

Effect of organic manures Nitrogen and Zinc fertilization on growth, yield, yield attributes and quality of rice (*Oryza sativa* L.)

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SUMMARY

A field experiment was conducted during *kharif* season of 2003 and 2004 at J.V. College, Baraut, U.P., to study the effect of organic manures and fertilizer treatments on growth, yield and yield attribute of rice (*Oryza sativa* L.). Application of organic manures significantly influenced the growth, yield and yield attributes of rice (*Oryza sativa* L.). Application of organic manures significantly influenced the growth, yield and yield attributes of rice during both the years of experimentation. However, the organic manures viz., FYM, PM and FYM + PM, did not show marked variation among themselves. Each unit increase in N levels led to significant increase in growth, yield and yield attributing characters of rice up to 80 kg N/ha over control during the study. The maximum mean grain yield (45.4 q/ha) was recorded with NPZn treatment. Over the years, incorporation of FYM, PM and FYM + PM registered and Zinc application along with N in both the years of study significantly increased grain yield of rice over 40 kg N/ha and in pooled analysis also. Fertilizer treatment NPZn recorded the highest protein content during both the seasons.

Key words : Rice, Nitrogen, Poultry manure, Farmyard manure, Yield, Yield attributes protein.

Rice production has to be increased at a much faster rate to feed the burgeoning population, as it is a main cereal crop of India. India has made great strides in the production of rice and has created large potential for further increase in production. Due to increasing population pressure, the demands of food grains are rapidly increasing. The present food grains situation is very comfortable, but to meet the future demand we would need better planning and resource management. India will need about 260-264 million metric tones of food grains to provide adequate nutrition to 1.35 billion people by 2020 AD against the limitation of expanding of cultivable land area. The only way out to this goal is raising crop productivity level through the use of some organic sources of plant nutrients with chemical fertilizers. This can help for sustainable development and to avoid chemicalised farming (Ghosh, 2000 and Sarkar, 2001). Hence, the present investigation was undertaken to study the effects of organic manures (FYM, PM and FYM + PM) and N-fertilization on growth yield and yield attributes of rice.

MATERIALS AND METHODS

The field experiment was conducted during the *kharif* season of 2003 and 2004 at the research farm of J.V. College, Baraut, U.P. The soil was sandy clay loam, having pH 7.3 (Soil : solution ratio 1 : 2.5), organic carbon 0.54%, total kjeldahl N 0.058% and 22.8 and 270.40 kg/ha available P and K respectively. The treatments comprised 4 organic manures (No organic manure, farmyard manure, poultry manure and farmyard manure + poultry manure) and 6 fertilizer levels (0, 40, 80, 120 kg N, N 120 P 60 and N 120 P 60 Zn 25 kg/ha). The experiment was laid out in split plot design, keeping the organic manures in the main plot and fertilizer treatments in subplots, using 3 replication. FYM, PM and

FYM + PM were applied @ the rate of 10.0, 3.0 and 5.0 + 1.5 tonnes / ha, respectively. Seedlings of 27 days of 'Pusa Basmati-1' rice were transplanted, keeping 2 seedling / hill on 13 and 11 July in 2003 and 2004 under puddle conditions. All organics were applied on dry weight basis 3 weeks before transplanting. The N content in 2 organic manures was analysed 0.50 and 1.81% in FYM and PM respectively. The nitrogen treatments were imposed in 2 equal splits, half at the time of transplanting and the remaining half at 35 DAT. Entire amount of P and ZnSO₄ were applied at the time of transplanting. The sources of N, P and Zn were prilled urea, single super phosphate and zinc sulphate respectively. Plant samples were collected at different stages of crop growth and over-dried at 65°C till constant weight. The plant height was measured at harvest from base of the plant to the tip of the top most leaves. The rice crop was harvested in the second week of November in both the years and grain yield was reported at 14% moisture. The gross and net plot size was 5m × 3m and 4m × 2.5m, respectively. Five plants were randomly selected for yield attributes i.e., spike length, number of grains per spike and 1000-grain weight were determined. Crude protein content in grains was obtained by multiplying the percentage of nitrogen with a factor 5.95 (Juliano et al., 1973). Statistical analysis of data was carried out using standard analysis of variance (Cochran and Cox, 1957). The significance was tested by 't' test and critical difference (CD P = 0.05) was calculated to compare the differences of treatment means.

RESULTS AND DISCUSSION

Growth attributes

Incorporation of organic manures markedly improve the plant height at the time of harvest and other growth attributing characters, viz. Dry matter production and leaf area index. However, number of tillers/hill did not influence due to organic manures (Table-1). The organic manures

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