ha)	ERF yield (t/ha)
A : Single application	2	119,29	12,70	13,48	15,06	15,97
B : Double application: 2/3;1/3	4	114,87	12,51	13,41	14,41	15,45
C : " " : 1/2;1/2	5	115,28	12,38	13,24	14,25	15,25
D : " " : 1/3;2/3	3	122,17	12,57	13,43	15,37	16,43
E : Triple application	2	120,78	12,05	13,11	14,56	15,84
Mean	-	117,66	12,45	13,33	14,64	15,68
Significance	-	N.S.	N.S.	N.S.	N.S.	N.S.

2. Time of application of nitrogen splits

Grouping	No. of treatments	Cane yield (t/ha)	ERC % cane	ERF % cane	ERC yield (t/ha)	ERF yield (t/ha)
F : All N applied by 2 weeks	1	118,81	12,54	13,31	14,81	15,71
G : " " " " 6 "	4	121,87	12,54	13,43	15,26	16,36
H : " " " " 10 weeks	7	117,03	12,49	13,38	14,64	15,67
I : " " " " 14 weeks	4	114,26	12,25	13,16	13,98	15,03
Mean	-	117,66	12,45	13,33	14,64	15,68
Significance	-	N.S.	N.S.	N.S.	N.S.	N.S.

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

CANE YIELD DATA SUMMARY : Plant, first, second and third ratoon

TREATMENTS					CANE YIELD (t/ha)				
No.	SPLITS				P	1R	2R	3R	Mean
12	1	0	0	0	108,24	139,68	127,11	118,81	123,46
9	0	1	0	0	106,41	139,38	123,78	119,77	122,34
1	2/3	1/3	0	0	115,92	147,14	119,77	123,30	126,53
7	2/3	0	1/3	0	118,55	145,00	118,64	103,23	121,36
6	0	2/3	1/3	0	116,42	125,91	120,61	120,96	120,98
15	0	2/3	0	1/3	118,42	137,00	120,96	111,97	122,09
4	1/2	1/2	0	0	119,53	148,81	122,76	119,99	127,77
16	1/2	0	1/2	0	112,92	144,64	120,88	113,06	122,88
11	1/2	0	0	1/2	112,80	142,95	126,28	101,05	120,77
14	0	1/2	1/2	0	122,17	141,12	128,14	122,18	128,40
5	0	1/2	0	1/2	126,18	135,52	119,73	120,14	125,39
8	1/3	2/3	0	0	125,74	143,44	116,94	124,43	127,64
13	1/3	0	2/3	0	128,72	150,60	127,14	121,82	132,07
3	0	1/3	2/3	0	120,12	136,94	116,45	120,26	123,44
10	1/3	1/3	1/3	0	125,24	146,25	126,56	117,67	128,93
2	0	1/3	1/3	1/3	127,16	139,58	118,82	123,88	127,36
Trial Mean					119,03	141,50	122,16	117,66	125,09
S.E. plot \pm					12,54	8,10	7,49	9,56	-
S.E. mean \pm					6,27	4,05	5,30	4,78	-
C.V.%					10,54	5,72	6,13	8,12	-
Significance					N.S.	N.S.	N.S.	-	-
L.S.D. P=0,05					-	-	-	13,75	-
P=0,01					-	-	-	-	-

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

QUALITY ANALYSIS DATA SUMMARY: Plant, first, second and third ratoon

TREATMENTS					ERC % CANE					ERF % CANE				
No.	SPLITS				P	1R	2R	3R	Mean	P	1R	2R	3R	Mean
12	1	0	0	0	11,06	12,33	13,07	12,54	12,25	12,34	13,25	14,33	13,31	13,31
9	0	1	0	0	11,47	12,31	12,86	12,85	12,37	12,60	13,26	14,08	13,65	13,40
1	2/3	1/3	0	0	11,20	12,06	13,12	12,36	12,19	12,57	13,04	14,22	13,42	13,31
7	2/3	0	1/3	0	11,24	12,23	13,07	12,59	12,28	12,46	13,28	14,40	13,33	13,37
6	0	2/3	1/3	0	11,10	11,85	12,65	12,42	12,01	12,43	12,80	14,02	13,29	13,14
15	0	2/3	0	1/3	10,65	11,76	13,18	12,66	12,06	12,07	12,82	14,41	13,58	13,22
4	1/2	1/2	0	0	10,85	12,05	13,03	12,49	12,11	12,14	13,05	14,27	13,33	13,20
16	1/2	0	1/2	0	11,30	12,40	13,21	12,75	12,42	12,54	13,45	14,39	13,65	13,51
11	1/2	0	0	1/2	11,31	11,44	12,88	12,17	11,95	12,52	12,42	14,05	12,94	12,98
14	0	1/2	1/2	0	11,16	11,90	12,67	12,49	12,06	12,51	12,88	13,85	13,36	13,15
5	0	1/2	0	1/2	10,81	11,80	13,10	12,00	11,93	12,21	12,83	14,48	12,94	13,12
8	1/3	2/3	0	0	11,28	12,49	12,89	12,44	12,28	12,57	13,50	14,30	13,31	13,42
13	1/3	0	2/3	0	11,04	12,09	12,99	12,58	12,18	12,34	13,08	14,34	13,50	13,32
3	0	1/3	2/3	0	10,83	11,81	13,11	12,70	12,11	12,17	12,78	14,28	13,49	13,18
10	1/3	1/3	1/3	0	11,05	11,89	13,17	11,93	12,01	12,31	12,94	14,50	13,03	13,20
2	0	1/3	1/3	1/3	10,79	11,82	12,87	12,17	11,91	12,18	12,97	14,04	13,19	13,10
Trial mean					11,07	12,01	12,99	12,45	12,13	12,37	13,02	14,25	13,33	13,24
S.E. plot \pm					0,31	0,43	0,45	0,40	-	0,25	0,41	0,42	0,40	-
S.E. mean \pm					0,16	0,21	0,32	0,20	-	0,12	0,20	0,30	0,20	-
C.V.%					2,82	3,58	3,48	3,21	-	2,02	3,12	2,96	3,03	-
Significance					N.S.	N.S.	N.S.	N.S.	-	N.S.	N.S.	N.S.	N.S.	-

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SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

21

G400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

Cat: 1317

Object: To determine the effects of different split applications of nitrogen on late-season cane.

