

Research Paper :

## Micronutrient status of micropropagated banana (*Musa paradisiaca* L) orchards of Marathwada

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### ABSTRACT

Soil sample of 0-30 cm depths and leaf samples from the bud differentiation stage were collected from the 31 micropropagated banana orchards of Marathwada region of Maharashtra to study the micronutrient status. The analysis of soil revealed that the orchard soils were sufficient in DTPA extractable Zn, Cu, Fe and Mn and leaf analysis indicated deficient to sufficient in range. The pH had the negative correlation with available Fe and Mn and positively correlated with Zn, Cu, organic carbon positively correlated with Zn, Cu, Fe and Mn. The leaf micronutrient concentration non significantly correlated with soil micronutrient cation.

**Key words :** DTPA extractable soil micronutrient cation, Leaf micronutrient concentration, Soil properties, Micropropagated banana

India rank first in banana production and third in area under fruit crops. Banana is cultivated in wide area from 30° N to 30° S of the equator. The nutrient demand of banana is more as it remove huge quantity of nutrients from soil for its growth and development. The availability of micronutrients to plant is control by their total amounts present in the soil in which they occur. Most of the soils of Maharashtra are deficient, in India widespread deficiencies of Zn, Cu, Fe and Mn are associate with specific soil properties and cropping system (Takkar, 1996). The emerging micronutrient deficiencies of banana affect its productivity. In view of the several reports on micronutrients deficiency in Indian soils and crops, projection on micronutrients need has become crucial. The information available on Marathwada micropropagated banana orchards micronutrient reserves is very meager. Hence, an attempt was made to assess the micronutrient cation (Zn, Cu, Fe and Mn) reserves of the micropropagated banana orchards of Marathwada region of Maharashtra and their relationships among soil properties and leaf nutrient concentration.

### MATERIALS AND METHODS

Soil and leaf samples were collected from the 31 micropropagated banana (*Musa paradisiaca* L) orchards from the three districts of Maharashtra during the year 2007-08. From each orchard leaf samples were taken from bud differentiation stage. The middle half strip of banana both sides of midrib taken halfway along third youngest leaf from apex (Bhargava and Reddy, 1992). Soil samples were taken from 0-30 depths with soil auger

within the canopy of the same trees.

The leaf samples were hand washed with tap water to remove the foreign materials rinsed in distilled water and dipped in 0.2% detergent and N/10 HCl and finally with double distilled water. The washed leaves were dried in oven at 70°C, powdered and kept in polythene wares. Air-dried soil samples were crushed and sieved through 20 mesh sieve. Soil pH, EC, organic carbon and calcium carbonate were determined by standard procedures. The available micronutrient cation (Zn, Cu, Fe and Mn) were extracted with DTPA- CaCl<sub>2</sub>- TEA solution of pH 7.3 (Lindsay and Norvell, 1978). In the extracted micronutrient were determined by AAS. The leaf micronutrient cation were determined in HNO<sub>3</sub>: HClO<sub>4</sub> (9:4) digested samples by AAS (Jackson, 1973).

### RESULTS AND DISCUSSION

The important soil properties of the micropropagated banana orchards are given in Table 1. The pH varied from 7.70 to 8.20, EC 0.09 to 0.27 dSm<sup>-1</sup>, organic carbon 1.20 to 8.60 gKg<sup>-1</sup> and calcium carbonate 12 to 97 gKg<sup>-1</sup>. The high organic carbon in the banana orchards is the results of decomposition of banana leaves in the field. The soil P<sup>H</sup> is almost constant and alkaline in nature, the Marathwada regions soils is generally calcareous in nature contain high amount of CaCO<sub>3</sub> (Table1). Almost similar results were reported by Malewar *et al.* (1978) in Marathwada region soil.

### DTPA- micronutrient in the orchards soils:

The DTPA- extractable Zn, Cu, Fe and Mn varied