

Research
Paper

Effect of fertilizer nutrients and FYM on rice crop and soil fertility in long term rice based cropping system

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ABSTRACT

Field experiment was conducted at crop research centre, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttaranchal, India to find out the effect of fertilizer nutrients and FYM on rice crop and soil fertility in long term rice based crop system. 14 different treatment combinations were tested in randomized block design with 4 replications. The full nutrient treatments (NPK) had significant bearing on growth as well as on yield contributing characteristics. While the imbalanced fertilizer use *i.e.* N, NK, NP, PK reduced growth significantly as compared to balanced fertilizer treatments. The panicle number was adversely affected mainly due to lack of N, followed by P, whereas the total number of spikelets/panicle and grain weight/ panicle were adversely affected in the control where no fertilizer was used. The highest level of rice productivity (7.2 t/ha grain) was obtained with NPK +FYM treatment, whereas the lower yields were obtained with imbalanced use of fertilizer (e.g. N alone, PK, NK and NP etc). Even in the conventional recommended dose of NPK and NPK + Zn the yields were lower as compared to NPK + FYM or NPK + FYM + Zn. Application of individual nutrients (N, P and K) increased their concentration both in grain and straw. The uptake of these nutrients was increased with N application both in grain and straw. The treatments containing FYM had low values of soil pH. Productivity and fertility status were highest with balanced application of fertilizer along with FYM.

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The fertility problem cannot be solved merely by supplying of plant nutrients but their efficient management also has to be given due consideration. Long term field experiments can be used for precise monitoring of changes in soil properties and soil productivity (Sheeba and Kumarasamy, 2001). Long term manorial experiments were conducted in India and in the world. These experiments showed a declining trend in crop productivity and soil fertility under modern intensive farming, particularly when rice based (cereal- cereal) cropping pattern was followed with imbalanced fertilizer use (Nambiar and Abrol, 1989). Long term fertility trial showed a decline in rice yield even after applying recommended dose of fertilizers. Such decline in yield was more apparent when wheat was grown after rice (Swarup and Ganeshamurthy, 1998). One of the reasons of this reported declining yield trend in rice-wheat system might be due to soil sickness, as both the crops were extensive feeder of nutrients. Keeping these in view, an attempt has been made to study the effect of fertilizer nutrients and FYM on rice crop and soil fertility

in long term rice based cropping system.

RESEARCH PROCEDURE

The experiment was conducted at the crop research centre of the G.B. Pant University of Agriculture and Technology, Pantnagar, Uttaranchal during *Kharif* season of 2000 to study the effect of fertilizer nutrients and FYM on rice crop (Variety Pant Dhan 4) and soil fertility in long term rice based cropping system. This was a part of long term fertility experiment being conducted since 1984. The experiment was laid out in a Randomized Block Design (RBD) having fourteen (14) treatment combinations and four (4) replications. At initial period the soil of the experimental site was silty loam in texture and neutral to slightly alkaline in reaction (pH = 7.9) having higher organic carbon (1.2%). The rice variety (Pant Dhan 4) was transplanted maintaining a spacing of 20 cm x 15 cm. Fertilizer doses per hectare were N means 120 kg/ha, P and K mean 40 kg P₂O₅ /ha and 40 kg K₂O/ha,