

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

8210/15 Frost Damage Trial

Catalogue: 1181

Object: To determine the effect of simulated frost i.e. sub-zero temperatures in a cold room on the rate of deterioration of NCo 376.

Details: Location : ZRSA Experiment Station.
Soil Type : PE.1 sandy clay loam in 3 250 cm² asbestos pots.
Planted : 31:12:1979.
Variety : NCo 376
Spacing : Pots placed next to each other in rows 1,5 m apart.
Officer responsible : R.J. Haslam.

Statistical: Design : Randomised blocks, 3 treatments in 6 replications.
Plot size : 12 pots.
Sample size : One stalk from each pot at each time of sampling.

Fertiliser: Pre-planting - 20g single superphosphate mixed in the top 10 cm of soil in each pot.
Nitrogen broadcast at least weekly in sufficient quantities to ensure rapid uninterrupted growth.
Potassium chloride broadcast in light applications once a fortnight during the period of rapid stalk elongation.

Treatments: Sub-zero temperatures

1. Control
2. -2°C for 2 hours
3. -2°C for 4 hours

Conduct:

- (a) 2 one-eyed cane setts to be planted in each pot on stands outside.
- (b) Pots to be watered daily when necessary and nutrients to be applied at weekly intervals to ensure uninterrupted growth. Stalks to be supported to prevent lodging.
- (c) Plants to be placed in the cold room in the late afternoon and temperatures thermostatically controlled to drop to $\pm 2^{\circ}\text{C}$ by early the following morning, when the thermostats will be reset to drop the temperatures to -2°C . The time when the temperature drops to -2°C to be recorded and temperatures to be maintained at -2°C for the prescribed duration.
- (d) After sub-zero temperatures have been superimposed, pots to be placed again on the stands outside.
- (e) At sampling one stalk from each pot to be cut off at ground level in each pot in each plot i.e. 12 stalks, 9 stalks randomly selected for frost injury parameters and sugar content and the remaining three stalks for dry mass.

(f) Samples to be taken immediately before simulating frost and at two weekly intervals thereafter up to 10 weeks after superimposing simulated frost.

Records :

1. Numbers of green leaves
2. Deaths of apical buds and the position of dead lateral buds.
3. Numbers of dead internodes.
4. Numbers of discoloured nodes i.e. infected.
5. Fresh mass of stalks for both sucrose and dry mass samples.
6. Stalk juice quality.
7. Dry mass of sub-samples.

RJH/FEB.80.