This crop: Fourth ratoon Age: 11,7 months (19.11.84 to 11.11.85).

Location: ZSA Experiment Station, Block K4.

Soil type: PE.1 sandy clay loam derived from gneiss.

Design: 4 x 4 lattice in 4 replications.

Variety/Spacing: NCo 376 in 1,5 m rows.

Fertiliser:

	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
Amount(kg/ha)	180	100	60
<u>Application:</u>	see treatments	all at 4 weeks	$\frac{1}{2}$ at 2 weeks $\frac{1}{2}$ at 10 weeks

Treatments: Nitrogen splits were applied as per treatment table:

TREATMENTS	NITROGEN SPLITS			
	WEEKS AFTER CUTTING			
	2	6	10	14
1	2/3	1/3	0	0
2	0	1/3	1/3	1/3
3	0	1/3	2/3	0
4	1/2	1/2	0	0
5	0	1/2	0	1/2
6	0	2/3	1/3	0
7	2/3	0	1/3	0
8	1/3	2/3	0	0
9	0	1	0	0
10	1/3	1/3	1/3	0
11	1/2	0	0	1/2
12	1	0	0	0
13	1/3	0	2/3	0
14	0	1/2	1/2	0
15	0	2/3	0	1/3
16	1/2	0	1/2	0

Rainfall: 701,2 mm **Irrigation:** 1028,0 mm

2/RESULTS.....

RESULTS

Relevant harvest data are presented in the attached tables.

Three statistical analyses were done on each set of data. The first, compared the treatment means. The second and third were done after grouping the treatment means according to the number and order of magnitude of splits; and, according to the time of application of nitrogen splits, respectively.

- a) Cane yield: There were highly significant ($P = 0,01$) treatment differences in the trial as a whole. However, grouped data showed no significant differences.
- b) ERC% cane: Highly significant ($P = 0,01$) treatment differences were obtained. No significant differences emerged when data were grouped according to the number and order of magnitude of splits, although it was apparent that split applications had a detrimental effect on ERC% cane when compared with single applications.

There was a tendency towards lower ERC% cane values when application of nitrogen was delayed beyond 6 weeks. As a result, applying all the nitrogen by 6 weeks resulted in a significantly higher ERC% cane than delaying the total nitrogen application to 14 weeks.

- c) ERF% cane: There were no significant differences in the trial as a whole, and also when the data were grouped. There was a trend towards lower ERF% cane values when application of nitrogen was delayed beyond 6 weeks. Also, split applications of nitrogen gave lower ERF% cane than single applications though actual differences were not significant.
- d) ERC yield: Although significant ($P = 0,05$) treatment differences were recorded in the trial, the grouped data did not yield any significant differences. Lower ERC yields were obtained when nitrogen applications were delayed beyond 6 weeks.
- e) ERF yield: There were no significant differences. The data exhibited a pattern very similar to that obtained with ERC yield data. Lower ERF yields were obtained when total nitrogen applications were delayed beyond 6 weeks.
- f) Rainfall effects: Significant daily falls of rain in relation to nitrogen application dates are shown in the table below:

FERTILISER APPLICATION DATE	RAINFALL RECORDED	
	DATE	mm
13.12.84 (2 weeks)	15.12.84	36,2
	16.12.84	13,8
	23.12.84	17,6
	24.12.84	19,4
4. 1.85 (6 weeks)	15. 1.85	27,8
	19. 1.85	33,0
	27. 1.85	11,0
30. 1.85 (10 weeks)	1. 2.85	9,2
	2. 2.85	9,6
	3. 2.85	20,0
	5. 2.85	25,6
	8. 2.85	10,9
	10. 2.85	32,0
1. 3.85 (14 weeks)	-	Nil

3/Relatively.....

Relatively heavy falls were received two days after the first application; eleven days after the second application; and two days after the third application. No significant rainfall was recorded immediately after the fourth application.

CONCLUSIONS

It appears that the amount of rainfall received in the fourth ratoon did not cause heavy losses of applied nitrogen through leaching.

Two conclusions can be drawn from the results of the crops harvested to date.

The results of the first four ratoon crops have demonstrated that: in a season when nitrogen leaching losses are low because of lack of heavy down-pours, maximum yields of crystal and fermentables are obtained when all the nitrogen is applied by as early as 6 to 10 weeks. There were no significant differences between splitting the nitrogen dressing or applying it in one dose.

Conversely, plant cane data showed that in a season during which heavy down-pours occur, it is beneficial to split nitrogen applications, and to apply these splits over 10 to 14 weeks.

BM/Feb'86
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6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

HARVEST DATA - FOURTH RATOON

TREATMENTS					CANE YIELD	ERC%	ERF%	ERC YIELD	ERF YIELD
NO	SPLITS				(t/ha)	CANE	CANE	(t/ha)	(t/ha)
1	2/3	1/3	0	0	117,66	12,57	13,28	14,77	15,60
8	1/3	2/3	0	0	116,45	12,27	13,04	14,25	15,16
11	1/2	0	0	1/2	111,47	11,78	12,62	13,14	14,07
10	1/3	1/3	1/3	0	109,88	12,04	12,98	13,27	14,29
3	0	1/3	2/3	0	109,05	12,35	13,15	13,47	14,36
2	0	1/3	1/3	1/3	109,03	12,19	13,09	13,33	14,30
12	1	0	0	0	108,99	12,45	13,20	13,50	14,32
13	1/3	0	2/3	0	108,40	12,08	12,87	13,07	13,95
4	1/2	1/2	0	0	108,23	12,43	13,17	13,40	14,20
5	0	1/2	0	1/2	108,06	12,16	12,95	13,17	14,03
15	0	2/3	0	1/3	105,07	12,09	12,90	12,72	13,59
6	0	2/3	1/3	0	103,90	12,24	13,04	12,78	13,61
9	0	1	0	0	102,50	12,63	13,38	12,92	13,68
16	1/2	0	1/2	0	101,11	12,55	13,26	12,66	13,37
7	2/3	0	1/3	0	100,40	12,39	13,21	12,47	13,30
14	0	1/2	1/2	0	99,86	12,33	13,12	12,22	12,97
Significance					**	**	N.S.	*	*
L.S.D. P = 0,05					10,28	0,42	-	1,33	1,45
P = 0,01					13,82	0,56	-	-	-
Trial mean					107,44	12,23	13,08	13,20	14,05
S.E. plot ±					7,14	0,29	0,31	0,92	1,00
S.E. mean ±					5,05	0,21	0,22	0,65	0,71
C.V.%					6,65	2,38	2,41	7,00	7,15

