

## **Studies on soil separates of district Unnao (Uttar Pradesh) and status of certain micro nutrients**

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### **ABSTRACT**

Five soil association of Unnao viz., clay loam, clay loam (Halomorphic), sandy clay loam, sandy loam and sandy loam (Calcimorphic) showed the texture of silt + clay with a range of 43.20 to 48.80, 51.10 to 56.25, 55.29 to 61.78, 40.30 to 46.27 and 40.57 to 45.95 per cent, respectively. Available zinc in Unnao soils varied from 0.20 to 2.0 ppm with a mean of 0.92 ppm. It was maximum in clay loam (Halomorphic). The iron status ranged from 4.00 to 20.19 with a mean of 10.84 ppm. Its highest availability was under clay loam (12.07 ppm) and lowest being in sandy clay loam (9.16 ppm). Available copper and manganese varied from 0.15 to 8.20 and 1.50 to 14.20 ppm with the mean of 2.57 and 5.1 ppm, respectively. Clay loam and sandy loam (Calcimorphic) exhibited maximum values in respective micro nutrients.

**Key words :** Soil properties, Zn, Fe, Cu, Mn.

Nutrients both macro and micro are being removed continuously by the crops depleting the soil fertility. The role of micro nutrients in crop production is significant though required in traces. Among these zinc, iron, copper and manganese are relatively more important. Zinc regulates the consumption of sugars influencing the growth and development of crops (Singh and Rajhans, 1996). Iron is involved in whole series of respiratory enzyme and photosynthetic reactions (Mehta *et al.*, 2005). Copper promotes the formation of vitamin 'A' (Singh *et al.*, 2003). Manganese regulates plant growth particularly in oxidation reduction process and decarboxylation and hydrolysis reactions (Mukhopadhyaya and Das, 2001).

Since the crops are utilizing micro elements year after year and generations after generations without adding traces of them, therefore, it becomes imperative to determine their existing status in the soil so that a balanced nutritional programme may be chalked out.

### **MATERIALS AND METHODS**

District Unnao is a part of lower doab lying by the side of river Ganga. Based on top sequence regime and relevant properties five soil associations viz.: clay loam, clay loam (Halomorphic), sandy clay loam, sandy loam and sandy loam (Calcimorphic) have been identified. Soil samples were collected randomly from different villages of extension blocks of district Unnao from cultivators' field and analysed chemically.

Available Zinc, Iron, Copper and Manganese were

extracted with DTPA (Diethylene Triamine Penta Acetic Acid) solution and were determined by the method of Lindsay and Norvell (1978). The pH of soil samples was measured in 1:2.5 soil: distilled water suspension by Bechman pH meter using glass electrode. Organic matter was determined by Walkley and Black's rapid titration method (Piper, 1966). Mechanical separates were estimated by routine method.

### **RESULTS AND DISCUSSION**

The texture of clay loam had silt + clay content between 43.20-48.80 per cent with a mean of 45.14 per cent pH. CaCO<sub>3</sub> and organic carbon ranged from 7.2-8.3, 1.1-2.1 per cent and 0.45-0.92 per cent, respectively with the corresponding mean values of 7.45, 1.67 per cent and 0.67 per cent (Table 1).

Clay loam (Halomorphic) had silt + clay content between 51.10 to 56.25 per cent, the mean value being 53.24 per cent. The soil pH and percentage of CaCO<sub>3</sub> and Organic Carbon ranged between 7.1 to 7.9, 0.49 to 1.25 per cent and 0.25 to 0.51, respectively with the corresponding mean values of 7.3, 0.87 per cent and 0.37 per cent.

Sandy clay loam soil showed silt + clay contents varying between 55.29 to 61.78 per cent with the mean of 58.18. The soil pH, CaCO<sub>3</sub> per cent and organic carbon per cent varied between 7.2 to 8.3, 2.35 to 3.60 and 0.32 to 0.65, respectively, the corresponding mean values being 7.75, 2.86 and 0.51.

Sandy loam soils of Unnao showed silt + clay per cent content between 40.30 to 46.27 with a mean of