

Research Paper :

Effect of integrated nutrient management on productivity and nutrient uptake in wheat and soil fertility

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Accepted : August, 2009

ABSTRACT

A field experiment was conducted at the research farm of A.S. (P.G) College, Lakhaoti, Bulandshahr (U.P) to study the effect of INM on productivity and nutrient uptake in wheat and soil fertility. The yield attributes like earhead length (cm), number of grains per earhead and 1000- grains weight (grams) increased by increasing fertility levels from 50% to 100% and with the integration of vermicompost / FYM and PSB with inorganic fertilizers (NPK and Zn) and were recorded highest with the treatment comprised of 100% recommended fertilizer dose plus vermicompost +Zn+PSB. The significantly higher grain and straw yield of wheat (52.75 and 61.65 q/ha, respectively) were recorded with the conjunctive use of vermicompost, PSB and Zn in collaboration with 100% recommended fertilizer dose as compared to its counter part of 50% recommended NPK, whether applied alone or in combination with FYM, PSB, Zn and vermicompost (VC). Significant improvement owing to appropriate combination of NPK, VC/FYM, Zn and PSB was observed for the nutrient uptake by the crop and the maximum nutrient uptake was noticed due to 100% RFD of NPK + VC +Zn +PSB and minimum with control. The maximum fertility status in terms of available N, P, K and Zn after the harvest of crop as (231.0, 18.5, 130.6 kg/ha and 1.64 mg/kg, respectively) was recorded with treatment T₂₀ comprised of 100% recommended NPK + VC + Zn + PSB.

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Key words : Wheat, INM, Productivity, Nutrient uptake, Soil fertility

Wheat (*Triticum aestivum*) is the world's most widely cultivated food grain crop. In India, it is second staple food crop next to rice. Lack of manuring and balanced fertilization is one of the most important causes of low yield. Integrating chemical fertilizers with organic manures has been found to be quite promising not only in maintaining higher productivity but also in providing greater stability in crop production (Nambiar and Abrol, 1992). Considering these facts, the present study was carried out under field condition taking wheat as a test crop to develop an appropriate integrated nutrient management package for sustainable production of wheat and to study the status of available nutrients in soil.

MATERIALS AND METHODS

A field experiment was conducted at the research farm of A.S. (P.G) College, Lakhaoti, Bulandshahr (U.P.) during the *rabi* season of 2005-06 and 2006-07 using wheat (PBW-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⁻¹, Organic carbon – 2.80 and 3.20g/kg soil, available nitrogen -196.0 and 198.0kg/ha, available phosphorous- 12.0 and 14.0kg/ha, available potassium - 112.0 and 114.0kg/ha, available zinc-1.40 and 1.61mg/kg

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 VC/FYM, PSB and Zn along with one absolute control, were laid out in Randomized Block Design (RBD) and replicated thrice. Nitrogen, phosphorous, potassium and zinc were applied in the form of urea, diammonium phosphate, muriate of potash and zinc sulphate @ 120:60:40:25, respectively. The whole quantity of phosphorus 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 of water for 10kg seeds.

RESULTS AND DISCUSSION

Increasing the level of NPK caused an increment in yield attributes *viz.*, earhead length (cm), number of grains per earhead and 1000 - grains weight (grams) (Table 1). These parameters were by and large affected to the same extent when subjected to INM involving FYM + PSB +