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

GROUPING OF HARVEST DATA FOURTH RATOON

1. Number and order of magnitude of splits

GROUPING	NO OF TREATMENTS	CANE YIELD (t/ha)	ERC% CANE	ERF% CANE	ERC YIELD (t/ha)	ERF YIELD (t/ha)
A : Single application	2	105,75	12,54	13,29	13,21	14,00
B : Double application : 2/3; 1/3;	4	106,76	12,32	13,11	13,19	14,03
C : Double application : 1/2; 1/2;	5	105,55	12,25	13,02	12,92	13,73
D : Double application : 1/3; 2/3;	3	111,30	12,23	13,02	13,60	14,43
E : Triple application	2	109,46	12,12	13,04	13,30	14,30
MEAN	-	107,44	12,28	13,08	13,20	14,05
SIGNIFICANCE	-	N.S.	N.S.	N.S.	N.S.	N.S.

2. Time of application of nitrogen splits

GROUPING	NO OF TREATMENTS	CANE YIELD (t/ha)	ERC% CANE	ERF% CANE	ERC YIELD (t/ha)	ERF YIELD (t/ha)
F : All N applied by 2 weeks	1	108,99	12,45	13,20	13,50	14,32
G : All N applied by 6 weeks	4	111,21	12,48	13,22	13,84	14,66
H : All N applied by 10 weeks	7	104,51	12,23	13,09	12,85	13,59
I : All N applied by 14 weeks	4	108,41	12,06	12,89	13,09	14,00
MEAN	-	107,44	12,28	13,08	13,20	14,05
SIGNIFICANCE	-	N.S.	GI**	N.S.	N.S.	N.S.

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

CANE YIELD DATA SUMMARY : P, 1R, 2R, 3R and 4R

TREATMENTS					CANE YIELD (t/ha)					
NO	SPLITS				P	1R	2R	3R	4R	MEAN
12	1	0	0	0	102,24	139,68	127,11	118,81	108,99	120,57
9	0	1	0	0	106,41	139,38	123,78	119,77	102,50	118,37
1	2/3	1/3	0	0	115,92	147,14	119,77	123,30	117,66	124,76
7	2/3	0	1/3	0	118,55	145,00	118,64	103,23	100,40	117,16
6	0	2/3	1/3	0	116,42	125,91	120,61	120,96	103,90	117,56
15	0	2/3	0	1/3	118,42	137,00	120,96	111,97	105,07	118,68
4	1/2	1/2	0	0	119,53	148,81	122,76	119,99	108,23	123,86
16	1/2	0	1/2	0	112,92	144,64	120,88	113,06	101,11	118,52
11	1/2	0	0	1/2	112,60	142,95	126,28	101,05	111,47	118,91
14	0	1/2	1/2	0	122,17	141,12	128,14	122,18	93,86	122,49
5	0	1/2	0	1/2	126,18	135,52	119,73	120,14	108,06	121,93
8	1/3	2/3	0	0	125,74	143,44	116,94	124,43	116,45	125,40
3	1/3	0	2/3	0	128,72	150,60	127,14	121,82	108,40	127,34
3	0	1/3	2/3	0	120,12	136,94	116,45	120,26	109,05	120,56
10	1/3	1/3	1/3	0	125,24	146,25	126,56	117,67	109,88	125,12
2	0	1/3	1/3	1/3	127,16	139,58	118,82	123,88	109,03	123,69
Trial mean					119,03	141,50	122,16	117,65	107,44	121,56
S.E.plot ±					12,54	8,10	7,49	9,56	7,14	-
S.E.mean ±					6,27	4,05	5,30	4,78	5,05	-
C.V.%					10,54	5,72	6,13	8,12	6,65	-
Significance					N.S.	N.S.	N.S.	*	**	-
L.S.D. P = 0,05					-	-	-	13,75	10,28	-
P = 0,01					-	-	-	-	13,82	-

6400/22. SPLIT APPLICATIONS OF NITROGEN TRIAL

ERC YIELD DATA SUMMARY : P, 1R, 2R, 3R and 4R

TREATMENTS					ERC YIELD (t/ha)					
NO.	SPLITS				P	1R	2R	3R	4R	MEAN
12	1	0	0	0	11,99	17,21	16,55	14,81	13,50	14,81
9	0	1	0	0	12,16	17,15	15,87	15,30	12,92	14,60
1	2/3	1/3	0	0	12,93	17,76	15,73	15,26	14,77	15,29
7	2/3	0	1/3	0	13,15	17,69	15,55	13,13	12,47	14,40
6	0	2/3	1/3	0	12,86	14,93	15,31	15,13	12,78	14,20
15	0	2/3	0	1/3	12,56	16,11	15,97	14,12	12,72	14,30
4	1/2	1/2	0	0	13,03	18,00	15,97	14,98	13,40	15,03
10	1/2	0	1/2	0	12,94	17,95	15,95	14,35	12,66	14,77
11	1/2	0	0	1/2	12,69	16,28	16,23	12,22	13,14	14,11
14	0	1/2	1/2	0	13,76	16,83	16,25	15,25	12,22	14,36
5	0	1/2	0	1/2	13,53	15,98	15,71	14,44	13,17	14,57
13	1/3	2/3	0	0	14,20	17,90	15,11	15,50	14,25	15,39
8	1/3	0	2/3	0	14,36	19,21	16,54	15,27	13,07	15,49
3	0	1/3	2/3	0	12,92	16,18	15,29	15,35	13,47	14,64
10	1/3	1/3	1/3	0	13,90	17,39	16,64	13,97	13,27	15,03
2	0	1/3	1/3	1/3	13,75	16,49	15,36	15,15	13,33	14,82
Trial mean					13,17	17,00	15,06	14,64	13,20	14,73
S.E. plot ±					1,49	1,19	1,19	1,21	0,92	-
S.E. mean ±					0,74	0,59	0,54	0,61	0,65	-
C.V.%					11,31	6,96	7,49	8,29	7,00	-
Significance					N.S.	N.S.	N.S.	*	*	-
L.S.D. P = 0,05					-	-	-	1,75	1,33	-
P = 0,01					-	-	-	-	-	-

