

Studies on forms of Potassium and Nutrients status of soil in central and Eastern Vidarbha region of Maharashtra

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Forms of potassium, nutrients status and their interrelationship with total and available nutrient were investigated in forty-five soil samples representing fourteen profiles from five districts (Typic Haplusterts) of Central and Western Vidarbha region of Maharashtra. The available, water soluble, exchangeable, non exchangeable and lattice K contributed 1.97, 0.12, 1.88, 11.25 and 86.76 per cent towards total soil K in the given soils. The soils of Wardha, Nagpur, Chandrapur and Bhandara districts were slightly calcareous neutral to alkaline in reaction and the soils of Gondia district was non calcareous and slightly acidic in reaction. The Central Vidarbha soils are clay in texture having high CEC and organic carbon content. Where as the soils of Eastern Vidarbha is clay loam, sandy clay loam, low in CEC and organic carbon content. No definite trend was observed in the forms of potassium except exchangeable and available K they are decreased with increase in depth. The available K, exchangeable K, total K and lattice K, influenced by total N ($r=0.3268^*$, $r=0.3122^*$, $r=0.2950$, $r=0.3079^*$) respectively. The available K and exchangeable K is also affected by available N ($r=0.9784^{**}$, $r=0.9773^{**}$) respectively, in Vidarbha region. In Central Vidarbha available and exchangeable K influenced by total and available N respectively. In eastern Vidarbha the available K and exchangeable K influenced by total S and available N.

Key words : Forms of soil K, Soil depth, Relationship with total and Available nutrients.

INTRODUCTION

Soil potassium is believed to exist in dynamic equilibrium in four forms, viz... water soluble, exchangeable, non-exchangeable and lattice K, of which the first two are important for the growth of higher plants and microbes. The various forms of potassium in soil exist in equilibrium with one another and depletion of one form is replenished by other forms (Chandel *et al.*, 1976). The release of K from a soil depends on the interaction of soil properties and thus, all the forms of this nutrient present in soil and relationships with soil nutrients. Studies were carried out on these aspects in typic haplusterts of Central and Eastern Vidarbha Region of Maharashtra.

MATERIALS AND METHODS

The fourteen soil profiles were collected from Central and Eastern Vidarbha region. Eight profile samples were collected from Nagpur, two from Wardha, two from Chandrapur, one each from Bhandara and Gondia district as per the procedure laid down by Piper (1996). The soil samples were analysed for their particle size distribution by international pipette method, calcium carbonate and exchangeable K by standard method of Piper (1996) pH, EC (1:2.5), organic carbon, CEC, Total N, available P, K

and S by the procedure of Jackson (1967). Available N estimated by Subbiah and Asija (1956) total P and K estimated by Hesse (1971), total S by Chopra and Kanwar (1976), non exchangeable K by Wood and De Turk (1941), water soluble K determined by Dhawan *et al.*, (1968) and lattice K by Ranganathan and Satyanarayana (1980). Statistical analysis involved simple correlations between forms of potassium and soil properties as per the procedure of Panse and Sukhatme (1978).

RESULTS AND DISCUSSION

Total and available major nutrient status of soil:

The results showed the higher availability of total N,P,K and S (Table 1) in all the profiles. The total N,P,K and S ranged from 0.022-0.103, 0.011-0.090, 0.2250.90 and 0.0109-0.084 per cent. The availability of total N,P,K and S decreases with an increase in depth of the soil. This might be related to the higher values of organic form of these nutrients in this layer. The results are in conformity with Trivedi *et al.*, (2000). In Central and Eastern Vidarbha there is no trend of increase or decrease of total N,P,K and S except total P and S in Central Vidarbha it is consistently decreased with increase in depth. The alkaline permanganate extractable N in surface and subsurface of soil ranged from 218.4-430.08 and 100.8-378.06 kg ha⁻¹.

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