

SOUTH AFRICAN SUGAR ASSOCIATION

AGRONOMISTS' ASSOCIATION

Code: HW188/79

Cat. No.: 1299

TITLE: Cane germination and growth in trays

1. Particulars of project

<u>This crop</u>	: Plant cane				
<u>Site</u>	: Mount Edgecombe			<u>Age:</u> 2,4 months	
<u>Region</u>	: N. Coast Coastal				
<u>Soil system</u>	: Various			<u>Dates:</u> 14 Sept. 1979 - 26 Nov. 1979	
<u>Soil form/series</u>	: Various				
<u>Design</u>	: Random plots			<u>Irrigation:</u> By hand 135 ml/day/pot	
<u>Variety</u>	: NCo 376				
<u>Fertilizer (kg/ha):</u>	<u>N</u>	<u>P</u>	<u>K</u>	<u>Soil series</u>	<u>Clay content (approx.)</u>
Shorrocks	150	30	150	Shorrocks	53%
Clansthal	300	60	300	Clansthal	2%
Waldene	300	60	300	Waldene	8%

2. Objectives

To investigate possible causes for poor and variable germination and growth of cane in the trays which are used in the phytotoxicity traysite trials.

3. Treatments

Standard treatment consisted of:

Shallow trays (100 mm deep x 300 mm x 300 mm).

Eight one eyed cane setts planted at 5 cm depth.

Setts pre-germinated for three days under moist hessian.

Temik nematicide applied at 0,36 g/tray in Clansthal and Waldene soils. This was applied and lightly incorporated at the same depth as planting.

Fertilizer 14,2 g/tray of 5.1.5(42) in sand trays and

7,2 g/tray in clay trays also applied and

lightly incorporated at planting depth.

Nutrient solution applied once per week to emerged cane foliage.

Water applied once a day at 135 ml/tray.

Cane setts treated with Benlate fungicide at 0,75 g/l.

Alternative treatments of:

Deep trays ( $\pm$  200 mm deep x 200 mm x 400 mm) instead of shallow trays.

Cane setts planted at 8 cm instead of 5 cm depth.

Setts treated with Panocrine (2 ml/l) instead of Benlate.

Setts treated with Aretan (3 g/l) instead of Benlate.

Soil of Waldene or Clansthal series not treated with Temik.

Waldene series soil covered with a trash mulch.

Trays raised off the ground to allow freer drainage and to prevent possible absorption from wet patches on the floor.

Cane setts planted without pre-germination under hessian.

#### Experimental

Cane growth was measured by means of stalk height measurements and total shoot counts. Germination counts were taken 24 days after planting. Fresh mass of above-ground foliage was measured 2,4 months after planting.

#### Results

1. Mean yield (fresh mass g/plot) and crop characteristics are presented in Table 1.
2. Mean effects of planting depth and tray depth are presented in Table 2.

