

RICE RESPONSE TO HIGH SOIL BORON AND ROLE OF CALCIUM IN BORON TOLERANCE OF RICE

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ABSTRACT

In view of potential B toxicity in some soils of Pakistan, pot culture studies were undertaken to investigate rice response to high soil B and the role of Ca in crop tolerance to high soil B. At about 10 mg kg⁻¹ available soil B, rice straw and grain contained about 120 and 12 mg B Kg⁻¹, resulting in 46% and 22% soil, considered high by FAO, straw and grain would be likely to contain 21-75 and 5-9 mg B Kg⁻¹, respectively which could result in 7-13% depression in straw and 4-10% in grain yield. Rice was concluded to be less tolerant but more resistant to high B application than that of wheat. The resistance was attributed to Ca-B interaction in plant and soil while CaCO₃ had no effect on B uptake under low land soil conditions.

INTRODUCTION

Potential B toxicity has been reported in some soils of Pakistan (Sillanpaa, 1982). Resinauer et al. (1973) have indicated B toxicity in soils with > 5 mg B kg⁻¹ and 30 mg B kg⁻¹ in wheat leaves (Chapman, 1966). Elsewhere 129 mg B kg⁻¹ in wheat tissue have been shown to reduce

The experiment was replicated thrice in a completely randomized design. Plants were grown to maturity and grain and straw yields were recorded. Boron in grain and straw was determined by dry ashing plant material and hot water extraction of soil samples and developing colour with azomethine-H (Shanina et al. 1967).

EXPERIMENT 2: A supplementary experiment was conducted at CSIRO, Division of Soils, South Australia in 1984 where local varieties of rice and maize were subjected to various types of salinity along with application of different micronutrients. Here data of dry matter yield and CaCl₂ effect on B uptake has been presented to understand the mechanism of rice resistance of applied B. Boron in plant material was determined after dry ashing, on an inductively coupled plasma optical emission spectrophotometer (Kausar and Cartwright, 1984).