

## SUGAR/SOIL TREATMENTS AND CARBON DIOXIDE

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The use of a sugar solution to avert phytotoxicity in soils high in salts or ammonium nitrogen has become a common practice. A solution of one pound sucrose per 10 gallons of water will reduce a salt reading of 125 (mhos  $\times 10^{-5}$ ; 1:2 v/v extraction) to below 100 overnight. (Koths & Linville, 1969)

This has been attributed to several factors. (1) The microbial population multiplies rapidly, incorporating the salts (especially nitrogen) in their bodies making the concentration of salts in the soil solution lower. (2) The energy supplied to the roots by the sugar may render them less susceptible to the salt effect. (3) Although sucrose raises the osmotic concentration of the soil solution, specific ion effects may be ameliorated.

Now, another possible explanation may be added. Dr. H. Z. Enoch (1973, 1978) has reported that carbon dioxide enrichment of the atmosphere will change the salt tolerance of certain crops. Sugar treatment of the soil produced considerable  $\text{CO}_2$  while reducing  $\text{O}_2$  (Koths & Allard, 1979). Perhaps this additional  $\text{CO}_2$  will assist in reducing soluble salt phytotoxicity.

One might conjecture that  $\text{CO}_2$  enrichment of the atmosphere has a direct effect upon the roots. The increase in atmospheric  $\text{CO}_2$  will increase the  $\text{CO}_2$  in the soil atmosphere and in the soil solution. If it is this increase that reduces soluble

salt phytotoxicity, the CO<sub>2</sub> from microbial respiration due to the sugar would have a direct effect upon the root through the activity of the rhizosphere microflora.

#### REFERENCES

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