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

ERF YIELD DATA SUMMARY : P, 1R, 2R, 3R and 4R

TREATMENTS					ERF YIELD (t/ha)					
NO	SPLITS				P	1R	2R	3R	4R	MEAN
12	1	0	0	0	13,38	18,51	18,10	15,71	14,32	16,00
9	0	1	0	0	13,34	18,47	17,38	16,23	13,68	15,82
1	2/3	1/3	0	0	14,50	19,19	17,06	16,58	15,60	16,59
7	2/3	0	1/3	0	14,62	19,26	17,07	13,89	13,30	15,63
6	0	2/3	1/3	0	14,42	16,13	16,95	16,19	13,61	15,46
15	0	2/3	0	1/3	14,25	17,58	17,48	15,15	13,59	15,61
4	1/2	1/2	0	0	14,57	19,46	17,48	16,02	14,20	16,35
16	1/2	0	1/2	0	14,33	19,46	17,36	15,37	13,37	15,98
11	1/2	0	0	1/2	14,04	17,72	17,72	12,99	14,07	15,31
14	0	1/2	1/2	0	15,40	18,20	17,84	16,30	12,97	16,14
5	0	1/2	0	1/2	15,28	17,36	17,32	15,56	14,03	15,91
8	1/3	2/3	0	0	15,84	19,38	16,66	16,61	15,16	16,73
3	1/3	0	2/3	0	16,00	19,68	18,29	16,36	13,93	16,85
3	0	1/3	2/3	0	14,52	17,52	16,66	16,32	14,36	15,88
10	1/3	1/3	0	0	15,50	18,92	18,34	15,24	14,29	16,46
2	0	1/3	1/3	1/3	15,50	18,00	16,80	16,43	14,30	16,21
Trial mean					14,72	18,43	17,41	15,68	14,05	16,06
S.E. plot ±					1,63	1,26	1,22	1,29	1,00	-
S.E. mean ±					0,81	0,63	0,86	0,65	0,71	-
C.V.%					11,05	6,83	7,01	8,25	7,15	-
Significance					N.S.	N.S.	N.S.	*	*	-
L.S.D. P = 0,05					-	-	-	1,86	1,45	-
P = 0,01					-	-	-	-	-	-

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

ERC% CANE DATA SUMMARY : P, 1R, 2R, 3R and 4R

TREATMENTS					ERC% CANE					
NO	SPLITS				P	1R	2R	3R	4R	MEAN
12	1	0	0	0	11,06	12,33	13,07	12,54	12,45	12,29
9	0	1	0	0	11,47	12,31	12,86	12,85	12,63	12,42
1	2/3	1/3	0	0	11,20	12,06	13,12	12,36	12,57	12,26
7	2/3	0	1/3	0	11,24	12,23	13,07	12,59	12,39	12,30
6	0	2/3	1/3	0	11,10	11,85	12,65	12,42	12,24	12,05
15	0	2/3	0	1/3	10,65	11,76	13,18	12,66	12,09	12,07
4	1/2	1/2	0	0	10,85	12,05	13,03	12,49	12,43	12,17
8	1/2	0	1/2	0	11,30	12,40	13,21	12,75	12,55	12,44
11	1/2	0	0	1/2	11,31	11,44	12,88	12,17	11,78	11,92
14	0	1/2	1/2	0	11,16	11,90	12,67	12,49	12,33	12,11
5	0	1/2	0	1/2	10,81	11,80	13,10	12,00	12,16	11,97
10	1/3	2/3	0	0	11,23	12,49	12,89	12,44	12,27	12,27
13	1/3	0	2/3	0	11,04	12,09	12,99	12,58	12,08	12,16
3	0	1/3	2/3	0	10,83	11,81	13,11	12,70	12,35	12,16
10	1/3	1/3	1/3	0	11,05	11,89	13,17	11,93	12,04	12,02
2	0	1/3	1/3	1/3	10,79	11,82	12,87	12,17	12,19	11,97
Trial mean					11,07	12,01	12,99	12,45	12,28	12,16
S.E.plot ±					0,31	0,43	0,45	0,40	0,29	-
S.E. mean ±					0,16	0,21	0,32	0,20	0,21	-
C.V.%					2,82	3,53	3,48	3,21	2,33	-
Significance					N.S.	N.S.	N.S.	N.S.	**	-
L.S.D. P = 0,05					-	-	-	-	0,42	-
P = 0,01					-	-	-	-	0,56	-

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

ERF% CANE DATA SUMMARY : P, 1R, 2R, 3R, and 4R

TREATMENTS					ERF% CANE					
NO	SPLITS				P	1R	2R	3R	4R	MEANS
12	1	0	0	0	12,34	13,25	14,33	13,31	13,20	13,29
9	0	1	0	0	12,60	13,26	14,08	13,65	13,38	13,39
1	2/3	1/3	0	0	12,57	13,04	14,22	13,42	13,28	13,31
7	2/3	0	1/3	0	12,46	13,28	14,40	13,33	13,21	13,34
6	0	2/3	1/3	0	12,43	12,80	14,02	13,29	13,04	13,12
15	0	2/3	0	1/3	12,07	12,82	14,41	13,58	12,90	13,16
	1/2	1/2	0	0	12,14	13,05	14,27	13,33	13,17	13,19
16	1/2	0	1/2	0	12,54	13,45	14,39	13,65	13,26	13,46
11	1/2	0	0	1/2	12,52	12,42	14,05	12,94	12,62	12,91
14	0	1/2	1/2	0	12,51	12,88	13,85	13,36	13,12	13,14
	0	1/2	0	1/2	12,21	12,83	14,48	12,94	12,95	13,08
8	1/3	2/3	0	0	12,57	13,50	14,30	13,31	13,04	13,34
13	1/3	0	2/3	0	12,34	13,08	14,34	13,50	12,87	13,23
3	0	1/3	2/3	0	12,17	12,78	14,28	13,49	13,15	13,17
10	1/3	1/3	1/3	0	12,31	12,94	14,50	13,03	12,98	13,15
2	0	1/3	1/3	1/3	12,18	12,97	14,04	13,19	13,09	13,09
Trial mean					12,57	13,02	14,25	13,33	13,08	13,21
S.E. plot \pm					0,25	0,41	0,42	0,40	0,31	-
S.E. mean \pm					0,12	0,20	0,30	0,20	0,22	-
C.V.%					2,02	3,12	2,96	3,03	2,41	-
Significance					N.S.	N.S.	N.S.	N.S.	N.S.	-

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SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

Cat. No. 1317

Object: To determine the effects of different split applications of nitrogen on late-season cane.

