

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

6220/1 PHOSPHATE PLACEMENTS/SOIL SAMPLING METHODS TRIAL

Catalogue No.: 1211

Object: To determine the most representative soil sampling methods to assess soil fertility status for fertiliser recommendations.

This crop: Plant Age : 12,0 months (16.10.79 - 17.10.80)

Location: Section 3, field 9A, Hippo Valley Estates

Soil type: P.2 sandy loam derived from gneiss

Design: Randomised blocks, 3 replications

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

Fertiliser: Nitrogen : 140 kg N/ha  
Potassium : Nil  
Phosphate : See treatments

Treatments: Phosphate levels (first digit)

1. 100 kg/ha P<sub>2</sub>O<sub>5</sub>
2. 200 kg/ha P<sub>2</sub>O<sub>5</sub>

Phosphate placement (second digit)

- A. Broadcast over plot after planting and incorporated
- B. In furrow before planting
- C. On cane row 4 weeks after plant/ratoon
- D. Single banding
- E. Double banding

Only treatment B was applied.

CONDUCT

No treatments (other than B) or potassic fertiliser were applied in order to further deplete the P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O status of the trial area so that meaningful responses could be obtained in the first ratoon crop.

RESULTS

Relevant plant crop harvest data, together with foliar analysis results and residual soil P<sub>2</sub>O<sub>5</sub> levels after harvest are presented in the attached tables.

- a. Cane yield. Cane yields were higher than expected and highly variable. Those plots that received phosphate showed a marginal non significant trend towards greater yields compared with the remainder of the plots that received no phosphate.
- b. ERC % cane. Those plots that received phosphate showed a marginal, non significant depression of ERC % cane compared with the untreated plots.

2./ c. TEEC/ha. ...

- c. TERC/ha. The combined effects of the trends in yield and ERC % cane resulted in no response to applied phosphate.
- d. Foliar analysis. Results obtained were not consistent with levels expected from cane growing under potassium and phosphate deficient conditions.
- e. Soil P<sub>2</sub>O<sub>5</sub>. Residual soil P<sub>2</sub>O<sub>5</sub> levels after harvest were higher than hoped, but consistent with yield and foliar levels.

#### CONCLUSIONS

The first ratoon crop will be grown without applied potassium or phosphate in order to further deplete the soil to levels where meaningful responses could be anticipated.

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JJR/Nov. '80.

HARVEST DATAPLANT CROP

TREATMENTS	YIELD t/ha	ERC % cane.	TERC t/ha
No P <sub>2</sub> O <sub>5</sub>	131,45	13,23	17,38
100 "	132,12	12,80	16,92
200 "	138,33	13,02	18,01
Significance	N.S.	N.S.	N.S.
Trial mean	132,21	13,17	17,40
S.E. mean ±	5,45	0,23	0,74
C.V. %	7,14	3,06	7,35

SOIL AND FOLIAR ANALYSIS DATA

TREATMENTS	FOLIAR LEVELS AT ± 22 WEEKS			RESIDUAL SOIL P <sub>2</sub> O <sub>5</sub> (ppm) AFTER HARVEST
	N%	P%	K%	
No P <sub>2</sub> O <sub>5</sub>	1,99	0,22	1,22	11
100 "	1,90	0,24	1,28	15
200 "	1,93	0,22	1,19	9
Mean	1,97	0,22	1,22	11

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Title: PHOSPHATE PLACEMENT/SOIL SAMPLING METHODS  
TRIAL 6220/1

Cat.: 1211

Object : To determine the most representative soil sampling methods to assess soil fertility status for fertiliser recommendations.

This crop : First ratoon. Age : 12,2 months (17.10.80 to 22.10.81)

Location : Section 3, Field 9A, Hippo Valley Estates.

Soil type : P.2 sandy loam derived from gneiss.

Design : Randomised blocks, 3 replications

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

Fertiliser (kg/ha) :

	<u>N</u>	<u>P<sub>2</sub>O<sub>5</sub></u>	<u>K<sub>2</sub>O</u>
P	140	See treats.	Nil
1R	180	Nil	Nil

Treatments : Phosphate levels (first digit)

1. 100 kg P<sub>2</sub>O<sub>5</sub>/ha
2. 200 " " / "

Phosphate placement (second digit)

- A. Broadcast over plot after planting and incorporated.
- B. In furrow before planting
- C. On cane row 4 weeks after plant/ratoon
- D. Single banding
- E. Double banding

Treatment B only was applied to the plant crop. No treatments were applied to the first ratoon crop.

