

Plenary Address II

Microbial Mediated Sulfur, Silica, Phosphorous and Nutrients to the Plants for Sustainable Agriculture in Dry Lands

Anandham, R.

*Department of Agricultural Microbiology, Agricultural College and Research Institute, Madurai
625 104, Tamil Nadu Agricultural University, Tamil Nadu, India.*

anandhamranga@gmail.com

Abstract

Sulfur (S) is increasingly being recognized as the fourth major plant nutrient after nitrogen, phosphorus and potassium. It is a constituent of amino acids cysteine and methionine, which act as a precursor for the synthesis of all other compounds containing reduced sulfur (Scherer, 2001). Sulfur is essential for both plant and animal life. Although the element is required by plants in amounts comparable to phosphorus, the first field case of sulfur deficiency was reported only in 1933. In wetland rice, sulfur deficiency was first reported in 1938. During the last 10 years, sulfur deficiency has been recognized as an important growth-limiting factor for both dry land crops and wetland rice. In Asia, sulfur deficiency of wetland rice has been reported in Bangladesh, Burma, India, Indonesia, Japan, Philippines and Sri Lanka. Responses to sulfur have been reported for 23 crops in 40 tropical countries. This occurrence of sulfur deficiencies has been accentuated by the increase in use of low sulfur fertilizers, decrease in use of organic manures, intensive cropping and reduced atmospheric deposition. To alleviate sulfur deficiency, sulfur fertilizers are invariably added to soils, usually in a reduced form, such as elemental sulfur. Use of S oxidizers enhances the rate of natural oxidation of S and speed up the production of sulfates, and makes them available to plants at their critical stages, consequently resulting in increased plant yield.

Forms of Sulfur

The distribution of organic S within a soil profile follows the pattern of organic matter and decreases with depth. Soil organic S can be divided into three fractions: C-bonded S, /non C-bonded S, and the soil biomass. The greater part of total organic S in soils of humid and semiarid regions are present as C-bonded S. Separation of this fraction is