This crop: Fifth ratoon. Age: 12,0 months (11.11.85 to 10.11.86).

Location: ZSA Experiment Station, Block K4.

Soil type: PE.1 sandy clay loam derived from gneiss.

Design: 4 x 4 lattice in 4 replications.

Variety/Spacing: NCo376 in 1,5m rows.

<u>Fertiliser:</u>	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
amount:	180	100	60
application:	see treatments	all at 4 weeks	$\frac{1}{2}$ at 2 weeks $\frac{1}{2}$ at 10 weeks

Treatments:

TREATMENTS	NITROGEN SPLITS			
	WEEKS AFTER CUTTING			
	2	6	10	14
1	2/3	1/3	0	0
2	0	1/3	1/3	1/3
3	0	1/3	2/3	0
4	1/2	1/2	0	0
5	0	1/2	0	1/2
6	0	2/3	1/3	0
7	2/3	0	1/3	0
8	1/3	2/3	0	0
9	0	1	0	0
10	1/3	1/3	1/3	0
11	1/2	0	0	1/2
12	1	0	0	0
13	1/3	0	2/3	0
14	0	1/2	1/2	0
15	0	2/3	0	1/3
16	1/2	0	1/2	0

Rainfall: 508,7mm Irrigation: 1 108,0mm

RESULTS

Relevant, harvest data are presented in the attached tables.

2/(a).....

(a) Cane, ERC and ERF yields; ERC and ERF% cane:

There were no significant differences between treatments in the trial. Grouping treatments by time of application of N splits showed that applying all the N by 2 weeks gave higher cane, ERC and ERF yields, and also gave higher ERC% cane and ERF% cane, than when applying all the N over 6, 10 or 14 weeks, although the differences were not significant. The double application of 2/3 N followed by 1/3 N gave significantly lower cane, ERC and ERF yields than those obtained in the other treatments.

There were no significant differences in ERC% cane or ERF% cane values between single and split N applications.

(b) Rainfall effects:

Significant daily falls of rain in relation to nitrogen application dates are shown in the table below:

FERTILISER APPLICATION DATE	RAINFALL RECORDED	
	DATE	mm
28.11.85 (2 weeks)	5.12.85	20,2
	19.12.85	11,4
	21.12.85	11,0
24.12.85 (6 weeks)	1. 1.86	46,4
	4. 1.86	40,6
	11. 1.86	12,0
	16. 1.86	56,8
20. 1.86 (10 weeks)	22. 1.86	6,4
	26. 1.86	10,2
	2. 2.86	9,0
	8. 2.86	13,4
18. 2.86 (14 weeks)	24. 2.86	10,0
	24. 3.86	11,0
	25. 3.86	8,6

Very heavy falls were received after the second N application. Comparatively higher falls were received after the first, third, and fourth N applications.

CONCLUSIONS

Applied N losses due to rainfall appear to have been insignificant and as a result there was no benefit in splitting N applications and in delaying total N application by up to 14 weeks.

BM/Jan'87

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6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

HARVEST DATA : FIFTH RATOON

TREATMENTS					CANE YIELD (t/ha)	ERC% CANE	ERF% CANE	ERC YIELD (t/ha)	ERF YIELD (t/ha)
NO	SPLITS								
16	1/2	0	1/2	0	109,57	13,53	14,27	14,81	15,63
8	1/3	2/3	0	0	109,31	13,50	14,37	14,79	15,74
14	0	1/2	1/2	0	106,84	13,04	13,77	13,92	14,69
1	2/3	1/3	0	0	106,63	13,33	14,05	14,19	14,96
2	0	1/3	1/3	1/3	105,78	13,31	14,11	14,06	14,89
15	0	2/3	0	1/3	105,11	13,47	14,22	14,16	14,96
13	1/3	0	2/3	0	104,50	13,50	14,25	14,13	14,92
6	0	2/3	1/3	0	103,59	13,09	13,89	13,58	14,40
5	0	1/2	0	1/2	103,37	13,21	14,02	13,67	14,51
12	1	0	0	0	103,06	13,32	14,10	13,73	14,53
4	1/2	1/2	0	0	102,12	13,54	14,30	13,83	14,60
11	1/2	0	0	1/2	101,79	13,05	13,79	13,31	14,07
10	1/3	1/3	1/3	0	99,50	13,50	14,27	13,43	14,17
3	0	1/3	2/3	0	98,62	13,25	13,98	13,07	13,81
7	2/3	0	1/3	0	95,66	13,59	14,26	13,02	13,67
9	0	1	0	0	92,69	13,30	14,03	12,35	13,03
Trial mean					103,01	13,34	14,10	13,75	14,53
S.E. plot ±					9,48	0,34	0,33	1,38	1,45
S.E. mean ±					6,70	0,17	0,16	0,98	1,03
C.V.%					9,20	2,54	2,32	10,04	9,98
Significance					N.S.	N.S.	N.S.	N.S.	N.S.

