

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

TRIAL RESULT

CODE: N SE-7/87/SW/IYSIS 'T'
CAT. NO: 1842

TITLE : RATE AND TIMING OF N APPLICATION IN LATE
SEASON ON A 'T' SET SOIL

1. PARTICULARS OF PROJECT

This Crop	: 4th Ratoon	Irrigation	: Overhead
Site	: Block SE-7 Ricelands Estate	Variety	: NCo376
Region	: Northern Irrigated (Swaziland)	Fertilizer	: N P K kg/ha see 25 75 Treatment
Design	: Randomized blocks with split plots, 4 replications	Dates	: 20/10/90-18/11/91
Soil Series:	Tm, Ts	Age	: 13 months

2. OBJECTIVES

- 2.1 To determine the optimum rate of N for cane growing on T set soils.
- 2.2 To determine the effect on cane yield of different timings of N application in the late season.

3. MOTIVATION

Current fertilization practice at IYSIS in the late season consists of applying on the soil surface all nitrogen after ratooning. It is feared that this practice could lead to part of the fertilizer being lost either by leaching, volatilization or denitrification. Work is needed to test whether split application or delayed application increase the effectiveness of N fertilizer.

There is a need to test if high rates of N application are justified on T set soils.

4. TREATMENTS

4.1 N fertilizer rates

N1	100 kg N/ha
N2	130 kg N/ha
N3	160 kg N/ha
N4	190 kg N/ha

4.2 Timing of N application

- a) All fertilizer applied immediately after ratooning
- b) All fertilizer applied two months after ratooning except for a standard amount of 23 kg N/ha applied immediately after ratooning
- c) Split application : 50% after ratooning and 50% two months later.

Note on Treatment

- * Nitrogen as DAP (18% N) was applied at a standard rate of 23 kg N/ha immediately after ratooning. The balance in each N treatment was applied as urea (46% N).
- * Phosphorus as DAP (20% P) and potassium as KCl (50% K) were applied at the rate of 25 kg P/ha and 75 kg K/ha within one week of ratooning.
- * All fertilizers were surface broadcast by hand over the ridge and interrow and followed by irrigation.

5. RESULTS5.1. Harvest DataTable 1 : Cane Yield, Sucrose % Cane and Sucrose Yield

Treatments	T Cane/Ha				% Sucrose				T Sucrose/Ha			
	Sub Plots			Whole Plots	Sub Plots			Whole Plots	Sub Plots			Whole Plots
	a	b	c		a	b	c		a	b	c	
100 kg N/ha	109	112	103	108	17.15	16.84	16.79	16.93	18.8	18.9	17.3	18.3
130 kg N/ha	128	125	122	125	16.69	17.27	17.04	17.00	21.3	21.6	20.7	21.2
160 kg N/ha	125	114	131	123	16.68	16.93	17.02	16.88	20.8	19.3	22.4	20.8
190 kg N/ha	139	107	124	123	16.59	17.08	16.62	16.76	23.1	18.3	20.6	20.7
Mean	125	114	120	120	16.78	17.03	16.87	16.89	21.0	19.5	20.3	20.3
Interaction	NS				NS				NS			
LSD Whole Plots												
005 *	9				0.32				1.4			
001**	13				0.46				2.0			
Significance	*				NS				*			
LSD Sub Plots												
005 *	19				0.41				3.2			
001**	25				0.56				4.3			
Significance	NS				NS				NS			
CV % Whole Plots	11.5				2.9				10.8			
Sub Plots	13.1				2.1				13.5			
SE Whole Plots	14				0.45				2.2			
Sub Plots	16				0.35				2.7			

NOTE: a) All N fertilizer applied immediately after ratooning
b) All N fertilizer applied two months after ratooning
c) Split application

6. COMMENTS

6.1 General

The interaction between rate of N and timing of N application was non-significant.

6.2 Cane Yield

Cane yield increased significantly up to 130 kg N/ha and then levelled off.

Applying all N fertilizer after ratooning tended to give better cane yield than delaying N application for two months. Splitting N gave intermediate cane yield.

6.3 Cane Quality

The effect of the treatments on sucrose content were variable and non-significant.

6.4 Sucrose Yield

Sucrose yield increased significantly up to 130 kg N/ha and then tended to decrease, reflecting the effect of N on cane quality.

Sucrose yield tended to be better when all N was applied after ratooning and poorer when it was delayed for two months. Split application of N tended to give intermediate sucrose yield.

7. DISCUSSION

The rate of N application recommended by SSA on T set soils is 180 kg N/ha . Current rate used at IYSIS is 170 kg N/ha . Table 2 shows that both these rates tend to overestimate the N requirement of the "T" set soils under IYSIS management conditions. The data, however, show considerable seasonal variation in the optimum rate of N. Although 130 kg N/ha was found optimum in three seasons it was also found to be sub-optimal in two other seasons. More information is needed to conduct a proper risk analysis before new rates for the "T" set soils can be recommended.

Table 2 : Optimum Rates of N in Late Season Trials Conducted on T Set Soils at IYSIS

Season	1987	1988	1989	1990	1991
	(1)	(2)	(2)	(2)	(2)
N (kg/ha)	130	160	130	190	130

Note: (1) SE-1; (2) SE-7

Splitting or delaying N application proved no better than applying all the fertilizer after ratooning. These results concur with those obtained in previous late season trials conducted on 'T' set soils.

While it is clear that delaying or splitting the application of N does not increase the effectiveness of the fertilizer, the purchasing of it can be delayed and money on interest be saved. Application of all the fertilizer after ratooning, however, has some practical advantages, particularly in terms of labour requirement and utilization which, when time is limiting, can possibly outweigh the financial gain associated with split or delayed application.

8. CONCLUSION

- * Results of this trial showed that 130 kg N/ha achieved maximum sucrose yield in the late season on this 'T' set soil. This was much lower than the current SSA recommendation of 180 kg N/ha and IYSIS rate of 170 kg N/ha .
- * The N requirement was shown to be seasonally variable. Although 170 kg N/ha is often too high under IYSIS conditions, 130 kg N/ha can equally be too low. More information is needed before a new rate can be recommended.
- * There was no statistical difference in sucrose yield between timings of N application in this trial as well as in previous trials. While delaying application has some financial advantage, it may not always outweigh the ease of management of applying it all after ratooning.

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