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Influence of integrated nutrient management practices on dry matter production yield and NPK uptake of wet seeded rice

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ABSTRACT

To find out the influence of different integrated nutrient management practices on dry matter production, yield and nutrient uptake, the field experiment was conducted during *Rabi* season (Oct. – Jan.) of 2001 -02 at wetland of Central farm, Agricultural College and Research Institute, TNAU, Killikulam (8º 48' N 77º42' E and 40m AMSL). The experiment was laid out in randomized block design and replicated thrice. Eight integrated nutrient management practices viz., presowing of *Sesbania* @ 50 kg ha^{-1} and *in situ* incorporation at 45 DAS + 150: 50: 50 kg NPK ha^{-1}, presowing of *Sesbania* @ 75 kg ha^{-1} and *in situ* incorporation at 45 DAS + 112.5:37.5: 37.5 kg NPK ha^{-1}, intercropping of *Sesbania* in rice @ 25 kg ha^{-1} and *in situ* incorporation at 40 DAS + 150: 50: 50 kg NPK ha^{-1} , intercropping of *Sesbania* in rice @ 75 kg and *in situ* incorporation at 40 DAS + 112.5:37.5: 37.5 kg NPK ha^{-1}, GLM @ 6.25 t ha^{-1} + 150: 50: 50 kg NPK ha^{-1}, GLM @ 9.38 t ha^{-1} + 112.5:37.5: 37.5 kg NPK ha^{-1}, FYM @ 12.5 t ha^{-1} + 150: 50: 50 kg NPK ha^{-1}, FYM @ 18.75 t ha^{-1} + 112.5:37.5: 37.5 kg NPK ha^{-1} and two levels of inorganic NPK alone i.e., 150: 50: 50 kg NPK, 112.5:37.5: 37.5 kg NPK ha^{-1} and control (no manure) was adopted. The treatment receiving FYM @ 12.5 t ha^{-1} + 150: 50: 50 kg NPK ha^{-1} registered significantly the higher dry matter production viz., 2528, 6307, 8369 and 10902 kg ha^{-1} respectively at tillering, panicle initiation, flowering and at harvest stage. Grain yield (5538 kg ha^{-1}), straw yield (8693 kg ha^{-1}) and NPK uptake at all the stages and maximum uptake (154.24: 24.84: 171.60 kg ha^{-1}) was recorded at harvest stage in treatment received 12.5 t ha^{-1} of FYM with 100 % recommended NPK level. Application of inorganic NPK alone @ 100 % level (150: 50: 50 kg ha^{-1}) recorded the lower amount of grain yield (4382 kg ha^{-1}) straw yield (7373 kg ha^{-1}) and NPK uptake at harvest stage (140.45:22.11:151.58 kg ha^{-1}) than all the integrated nutrient management practices. However 100 % inorganic NPK alone (150: 50: 50 kg NPK ha^{-1}) recorded significantly higher amount of rice yield and nutrient uptake than 75 % recommended NPK (112.5:37.5: 37.5 kg ha^{-1}) alone and control.

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The total yield of rice, the 'Global grain' grown in 89 nations is almost 518 million tones every year and it is the stable food for more than half of the global population. In India it occupies about 44.6 million hectares with a production of 86.0 million tones and it continues to hold the key to sustainable food production by contributing 20 -25 % of agriculture GDP and assuring food security in India for the half the total population (Anonymous, 2002) By 2025, population level may reach as high as 150 crores in our country and there is an urgent need to increase the food production to nearly 450 MT to meet the growing demand. Among the major food crops, rice feeds more than half the people in the India, but not well and not for much longer (Thiyagarajan, 2002). The situation calls for profound improvements in the rice packages of practices such as integrate crop management, integrated nutrient management and the applicability of various sustainable farming technologies are crucial in attaining this goal (Uphoff, 2003). To achieve this target, nutrient deficiency status of rice growing belt and adoption of imbalanced nutrient management practices were major constraints to tap the full productivity potential of the rice. At the same time, in view of increasing nutrient demand, escalating prices of inorganic fertilizer and their possible degradation of cultivable soil health and hazardous to environment, warrants the need for judicious use of chemical fertilizer (Fauci and Dick, 1994; Fageria, 1994). There is immense need to exploit the alternate source of nutrients viz., organic manure, use of legumes in crop rotation and bio fertilizer to sustain the productivity with more environment friendly nutrient management system (Fageria and Baligar, 1997).

The supplementary and complementary use of organic manures improves the soil physical, chemical and