CANE YIELD DATA SUMMARY : P to 5R inclusive

TREATMENTS					CANE YEILD (t/ha)						
NO	SPLITS				P	1R	2R	3R	4R	5R	MEAN
12	1	0	0	0	108,24	139,68	127,11	118,81	108,99	103,06	117,65
9	0	1	0	0	106,41	139,39	123,78	119,77	102,50	92,69	114,09
1	2/3	1/3	0	0	115,92	147,14	119,77	123,30	117,66	106,63	121,74
7	2/3	0	1/3	0	118,55	145,00	118,64	103,23	100,40	95,66	113,58
6	0	2/3	1/3	0	116,42	125,91	120,61	120,96	103,90	103,59	115,23
15	0	2/3	0	1/3	118,42	137,00	120,96	111,97	105,07	105,11	116,42
4	1/2	1/2	0	0	119,53	148,81	122,76	119,99	108,23	102,12	120,24
16	1/2	0	1/2	0	112,92	144,64	120,88	113,06	101,11	109,57	117,03
11	1/2	0	0	1/2	112,80	142,95	126,28	101,05	111,47	101,79	116,06
14	0	1/2	1/2	0	122,17	141,12	128,14	122,18	98,86	106,84	119,89
5	0	1/2	0	1/2	126,18	135,52	119,73	120,14	108,06	103,37	118,83
8	1/3	2/3	0	0	125,74	143,44	116,94	124,43	116,45	109,31	122,72
13	1/3	0	2/3	0	128,72	150,60	126,14	121,82	108,40	104,50	123,36
3	0	1/3	2/3	0	120,12	136,94	116,45	120,26	109,05	98,62	116,91
10	1/3	1/3	1/3	0	125,24	146,25	126,56	117,67	109,88	99,50	120,85
2	0	1/3	1/3	1/3	127,16	139,58	118,82	123,88	109,03	105,78	120,71
Trial mean					119,03	141,50	122,16	117,66	107,44	103,01	118,47
S.E. plot ±					12,54	8,10	7,49	9,56	7,14	9,48	-
S.E. mean ±					6,27	4,05	5,30	4,78	5,05	6,70	-
C.V.%					10,54	5,72	6,13	8,12	6,65	9,20	---
Significance					N.S.	N.S.	N.S.	*	**	N.S.	-
L.S.D. P = 0,05					-	-	-	13,75	10,28	-	-
P = 0,01					-	-	-	-	13,82	-	-

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

GROUPING OF HARVEST DATA : FIFTH RATOON

1. NUMBER AND ORDER OF MAGNITUDE OF SPLITS

GROUPING	NO. OF TREATMENTS	CANE YIELD (t/ha)	ERC% CANE	ERF% CANE	ERC YIELD (t/ha)	ERF YIELD (t/ha)
A : Single application	2	106,34	13,36	14,20	14,23	15,13
B : Double application : 2/3; 1/3	4	96,62	13,41	14,14	12,97	13,67
C : Double application : 1/2; 1/2	5	104,62	13,42	14,17	14,05	14,84
D : Double application : 1/3; 2/3	3	104,43	13,25	14,01	13,83	14,63
E : Triple application	2	106,31	13,18	13,94	13,99	14,79
MEAN	-	103,01	13,34	14,10	13,75	14,53
Significance	-	AB** BE** BC** BD**	N.S.	N.S.	AB* BC* BD* BE*	AB** BC** BD* BE*

2. TIME OF APPLICATION OF NITROGEN SPLITS

GROUPING	NO. OF TREATMENTS	CANE YIELD (t/ha)	ERC% CANE	ERF% CANE	ERC YIELD (t/ha)	ERF YIELD (t/ha)
F : All N applied by 2 weeks	1	109,31	13,50	14,37	14,79	15,74
G : All N applied by 6 weeks	4	103,07	13,34	14,09	13,76	14,53
H : All N applied by 10 weeks	7	102,45	13,36	14,13	13,69	14,47
I : All N applied by 14 weeks	4	102,35	13,29	14,01	13,60	14,35
MEAN	-	103,01	13,34	14,10	13,75	14,53
Significance	-	N.S.	N.S.	N.S.	N.S.	N.S.

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

ERC YIELD DATA SUMMARY : P to 5R inclusive

TREATMENTS					ERC YIELD (t/ha)						
NO	SPLITS				P	1R	2R	3R	4R	5R	MEAN
12	1	0	0	0	11,99	17,21	16,55	14,81	13,50	13,73	14,63
9	0	1	0	0	12,16	17,15	15,87	15,30	12,92	12,35	14,29
1	2/3	1/3	0	0	12,93	17,76	15,73	15,26	14,77	14,19	15,11
7	2/3	0	1/3	0	13,15	17,69	15,55	13,13	12,47	13,02	14,17
6	0	2/3	1/3	0	12,86	14,93	15,31	15,13	12,78	13,58	14,10
15	0	2/3	0	1/3	12,56	16,11	15,97	14,12	12,72	14,16	14,27
4	1/2	1/2	0	0	13,03	18,00	15,97	14,98	13,40	13,83	14,87
16	1/2	0	1/2	0	12,94	17,05	15,95	14,35	12,66	14,81	14,63
11	1/2	0	0	1/2	12,69	16,28	16,23	12,22	13,14	13,31	13,98
14	0	1/2	1/2	0	13,76	16,83	16,25	15,25	12,22	13,92	14,71
5	0	1/2	0	1/2	13,53	15,98	15,71	14,44	13,17	13,67	14,42
8	1/3	2/3	0	0	14,20	17,90	15,11	15,50	14,25	14,79	15,29
13	1/3	0	2/3	0	14,36	18,21	16,54	15,27	13,07	14,13	15,26
3	0	1/3	2/3	0	12,92	16,18	13,29	15,35	13,47	13,07	14,38
10	1/3	1/3	1/3	0	13,90	17,39	16,64	13,97	13,27	13,43	14,77
2	0	1/3	1/3	1/3	13,76	16,49	15,36	15,15	13,33	14,06	14,69
Trial mean					13,17	17,00	15,88	14,64	13,20	13,75	14,61
S.E. plot ±					1,49	1,19	1,19	1,21	0,92	1,38	-
S.E. mean ±					0,74	0,59	0,84	0,61	0,65	0,98	-
C.V.%					11,31	6,96	7,49	8,29	7,00	10,04	-
Significance					N.S.	N.S.	N.S.	*	*	N.S.	-
L.S.D. P = 0,05					-	-	-	1,75	1,33	-	-
P = 0,01					-	-	-	-	-	-	-

