

## Effect of integrated nutrient management (INM) in wheat on soil properties and fertility status

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### ABSTRACT

A field experiment was carried out at research farm of A.S. (P.G.) College, Lakhaoti, Bulandshahr (U.P.) to find out the effect of integrated nutrient management applied to wheat (*Triticum aestivum* L.) on soil properties and fertility status. The result revealed that a significant improvement in soil properties and fertility status was found under treatment ( $T_{20}$ ) comprising of 100% Rec. NPK + Vermicompost + Zinc + PSB. Organic carbon content of soil improved from 3.0 to 4.6 g/kg soil, Bulk density reduced from 1.50 to 1.32 Mg/m<sup>3</sup>, water holding capacity increased from 20.32 to 23.72 %, available N from 197.0 to 219.0 kg ha<sup>-1</sup>, available P from 13.0 to 19.1 kg ha<sup>-1</sup>, available K from 113.0 to 130.4 kg ha<sup>-1</sup> and available Zn from 1.50 to 1.87 mg kg<sup>-1</sup> soil by the integration of organics with inorganics. However, the pH and electrical conductivity of soil were not reflected to a considerable extent.

**Key words :** INM, Wheat, Soil properties, Fertility status.

Application of chemical fertilizers even in balanced amount does not sustain the soil health under continuous cropping where as inclusion of organic manures regulates the removal of nutrients, improve the physico-chemical properties of soil (Satish Chander and Tripathi, 2006). Integrated use of organics, in organics and biofertilizer sources may improve the soil productivity as well physico- chemical properties. Therefore, present investigation was initiated to study the performance of integrated nutrient management on soil properties and fertility status.

### MATERIALS AND METHODS

A field experiment was carried out at the Research Farm of A.S (P.G.) College, Lakhaoti, Bulandshahr (UP) during the *rabi* season of 2005-2006 and 2006-2007 using wheat (PB - 373) as test crop. The soil of the experimental field was well drained, sandy loam, slightly alkaline in reaction (pH 7.8 and 7.6), having E.C. – 0.29 and 0.32 dSm<sup>-1</sup>, organic carbon 2.80 and 3.20g/kg soil, Bulk density 1.48 and 1.52 mg/m<sup>3</sup> available nitrogen 196.0 and 198.0 kg/ha<sup>-1</sup>, available phosphorous 12.0 and 14.0 kg ha<sup>-1</sup>, available potassium 112.0 and 114.0 kg ha<sup>-1</sup> and available zinc 1.40 and 1.61 mg kg<sup>-1</sup> during the respective years. The soil was low in organic carbon and available nitrogen and medium in available P and K. Twenty treatments consisted of two levels of NPK (50% and 100%) alone and in combination with FYM, PSB, Zn and vermicompost were laid out in Randomized Block Design (RBD) with three replications. Nitrogen, phosphorous, potassium and

Zn were applied in the form of urea, DAP, MOP and ZnSO<sub>4</sub> @ 12:60:40:25 kg/ha<sup>-1</sup>, respectively. The whole amount of phosphorous and potassium and half quantity of nitrogen as per treatment were applied at the time of sowing as basal dressing and rest half of nitrogen was applied in two splits as top dressing at CRI and tillering stages. Vermicompost @ 5t/ha and FYM @ 10t/ha were applied as basal dressing. Phosphate solubilising bacteria (PSB) was applied as seed treatment @ 100ml per 500 – 600 ml water for 10kg seeds.

### RESULTS AND DISCUSSION

#### *Physico-chemical properties of soil:*

Electrical conductivity and pH of soil reduced under all treatments over its initial status (Table 1) but differences were not upto the level of significance. The maximum reduction in pH and E.C. was noticed under treatments consisting of vermicompost and FYM which might be due to the production of organic acids from decomposition of vermicompost and FYM. The lowest pH (7.1) and E.C. (0.23dSm<sup>-1</sup>) was recorded with  $T_{20}$  (100% NPK+ Vermicompost + PSB +Zn). Bulk density reduced under all treatments over its initial status but the quantity of reduction was more at higher fertility level along with vermicompost and FYM. The treatment  $T_{20}$  (100% Rec. NPK + vermicompost + Zn + PSB) showed maximum reduction in bulk density (1.32 mg/m<sup>3</sup>). Considerable build up in organic carbon was noted in all the treatments having vermicompost and FYM over control. Build up in organic carbon was slightly more under higher fertility level