ABSTRACT

RESPONSE OF TWO BANANA CULTIVARS TO SOIL SALINITY

One of the major problems facing agriculture in Jamaica at present is the shortage of water, salinzations of coastal plains and increased salinity of many aquifers. For successful agriculture on soils containing moderate amounts of salt, it is necessary to select crop cultivars which will produce satisfactory yields when grown under saline conditions. Banana is one of the major crops for the home markets as a staple diet, and is an important foreign exchange earner as an export crop.

Field and greenhouse experiments were conducted to study the responses of two cultivars of bananas to soil salinity. Plants grown on saline soils developed necrotic leaves with scorching at the tips and browning and drying of the margins, giving the leaf blades a burnt appearance. This was accompanied by stunting, reduced psuedostem girth, leaf areas and dry matter production as well as a decrease in the rate of elongation of the

'cigar leaf'. These symptoms were mainly due to ion imbalance rather than to deficiency of potassium.

The high degree of correlation between the different growth parameters makes it possible to use non-destructive and easy-to-measure methods for the response of the banana plants to soil salinity status.

Plants growing on saline soils must undergo some sort of osmotic adjustment. In order to do so, plants reacted to soil salinity by lowering the water and osmotic potentials of their tissues. Osmotic adjustment was achieved in the '*Robusta*' cultivar to a large extent by the accumulation of sodium ions, whereas in the '*Grande Naine*' cultivar this was achieved mainly by the accumulation of sugars and free amino acids within the plant tissues.

The water potential of the leaves of cv. '*Grande Naine*' decreased with the increase in soil salinity, while that of the leaves of cv. '*Robusta*' did not change, indicating that '*Robusta*' plants were able to adjust their cell osmoticum to maintain their water potential status better than the '*Grande Naine*' plants.

Plants of the '*Robusta*' cultivar appeared to be more tolerant to soil salinity than those of the '*Grande Naine*' cultivar. Soils containing 0.025% or less NaCl salinity were beneficial to the growth of the '*Robusta*' plants, whereas the same caused a reduction in the growth of the '*Grande Naine*' plants. Growth of both cultivars on soils containing 0.2% NaCl and over was greatly inhibited. However, plants of the two cultivars could endure irrigation with brackish water of low salinities (0.4% sodium) with EC of 4.5 dS/m without much reduction in their growth.