ERF YIELD DATA SUMMARY : P to 5R inclusive

TREATMENTS					ERF YIELD (t/ha)						
NO	SPLITS				P	1R	2R	3R	4R	5R	MEAN
12	1	0	0	0	13,38	18,51	18,10	15,71	14,32	14,53	15,76
9	0	1	0	0	13,34	18,47	17,38	16,23	13,68	13,03	15,36
1	2/3	1/3	0	0	14,50	19,19	17,06	16,58	15,60	14,96	16,32
7	2/3	0	1/3	0	14,62	19,26	17,07	13,89	13,30	13,67	15,30
6	0	2/3	1/3	0	14,42	16,13	16,95	16,19	13,61	14,40	15,28
15	0	2/3	0	1/3	14,25	17,58	17,48	15,15	13,59	14,96	15,50
4	1/2	1/2	0	0	14,57	19,46	17,48	16,02	14,20	14,60	16,06
16	1/2	0	1/2	0	14,33	19,46	17,36	15,37	13,37	15,63	15,92
11	1/2	0	0	1/2	14,04	17,72	17,72	12,99	14,07	14,07	15,10
14	0	1/2	1/2	0	15,40	18,20	17,84	16,30	12,97	14,69	15,90
5	0	1/2	0	1/2	15,28	17,36	17,32	15,56	14,03	14,51	15,68
8	1/3	2/3	0	0	15,84	19,38	16,66	16,61	15,16	15,74	16,57
13	1/3	0	2/3	0	16,00	19,68	18,29	16,36	13,93	14,92	16,53
3	0	1/3	2/3	0	14,52	17,52	16,66	16,32	14,36	13,81	15,53
10	1/3	1/3	1/3	0	15,50	18,92	18,34	15,24	14,29	14,17	16,08
2	0	1/3	1/3	1/3	15,50	18,00	16,80	16,43	14,30	14,89	15,99
Trial mean					14,72	18,43	17,41	15,68	14,05	14,53	15,80
S.E. plot ±					1,63	1,26	1,22	1,29	1,00	1,45	-
S.E. mean ±					0,81	0,63	0,86	0,65	0,71	1,03	-
C.V.%					11,05	6,83	7,01	8,25	7,15	9,98	-
Significance					N.S.	N.S.	N.S.	*	*	N.S.	-
L.S.D. P = 0,05					-	-	-	1,86	1,45	-	-
P = 0,01					-	-	-	-	-	-	-

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SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

Cat: 1317

Object: To determine the effect of different split applications of nitrogen on late-season cane.

This crop: Sixth ratoon. Age: 11,4 months (10.11.86 to 21.10.87).

Location: ZSA Experiment Station, Block K4.

Soil type: PE.1 sandy clay loam derived from gneiss.

Design: 4 x 4 lattice in 4 replications.

Variety/Spacing: NCo376 in 1,5m rows.

Fertiliser:

	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
Amount(kg/ha):	180	100	60
Application:	see treat- ments	all at 4 weeks	† at 3 weeks ‡ at 10 weeks

Treatments:

<u>TREATMENTS</u>	<u>NITROGEN SPLITS</u>			
	<u>WEEKS AFTER CUTTING</u>			
	2	6	10	14
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	1	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0

Rainfall: 317,2mm Irrigation: 1347,0mm

RESULTS

- Relevant harvest data are presented in the attached tables.
- a) Cane, ERC and ERF yields: There were significant ($P = 0,05$) differences between treatments but no significant differences were recorded when yields were grouped according to number and magnitude of N splits and time of application of N splits.
 - b) ERC and ERF% cane: No significant differences were exhibited in both the trial as a whole and with the grouped data.
 - c) Rainfall effects: Significant falls of rain in relation to nitrogen application dates are shown in the table overleaf.

FERTILISER APPLICATION DATE	RAINFALL RECORD	
	DATE	mm
1.12.86 (2 weeks)	7.12.86	19,0
	8.12.86	39,2
21.12.86 (6 weeks)	29.12.86	10,0
	31.12.86	19,7
	16. 1.87	46,0
24.1.87 (10 weeks)	5. 2.87	13,2
20.2.87 (14 weeks)	-	nil

Heavy falls occurred seven days after the first and 26 days after the second N application. No heavy falls were received immediately after the third and fourth N applications.

CONCLUSIONS

Although relatively heavy falls of rain were received after the first and second N applications, the seasonal rainfall was below average. There were no consistent treatment responses when the data were grouped by number and order of magnitude of splits and by time of application of N splits. The results were similar to those obtained in the third ratoon.

BM/Jan'88

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6400/22 SPLIT APPLICATIONS OF NITROGEN TRIAL

HARVEST DATA : SIXTH RATOON - Table 1

TREATMENTS					CANE YIELD (t/ha)	ERC% CANE	ERF% CANE	ERC YIELD (t/ha)	ERF YIELD (t/ha)
NO	SPLITS								
7	2	0	1/2	0	96,30	13,03	13,72	12,59	13,27
13	2	0	1/2	0	96,22	13,25	14,05	12,74	13,52
10	2	1/2	1/2	0	95,42	13,37	14,18	12,76	13,54
1	2	1/2	0	0	94,98	13,00	13,70	12,21	12,87
4	2	1/2	0	0	94,92	13,15	14,01	12,49	13,29
16	2	0	1/2	0	94,86	12,67	13,43	12,09	12,81
5	0	0	0	1/2	94,70	12,71	13,48	11,99	12,71
14	0	0	1/2	0	94,57	13,16	13,86	12,44	13,09
11	1	0	0	1/2	94,56	13,27	14,07	12,63	13,40
12	1	0	0	0	94,56	13,07	13,88	12,42	13,18
8	1	0	0	0	94,15	13,37	14,10	12,64	13,32
6	0	0	1/2	0	91,75	12,75	13,48	11,64	12,31
2	0	0	1/2	0	90,68	12,80	13,53	11,50	12,15
9	0	1	0	0	85,94	13,04	13,75	11,21	11,82
15	0	1	0	1/2	78,73	13,08	13,89	10,36	11,02
3	0	1	0	0	76,00	12,82	13,63	9,74	10,38
Trial mean					91,77	13,03	13,80	11,96	12,67
S.E. plot ±					9,34	0,47	0,51	1,26	1,37
S.E. mean ±					6,61	0,34	0,36	0,89	0,97
C.V.%					10,18	3,64	3,71	10,57	10,82
Significance					*	N.S.	N.S.	*	*
LSD P = 0,05					13,44	-	-	1,15	1,97

GROUPING OF HARVEST DATA : SIXTH RATOON

1. NUMBER AND ORDER OF MAGNITUDE OF SPLITS - Table 2A

GROUPING	NO. OF TREATMENTS	CANE YIELD (t/ha)	ERC% CANE	ERF% CANE	ERC YIELD (t/ha)	ERF YIELD (t/ha)
A : Single application	2	90,25	13,06	13,82	11,82	12,50
B : Double application : 2, 1/2	4	90,44	12,97	13,70	11,70	12,37
C : Double application : 1/2, 1/2	5	94,72	12,99	13,77	12,33	13,06
D : Double application : 1/2, 1/2	3	88,79	13,15	13,93	11,71	12,41
E : Triple application	2	93,05	13,09	13,86	12,13	12,85
MEAN	-	91,77	13,03	13,80	11,96	12,67
Significance	-	N.S.	N.S.	N.S.	N.S.	N.S.

