PHOSPHORUS AND ZINC FERTILIZATION OF WHEAT AND RICE

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ABSTRACT

Deficiencies in soil zinc (Zn) may limit yield of rice and wheat in rice tract of the Punjab (Gujranwala and Lahore Divisions). The build-up of phosphorus (P) due to its continuous application could also reduce the plant Zn concentration. Therefore, this three seasons study in randomized complete block (Factorial) design investigates the effects of P and Zn fertilizer on yield of wheat and rice (in rotation) and their concentration in plant tissue to predict the specific P and Zn need of the crops. There were two levels of P (100 and 200 kg P_2O_5 ha^{-1}) and three levels of Zn i.e. 0, 3.5, and 7 for wheat and 0, 5, and 10 kg ha^{-1} for rice. Wheat yield data revealed that Zn addition at the rate of 3.5 kg ha^{-1} improved the grain yield significantly while there was no difference in the yield in treatments receiving 100 and 200 kg P_2O_5 ha^{-1}. A reverse situation was attained in rice where high P (200 kg P_2O_5 ha^{-1}) did increase the paddy yield significantly while Zn at the rate of 5 - 10 kg ha^{-1} was not successful to enhance the yield. The reason was satisfactory levels of soil Zn built-up to 1.6 - 2.8 mg kg^{-1} soil due to residual effect of Zn applied to previous crop i.e. wheat. Yield, tissue concentrations, nutrients (P & Zn) uptake and soil test levels did not show P induced Zn limitation on this alkaline soil. Higher soil test P and Zn values at the harvest of last wheat season were found in the treatment of 7 kg Zn ha^{-1} when applied in combination with 200 kg P_2O_5 ha^{-1} compared to other treatments.