



Yield, profitability, nutrient uptake of wheat and residual soil fertility as influenced by micronutrient nutrition

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Abstract : A field experiment was conducted during *Rabi* season of 2002-03 and 2003-04 at Crop Research Centre of G.B. Pant University of Agriculture and Technology, Pantnagar to study the effect of micronutrient cations on growth, yield, nutrient uptake of wheat and residual soil fertility. Application of ZnSO_4 @ either 10 kg or 5 kg/ha along with recommended NPK dose of 150 kg N+60 kg P_2O_5 +40 kg K_2O /ha showed the best expression reflected through growth and yield attributes as well as yield. The highest grain yield of 46.8 q/ha was obtained by application of ZnSO_4 @ 10 kg/ha along with recommended NPK doses which was about 10.1 per cent more than the grain yield obtained with NPK alone. However, Application of 5 kg ZnSO_4 /ha along with recommended NPK dose produced 46.2 q/ha of grain yield, statistically at par with this treatment. The uptake of nutrients viz., Zn, Fe, Mn and Cu by wheat crop also showed superiority in the treatments having application of respective nutrients. Application of ZnSO_4 @ 10 kg/ha along with NPK also proved economically beneficial as it recorded highest net returns (Rs. 29,065/ha) and B:C ratio (1.61) statistically at par with that of ZnSO_4 @ 5 kg/ha+ NPK. Micronutrients in soil recorded maximum in their respective application along with inorganics. Antagonistic effect of Fe and P and synergistic effect of Cu on Zn availability in soil were remarked. Synergistic effect of Fe on improvement of Mn was noted in soil. Negative correlation between Fe and Cu adversely affected the Cu concentration in soil.

Key Words : Micronutrients, Soil fertility, Uptake, Wheat, Yield

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INTRODUCTION

In India, wheat is considered as one of the most important cereals next to rice. Crop needs micronutrients for optimum production apart from macronutrient fertilization. Wheat crop removes 34-50 g Cu, 232-1219 g Fe, 140-330 g Mn and 66-209 g Zn for producing 20 q grain/ha (Rashid, 1998). Due to imbalanced and intensive use of NPK fertilizers in rice-wheat cropping system has depleted the soil available micronutrient reserve, particularly available Zn, playing a crucial role in various enzymatic and physiological activities of wheat and helps in formation of chlorophyll and auxins and its deficiency, often leads to decline in crop productivity. The efficiency of micronutrients application in increasing wheat yield up to more than 30 per cent has been well documented (Saleque *et al.*, 2006). Hence, management of micronutrients

is necessary for increasing the growth and yield characteristics of wheat. An integrated plant nutrient supply system is recommended for sustainable crop production and maintenance of soil health (Jain and Daharma, 2006). The present investigation was, therefore, undertaken to find out the effect of micronutrient cations on growth, yield, profitability, nutrient uptake by wheat and residual soil fertility status.

MATERIALS AND METHODS

A field experiment was conducted during *Rabi* season of 2002-03 and 2003-04 at Crop Research Centre, G.B. Pant University of Agriculture and Technology, Pantnagar. The soil of the experimental plot was silty clay loam having organic carbon (0.83%), available nitrogen (189.7 kg/ha), available P_2O_5

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