

## Rice productivity and nutrient uptake studies in wet seeded rice under integrated nutrient management practices

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(Accepted : December, 2006)

### SUMMARY

A field experiment was conducted during *Rabi* season (Oct. – Jan.) of 2001–02 at wetland of Central Farm, Agricultural College and Research Institute, TNAU, Killikulam (8° 48' N 77° 42' E and 40m AMSL) to study the rice productivity and nutrient uptake in wet seeded rice under integrated nutrient management practices. The experiment was executed in randomized block design and replicated thrice. Eight integrated nutrient management practices viz., presowing of *Sesbania* @ 50 kg ha<sup>-1</sup> and *in situ* incorporation at 45 DAS + 150: 50: 50 kg NPK ha<sup>-1</sup>, presowing of *Sesbania* @ 75 kg ha<sup>-1</sup> and *in situ* incorporation at 45 DAS + 112.5:37.5: 37.5 kg NPK ha<sup>-1</sup>, intercropping of *Sesbania* in rice @ 25 kg ha<sup>-1</sup> and *in situ* incorporation at 40 DAS + 150: 50: 50 kg NPK ha<sup>-1</sup>, intercropping of *Sesbania* in rice @ 75 kg and *in situ* incorporation at 40 DAS + 112.5:37.5: 37.5 kg NPK ha<sup>-1</sup>, GLM @ 6.25 t ha<sup>-1</sup> + 150: 50: 50 kg NPK ha<sup>-1</sup>, GLM @ 9.38 t ha<sup>-1</sup> + 112.5:37.5: 37.5 kg NPK ha<sup>-1</sup>, FYM @ 12.5 t ha<sup>-1</sup> + 150: 50: 50 kg NPK ha<sup>-1</sup>, FYM @ 18.75 t ha<sup>-1</sup> + 112.5:37.5: 37.5 kg NPK ha<sup>-1</sup> and two levels of inorganic NPK alone i.e., 150: 50: 50 kg NPK, 112.5:37.5: 37.5 kg NPK ha<sup>-1</sup> and control (no manure) was adopted. The treatment receiving FYM @ 12.5 t ha<sup>-1</sup> + 150: 50: 50 kg NPK ha<sup>-1</sup> registered significantly the higher grain yield (5538 kg ha<sup>-1</sup>), straw yield (8693 kg ha<sup>-1</sup>) and NPK uptake at all the stages and maximum uptake was recorded at harvest stage (154.24: 24.84: 171.60 kg ha<sup>-1</sup>). Application of inorganic NPK alone @ 150: 50: 50 kg ha<sup>-1</sup> recorded the lower amount of grain (4382 kg ha<sup>-1</sup>) and straw (7373 kg ha<sup>-1</sup>) yield and NPK uptake at harvest stage (140.45:22.11:151.58 kg ha<sup>-1</sup>) than all the integrated nutrient management practices. However 100 % inorganic NPK alone (150: 50: 50 kg NPK ha<sup>-1</sup>) recorded significantly higher amount of rice yield and nutrient uptake than 75 % recommended NPK (112.5:37.5: 37.5 kg ha<sup>-1</sup>) alone and control.

Key words: Integrated nutrient management, Inorganic fertilizer, Wet seeded rice, Rice yield, Nutrient uptake.

In India, agriculture progress takes place in geometric mean whereas population growth moves in arithmetic mean. 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 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 soil fertility management and the applicability of various sustainable farming technologies are crucial in attaining this goal (Uphoff, 2003). Nutrient imbalance is one of the major abiotic constraints limiting productivity of 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 chemical fertilizer with organic manures (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; Collins *et al.*, 1992).

The supplementary and complementary use of organic manures improves the soil physical, chemical and biological properties and also improves the use efficiency of applied fertilizer as well as other inputs (Wander *et al.*, 1994; Kalyanasundaram, 1997). Integrated use organic manures, bio fertilizer and chemical fertilizer resulted in higher crop yields, higher uptake of nutrients and enhanced availability of NPK (Singh *et al.*, 1997; Gupta and Gupta, 1997). Therefore, to study the effect of integrated nutrient management on rice productivity and NPK uptake a field investigation was executed by application of organic manures by four sources at two levels along with two levels of inorganic fertilizers to wet seeded (drum seeding) *rabi* (*Pishanam* season) rice grown in Southern parts of Tamil Nadu.

### MATERIALS AND METHODS

A field investigation was carried out during *rabi* season (*Pisahn* rice) of 2001–2002 at wetlands (field number 48 b of 'B' block) of Central farm, Agricultural College and Research Institute, Tamil Nadu Agricultural

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