CONDUCT

No treatments, except B to plant crop only, were applied to the plant or first ratoon crops in order to deplete the soil to a level where meaningful responses to applied treatments could be expected.

RESULTS

Relevant first ratoon harvest data, together with foliar analysis results and residual soil P<sub>2</sub>O<sub>5</sub> levels after harvest for plant and first ratoon crops plus trial means are attached. 100 and 200 P<sub>2</sub>O<sub>5</sub> treatments refer to treatment B only, while the no P<sub>2</sub>O<sub>5</sub> treatment refers to the remainder of the trial.

a. Cane yield. The depression of the no P<sub>2</sub>O<sub>5</sub> treatments (which represent 80% of the trial area) resulted in a slight decrease in trial mean yield from plant to first ratoon. There were no statistical yield effects, although there was a trend towards increased yield with increased P<sub>2</sub>O<sub>5</sub> application. The yield data confirms the very poor establishment of the plant crop, which suffered from extreme weed competition and erratic germination.

- b. ERC % cane. There were no significant treatment effects.
- c. TERC/ha. As a result of the lack of quality effects, TERC data followed the same trends exhibited by the yield data.
- d. Foliar analysis. The foliar data generally were not consistent with a deficient situation although there was a trend towards reduced P uptake in the first ratoon crop.
- e. Soil P2O5. Residual soil P2O5 after the first ratoon harvest indicated a more uniform phosphate status, at a level which should cause a yield reduction in the second ratoon crop.

#### CONCLUSIONS

The second ratoon crop will be grown without applied potassium or phosphate in order to continue the uniform depletion of the trial area, with the intention of applying treatments to the third ratoon crop.

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JJR/Jan '82.

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6220/1 PHOSPHATE PLACEMENT/SOIL SAMPLING METHODS TRIALHARVEST DATA

Treatments (kg/ha)	Cane yield (t/ha)			ERC % cane			TERC (t/ha)		
	P	LR	Mean	P	LR	Mean	P	LR	Mean
No P <sub>2</sub> O <sub>5</sub>	131,45	128,37	129,91	13,23	13,92	13,58	17,38	17,88	17,63
100 P <sub>2</sub> O <sub>5</sub>	132,12	133,83	132,98	12,80	14,20	13,50	16,92	18,99	17,96
200 P <sub>2</sub> O <sub>5</sub>	138,33	140,16	139,25	13,02	13,61	13,32	18,01	19,09	18,55
Significance	N.S.	N.S.	-	N.S.	N.S.	-	N.S.	N.S.	-
Trial mean	132,21	130,09	131,15	13,17	13,92	13,55	17,40	18,11	17,76
S.E. mean ±	5,45	4,91	-	0,23	0,19	-	0,74	0,75	-
C.V.%	7,14	6,11	-	3,06	2,26	-	7,35	6,82	-

FOLIAR DATA (DMB basis at ± 22 weeks)

Treatments (kg/ha)	N%			P%			K%		
	P	LR	Mean	P	LR	Mean	P	LR	Mean
No P <sub>2</sub> O <sub>5</sub>	1,99	1,95	1,97	0,22	0,21	0,21	1,22	1,21	1,22
100 P <sub>2</sub> O <sub>5</sub>	1,90	1,85	1,88	0,24	0,21	0,22	1,28	1,05	1,16
200 P <sub>2</sub> O <sub>5</sub>	1,93	2,04	1,99	0,22	0,22	0,22	1,19	1,16	1,17
Mean	1,97	1,95	1,96	0,22	0,21	0,21	1,22	1,19	1,21

SOIL DATA : Residual P<sub>2</sub>O<sub>5</sub> after harvest (Resin extract)

Treatments (kg/ha)	P <sub>2</sub> O <sub>5</sub> ppm		
	P	LR	Mean
No P <sub>2</sub> O <sub>5</sub>	11	12	12
100 P <sub>2</sub> O <sub>5</sub>	15	13	14
200 P <sub>2</sub> O <sub>5</sub>	9	12	11
Mean	11	12	12