RICE ORANGING DISEASE IN RELATION TO Fe TOXICITY DUE TO Si DEFICIENCY

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ABSTRACT

Rice oranging disease, a physiological disease, occurs on newly reclaimed red soil (oxisol) in Columbia, Indonesia and some other countries. The disease is characterized by a striking orange coloration of the leaves and has been related to nutritional deficiency and mineral toxicity. Fe was considered a toxicity but no evidence has been found. Pot experiments were conducted in the U.S. and China to study the soil factors responsible for oranging disease by chemical analysis of soil solutions, rice leaves and stem saps. In addition, electron probe (EDS) was used to study the element contents and distribution on the root cross section. It was found that the red soil solution had very low Si but high Fe level whereas the reverse was found in the paddy soil solution. Therefore, the former had much lower Si/Fe ration than did the latter. Electron probe revealed that the diseased that the diseased root had much higher Fe in the epidermis and much lower Si in the endodermis when compared with the normal ones, showing Fe toxicity as well as Si deficiency.

It is suggested that rice oranging disease might be related to Fe toxicity due to Si deficiency, thus Si adding for correcting Fe toxicity worth further research.