

PHYSIOLOGICAL STUDIES ON SALT TOLERANCE OF TWO BANANA CULTIVARS
3- EFFECT OF SALT STRESS AND FOLIAR SPRAY WITH SOME NUTRIENT ELEMENTS ON LEAF ANATOMICAL STRUCTURE
 BY

Abd El-Latif, F.M.*; Faten H.M. Ismaeil** and Hala I. Sherif*

* Hort. Dept., Fac. of Agric. Moshtohor, Benha Univ., Egypt.

** Agric. Botany Dept., Fac. of Agric. Moshtohor, Benha Univ., Egypt.

ABSTRACT

The present investigation was carried out during 2006 experimental season in the greenhouse of the Horticulture Research Station at El-Kanater Qalyoubia Governorate on 3 months old banana plants of Williams and Grand Nain cvs. In this experiment, it was aimed to investigate the possibility of decreasing the depressive effect of using saline solution for irrigation of two banana cultivars under study through foliar spray with the three nutrient elements i.e., P, K and Zn. Taking into consideration that salt stressed banana plants were irrigated with 3000 ppm saline solution of SAR 6 and/or lower/higher Cl:SO₄ ratio.

Leaf structures of saline stressed Williams and Grand Nain banana plants (irrigated with 3000 ppm saline solution of 6 SAR) were investigated regarding their response to P, K and Zn foliar sprays under lower or higher Cl:SO₄. Thickness of cuticle and epidermis layers of both lower and upper leaf surfaces; mesophyll (palisade & spongy tissues), fiber (upper and lower the vascular bundle), phloem & xylem tissues and diameter of widest xylem vessel in the vascular bundle were the investigated leaf anatomical characteristics.

The obtained results showed that:

- 1- Salinity increased thickness of both cuticle and epidermis layers of two leaf surfaces as well as palisade tissue thickness. However, spongy tissue thickness and two elements of vascular bundle i.e. phloem and xylem rows, as well as fiber tissue especially of lower bundles and diameter of xylem vessels in vascular bundle were decreased in salt stressed banana plants of two banana cvs. as compared to the analogous ones of tap water irrigated plants (control).
- 2- Any of P, K or Zn sprayed solution succeeded at variable degree to alleviate the harmful effect of salinity stress occurred in leaf anatomical character. Herein, thickness of (cuticle & epidermis layers) of two leaf surfaces and palisade tissue were obviously decreased as compared to the corresponding ones of unsprayed salt stressed plants for two banana cultivars. However, spongy tissue and xylem rows in vascular bundle were decreased. Such trends were true with variable degrees of differences exhibited in rate of response that depended mainly on concerned anatomical characters, sprayed element and banana cultivar leaf.

From obtained results of the present three papers (1- effect of salt concentration, sodium adsorption ratio and chloride level in irrigation water on growth and chemical constituents, 2- effect of sodium adsorption ratio (SAR), chloride level in irrigation water and foliar spray with some minerals on growth and chemical constituents and 3- effect of salt stress and foliar spray with some nutrient elements on leaf anatomical structure of two banana cultivars) it could be recommended for nursery men that under shortage of available fresh water that saline solution of relatively lower level of salt concentration (2000 ppm), SAR 3 and Cl:SO₄ could be safely used for