

Research Paper :

Micronutrient cation studies of some paddy growing soils of Kashmir

SHAKEEL AHAMAD SHAH AND S. GH. JEELANI ANDRABI

Accepted : July, 2009

ABSTRACT

A study on some paddy growing soils of Kashmir at different altitudes was carried from April 2007 –April 2009. Micronutrients or minor elements are required in very small quantities usually less than a pound per acre per year. Most micronutrient deficiencies are not wide spread but once they occur they result in plant abnormalities, reduced growth or crop failure. Toxicities can also occur since several of these elements have rather narrow range between deficiency and toxicity levels. Once harmful levels have been established the problem is more difficult to correct than a deficiency. The importance of micronutrients cations *viz.* Zn, Cu, Mn and Fe to agricultural crop is well recognized but the information in the major soil groups of Kashmir is lacking. Such information would be useful in ascertaining the current deficiencies/sufficiency of micronutrients. The micronutrient cations are relatively present in adequate amounts in nearly all the soils, yet their availability presents a problem in many soils. The physico chemical properties and micronutrient status of the soils was determined and the correlation between physico chemical properties and available micronutrients and the correlation of micronutrient cations with the contents in plants were determined. The results revealed that the soils were generally acidic to neutral in reaction with medium to high organic carbon content. Moreover, the results revealed that the soils are rich in available Zn, Cu, Mn and Fe content while the plant analysis revealed that the nutrients were present in adequate quantity.

See end of the article for authors' affiliations

Correspondence to :

**S. GH. JEELANI
ANDRABI**

National Institute of
Technology, SRINAGAR
(J.&K.) INDIA

Key words : Soils of Kashmir, Micronutrient cations Zn, Cu, Mn and Fe

The micronutrients are essential for the proper biochemical transformations within the plant body, so as to yield the desired end products, Zn is essential for protein and auxin production, copper is a constituent of cytochrome oxidase, iron helps in photosynthesis while Mn is essential for photosynthesis, carbon assimilation and nitrogen metabolism. Thus every micronutrient has a specific role in physiological functioning.

The micronutrient status in paddy growing soils of Kashmir is not well known. The high yielding varieties of paddy are grown with the application of fertilizers without the supplement of the micronutrients. Some work has been reported about the Kashmir soils which is too meager. Jalali *et al.* (1989) reported Zn deficiency in some Karewa soils.

MATERIALS AND METHODS

The detailed soil survey was carried in rice growing soils of Kashmir and after extensive field survey twelve different sites representing all the three soil agro climatic groups were identified for sampling. Four composite soil surface samples (0-15cm) were collected from each of the soil groups *i.e.* lower plains, mid altitude and high altitude. The soil samples were air dried and processed for laboratory investigations. Soils were analyzed for

pH(1:2.5) electrical conductivity (1:2.5), organic carbon, total nitrogen and available N, P and K contents following standard methods (Jackson, 1973). The micronutrients Zn, Cu, Mn and Fe were determined by atomic absorption spectroscopy (AAS) method.

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Physico chemical properties :

The soils characteristics are present in Table 1, 2 and 3. The texture of low, mid and high altitude soils was clay loam, silty clay loam and silt loam, respectively with relatively higher content of clay in mid altitude soils than low and high altitude soils which can be attributed to their alluvial nature and possibly due to the formation of clay humus complexes. Similar observations were reported by Jalali *et al.* (1989) while working on Kashmir soils.

The soil reaction was slightly acidic in high altitude soils, neutral in mid and low altitude soils. This variation in pH could be attributed to variation in organic matter content and rainfall distribution. The results are in consistence with findings of Mukshi (1994).

The electrical conductivity in the three physiographic