Table 1 Mean yield and plant characteristics at harvest

Treatment		No. setts germ/ tray	Shoot height (cm)	Shoot No.	Fresh mass (g)
Deep trays 5 cm plant depth	Clay	7	13,8	11,5*	158,5
Deep trays 8 cm plant depth	Clay	5,5	12,7	8,8	139,5
Shallow trays 5 cm depth	Clay	7,5	13,7	9,5	135,3
Shallow trays 8 cm plant depth	Clay	5,8	12,2	7,3	116,5
Standard treatment	Clay	6,3	13,9	7,3	116,5
Raised trays	Clay	7,5	11,8	8,0	126,8
Panoctine dip	Clay	7,5	13,1	9,8	150,8
Aretan dip	Clay	7,3	15,5	8,5	170,8*
No pre-germ. Good setts	Clay	3,3	10,7°	4,5	67,0
No pre-germination - Benlate dip - poor setts	Clay	0,75	10,6°°	5,8	34,5°°
Deep trays 5 cm plant depth	Sand	6,5	15,0	16,3**	290,0**
Deep trays 8 cm plant depth	Sand	7,8	16,1	11,8	321,8**
Shallow trays 5 cm plant depth	Sand	5,5	14,3°	11,0	174,8
Shallow trays 8 cm plant depth	Sand	6	14,0°	11,8	179,1
Standard treatment	Sand	7	16,8	10,0	186,8
Raised trays	Sand	7	15,5	10,5	179,3
Temik	Waldene soil	7,5	15,6	12,3	208,5
No Temik	Waldene soil	7	15,3	10,5	175,0
No mulch	Waldene soil	7,5	16,5	12,0	239,3*
Mulch	Waldene soil	7,5	15,2	12,3	245,3*
No pre-germination - good setts	Sand	4,8	14,0°	9,5	101,3°°
Temik	Clansthal soil	7,3	16,8	21,0**	185,8
No Temik	Clansthal soil	7	14,1°	16,8**	197,8
C.V.%			11,8	23,1	21,1
L.S.D. (0,05)			2,379	3,496	50,57
L.S.D. (0,01)			3,167	4,654	67,33
No fumigation		7,5	-	-	205
Fumigation with methyl bromide		7,5	-	-	294

\* Statistically significant increase 5% level

\*\* Statistically significant increase 1% level

° Statistically significant decrease 5% level

°° Statistically significant decrease 1% level

Table 2 Mean effects of planting depth and tray depth

Soil type	Tray & planting depth	Fresh mass Mean (g)
Combined sand and clay	Deep trays	227
	Shallow trays	151
	5 cm plant depth	190
	8 cm plant depth	189
Sand	5 cm plant depth	232
	8 cm plant depth	250
Clay	5 cm plant	147
	8 cm plant depth	128

Comments

No of setts germinated

1. Planting sett directly without pre-germination had severe adverse effects on sett germination.
2. Planting setts at 8 cm depth was slightly worse than at 5 cm depth in clay soil.

Shoot height

1. Shorter shoots resulted where no pre-germination was practised, in shallow trays with sand and in Clansthal soil without Temik.

Shoot numbers

1. 5 cm planting depth in both sandy and clay soils with deep trays appeared to benefit the production of tillers.
2. Clansthal sand (with and without Temik) pots also resulted in a greater number of tillers.

Fresh mass

1. Statistically significant reductions in fresh mass were evident from pots in which setts were planted without pre-germination.
2. Statistically significant increases in fresh mass resulted in the pots with Waldene soil where Temik had been applied, in the pots with clay soil where Aretan dip was used and in pots with sandy soil where deep trays and Temik were used.
3. Fumigation with Methyl bromide was beneficial.

### Mean effects of planting depth and tray depth

1. Deep trays were superior to shallow trays in both soil types.
2. Planting depth had varying effects in the different soil types. In clay soils shallow planting was superior while in sand deep planting was better.

### General

Although a level of statistical significance was not reached in all comparisons a number of trends were apparent from the results; these are:

### Clay soil

1. 5 cm planting depth is superior to 8 cm.
2. Aretan and Panocline fungicides are both superior to Benlate.
3. Pre-germination of setts showed great benefit.
4. Selected setts were superior to unselected setts.
5. Deep trays were superior to shallow trays.

### Sand soil

1. 8 cm planting depth is superior to 5 cm in deep trays.
2. Deep trays are superior to shallow trays.
3. Pre-germination of setts showed a marked beneficial effect.
4. No advantage was noticed due to raising trays off the concrete or to the addition of a mulch.
5. A slight advantage occurred due to Temik on a Waldene soil but stalk heights and counts were stimulated by Temik on the Clansthal sand.

### Conclusions

1. Pre-germination is essential for uniformity in pot trials such as described.
2. Other factors such as use of deep trays, correct planting depth for sand or clay soils, fumigation, the use of nematicide, and possibly the use of fungicides other than Benlate could improve uniformity and growth in such tray experiments.

PETT/VSJ  
3 August 1982