NUTRITIONAL STATUS OF THE SOILS AND LEAVES OF SUGAR BEET CROP GROWN ON THE FARMER'S FIELDS IN PESHAWAR VALLEY

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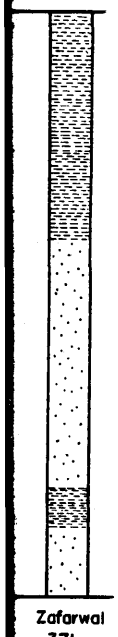
ABSTRACT

Thirty-eight paired samples of soil and sugar beet leaves were collected during 1987, from farmer's fields of Charsadda and Mardan tehsils which are predominant sugarbeet growing areas of Peshawar Valley. These samples were analysed for their major and minor nutrient element concentrations. Soil samples were also analysed for their physio-chemical characteristics. Correlation studies were also made between various nutrient values.

The data showed that the majority of the soils were deficient in N and phosphorus while adequate in potash, DTPA extractable Cu, Fe and Mn were adequate in all soils except 8 where only Fe content was marginal. Zinc content of the soil was deficient at 3 sites while adequate in the rest. Iron was deficient in two leaf samples and Mn in one while Cu and Zn were adequate in all leaf samples.

Copper content of the soil was positively correlated with organic matter, phosphorus and lime. Iron had positively significant correlation with pH and organic matter. Manganese had positive and significant correlation with pH and negatively significant correlation with lime content of the soil. Zinc had positively significant correlation with phosphorus.



INTRODUCTION

Micronutrients play a vital role in plant-nutrition and are essential for various enzymatic reactions and metabolic processes. For example, Fe, Cu and Mn are acting as catalyst in the oxidation reduction reactions in plants.

Zinc and Mn take part in plant metabolism. Mn is also essential for nitrogen fixation and protein synthesis. Zn is considered essential for growth hormones and Cu is needed in respiration and iron utilization in plants. Sugarbeet exhibits sensitivity to the application of Cu-

Studies on the micronutrient status reveal that there are areas where one or more trace elements are deficient and these are required for normal crop production. Ihsan (1986) studied micronutrient status of Mardan soils and reported that DTPA extractable Zn, Cu, Fe and Mn ranged from 0.63 to 1.99, 1.56 to 4.90, 5.39 to 32.01 and 14.08 to 44.90 ppm, respectively. Bangash (1983) analysed various soil series of Peshawar Valley and cited the contents of available Cu, Mn, Fe and Zn which ranged from 0.22 to 3,94, 4.13 to 12.00, 5.65 to 77.63 and 0.82 to 2.23 ppm, respectively.

Plant analysis is generally considered a more reliable diagnostic tool than soil analysis for micronutrients because it represent the actual uptake of a nutrient by the plant and truly reflects the vigor and health of the growing plant. Jones (1964) reported that Cu and Mn concentrations of sugar beet leaf blades were about two times, Zn three times and Fe concentration four times that found in the petioles. Neubert et al. (1969) gave Fe concentration ranges for some 24 crops from deficiency to high with some toxicity values. In general, when Fe values are 50 ppm or less in the dry matter, deficiency is likely to occur; the sufficiency range seems to be from 50 to 250 ppm. Schmehl and Humbert (1964) reported that in sugar beet deficiency symptoms were apparent if the above ground parts of the plant contained less than 20 ppm Mn in blade. Rosell and Ulrich (1964) reported the range of Zn concentration in sugar beet blades, showing deficiency symptoms, at 2-13 ppm. Jones (1972) stated that normal range for Cu concentration of plant tissue is about 5-20 ppm. When the Cu concentration in plants is less than 4 ppm in the dry matter, deficiencies are likely to occur.

The plant available contents of these nutrients are affected by climate, soil texture and structure, redox potential, clay contents, organic matter, lime, pH and presence of other metallic ions etc. Follet and Lindsay