2. TIME OF APPLICATION OF NITROGEN SPLITS - Table 2B

GROUPING	NO. OF TREATMENTS	CANE YIELD (t/ha)	ERC% CANE	ERF% CANE	ERC YIELD (t/ha)	ERF YIELD (t/ha)
F: All N applied by 2 weeks	1	94,56	13,07	13,88	12,42	13,18
G: All N applied by 6 weeks	4	92,50	13,14	13,89	12,14	12,83
H: All N applied by 10 weeks	7	92,16	13,01	13,76	12,00	12,70
I: All N applied by 14 weeks	4	89,67	12,97	13,74	11,62	12,32
MEAN	-	91,77	13,03	13,80	11,96	12,67
Significance	-	N.S.	N.S.	N.S.	N.S.	N.S.

6400/22 SPLIT APPLICATION OF NITROGEN TRIAL
CANE YIELD DATA SUMMARY P to 6R (Inclusive) - Table 3

TREATMENTS					CANE YIELD (t/ha)							
NO	SPLITS				P	1R	2R	3R	4R	5R	6R	MEAN
12	1	0	0	0	108,24	139,68	127,11	118,81	108,99	103,06	94,56	114,35
9	0	1	0	0	106,41	139,38	123,78	119,77	102,50	92,69	85,94	110,07
1	0	0	1	0	115,92	147,14	119,77	123,30	117,66	106,63	94,98	117,91
7	0	0	0	1	118,55	145,00	113,64	103,23	100,40	95,66	96,38	111,11
6	0	0	0	0	116,42	125,91	120,61	120,96	103,90	103,59	91,75	111,88
15	0	0	0	0	118,42	137,00	120,96	111,97	105,07	105,11	78,73	111,04
4	0	0	0	0	119,53	148,81	122,76	119,99	108,23	102,12	94,92	116,62
16	0	0	0	0	112,92	144,64	120,88	113,06	101,11	109,57	94,86	113,86
11	0	0	0	0	112,80	142,95	126,28	101,05	111,47	101,79	94,56	112,99
14	0	0	0	0	122,17	141,12	128,14	122,18	98,84	106,84	94,57	116,27
5	0	0	0	0	126,18	135,52	119,73	120,14	108,06	103,37	94,70	115,39
8	0	0	0	0	125,74	143,44	116,94	124,43	116,45	109,31	94,15	118,64
13	0	0	0	0	128,72	150,60	126,14	121,82	108,40	104,50	96,22	119,49
3	0	0	0	0	120,12	136,94	116,45	120,26	109,05	98,62	76,00	111,06
10	0	0	0	0	125,24	146,25	126,56	117,67	109,88	99,50	95,42	117,22
2	0	0	0	0	127,16	139,58	118,82	123,88	109,03	105,78	90,68	116,42
Trial mean					119,03	141,50	122,16	117,66	107,44	103,01	91,77	114,65
S.E. plot ±					12,54	8,10	7,49	9,56	7,14	9,48	9,34	-
S.E. mean ±					6,27	4,05	5,30	4,78	5,05	6,70	6,61	-
C.V.%					10,54	5,72	6,13	8,12	6,65	9,20	10,18	-
Significance					N.S.	N.S.	N.S.	*	**	N.S.	*	-
LSD P = 0,05					-	-	-	13,75	10,28	-	13,44	-
P = 0,01					-	-	-	-	13,82	-	-	-

ERC% CANE DATA SUMMARY P to 6R (Inclusive) - Table 4

TREATMENTS					ERC % CANE							
NO	SPLITS				P	1R	2R	3R	4R	5R	6R	MEAN
12	1	0	0	0	11,06	12,33	13,07	12,54	12,45	13,32	13,07	12,55
9	0	1	0	0	11,47	12,31	12,36	12,85	12,63	13,30	13,04	12,56
1	0	0	1	0	11,20	12,06	13,12	12,36	12,57	13,33	13,00	12,45
7	0	0	0	1	11,24	12,23	13,07	12,59	12,39	13,59	13,03	12,59
6	0	0	0	0	11,10	11,85	12,65	12,42	12,24	13,09	12,75	12,30
15	0	0	0	0	10,65	11,76	13,18	12,66	12,09	13,47	13,08	12,41
4	0	0	0	0	10,35	12,05	13,03	12,49	12,43	13,54	13,15	12,51
16	0	0	0	0	11,30	12,40	13,21	12,75	12,55	13,53	12,67	12,63
11	0	0	0	0	11,31	11,44	12,88	12,17	11,78	13,05	13,27	12,27
14	0	0	0	0	11,16	11,90	12,67	12,49	12,33	13,04	13,16	12,39
5	0	0	0	0	10,81	11,80	13,10	12,00	12,16	13,21	12,71	12,26
8	0	0	0	0	11,28	12,49	12,89	12,44	12,27	13,50	13,37	12,65
13	0	0	0	0	11,04	12,09	12,99	12,58	12,08	13,50	13,25	12,50
3	0	0	0	0	10,83	11,81	13,11	12,70	12,35	13,25	12,82	12,41
10	0	0	0	0	11,05	11,89	13,17	11,93	12,04	13,50	13,37	12,42
2	0	0	0	0	10,79	11,82	12,87	12,17	12,19	13,31	12,80	12,29
Trial mean					11,07	12,01	12,99	12,45	12,28	13,34	13,03	12,45
S.E. plot ±					0,31	0,43	0,45	0,40	0,29	0,34	0,47	-
S.E. mean ±					0,16	0,21	0,32	0,20	0,21	0,17	0,34	-
C.V.%					2,82	3,58	3,48	3,21	2,38	2,54	3,64	-
Significance					N.S.	N.S.	N.S.	N.S.	**	N.S.	N.S.	-
LSD P = 0,05					-	-	-	-	0,42	-	-	-
P = 0,01					-	-	-	-	0,56	-	-	-

