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Influence of integrated nitrogen management practices on yield attributes, yield and harvest index of wet seeded rice

M. SENTHIVELU* AND A.C. SURYA PRABHA
Department of Agronomy, Tamil Nadu Agricultural University, COIMBATORE (T.N.) INDIA

ABSTRACT

To study the influence of integrated nitrogen management practices on rice yield attributes, yield and harvest index of wet seeded rice, a field investigation was carried out 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). Total of eleven treatments were planned out in randomized block design and replicated thrice. Eight integrated nitrogen management practices viz., four organic manure sources with two levels (100 % and 150 % recommended dose) in combination (100 % organic manures + 100 % inorganic N level and 150 % organic manures + 75 % inorganic N level) with two levels of inorganic nitrogen (100 % and 75 % recommended level) serially, presowing of *Sesbania* @ 50 kg ha^{-1} and *in situ* incorporation at 45 DAS + 150 kg N ha^{-1}, presowing of *Sesbania* @ 75 kg ha^{-1} and *in situ* incorporation at 45 DAS + 112.5 kg N ha^{-1}, intercropping of *Sesbania* in rice @ 25 kg ha^{-1} and *in situ* incorporation at 40 DAS + 150 kg N ha^{-1} , intercropping of *Sesbania* in rice @ 75 kg and *in situ* incorporation at 40 DAS + 112.5 kg N ha^{-1}, GLM @ 6.25 t ha^{-1} + 150 kg N ha^{-1}, GLM @ 9.38 t ha^{-1} + 112.5 kg N ha^{-1}, FYM @ 12.5 t ha^{-1} + 150 kg N ha^{-1}, FYM @ 18.75 t ha^{-1} + 112.5 kg N ha^{-1} and three levels of inorganic N alone i.e., 150, 112.5 and 0 kg ha^{-1} (control) was adopted. The treatment receiving FYM @ 12.5 t ha^{-1} (100 %) + 150 kg N ha^{-1} (100 %) registered significantly the higher number of tillers (545 m^{-2}), number of productive tillers (526 m^{-2}), number of filled grains panicle^{-1}(94.30), test weight (22.2 g),grain yield (5538 kg ha^{-1}) and straw yield (8693kg ha^{-1}) however, there is no difference was observed in harvest index among the N management practices.

Key words : Wet seeded rice, Integrated nitrogen management, Organic sources, Yield attributes, Yield.

INTRODUCTION

Rice feeds more than half the people in the world, but not well and not for much longer. According to the United Nations the demand is expected to rise by a further 38 per cent within 30 years (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). Nitrogen is the predominant nutrient required in the largest amount by crop and especially rice. But nitrogen in soil solution is rapidly lost from the rooting zone through leaching or loss to the atmosphere through a process called denitrification (Balasubramanian and Veerabadran, 1997; Basumatary and Talukdar, 1998). The escalating prices of chemical inputs and it's dangerous to environment urged the scientists to develop alternative remedy practices such as integrated nitrogen management for reducing the nitrate pollution and to improve the rice yield in sustained manner (Fageria and Baligar, 1997). Bulky organic manure with any sources definitely improves the rice productivity (Jose Mathew *et al*.,1993) and the integrated use of organic and inorganic nitrogen can make contribution to increasing and sustaining rice production and reduce the nitrogen loss from the rice ecosystem (Dhane *et al.*,1995). Therefore, to study the influence of integrated nitrogen management practices on rice yield attributes, rice yield and harvest index a field experiment was conducted in wet seeded (drum seeding) rice in *Rabi (Pishanam)* season rice grown in southern parts of Tamil Nadu.

MATERIALS AND METHODS

A field experiment was carried out during *Rabi* season (*Pisahnam* rice) of 2001 -2002 at the wetlands (field number 48 b of 'B' block) of Central farm, Agricultural College and Research Institute, Tamil Nadu Agricultural University, Killikulam (8° 48'N latitude, 77°42' E longitude and 40 m above mean sea level). The soil of the experimental field was moderately deep and sandy clay in texture, with slightly alkaline in reaction (pH 7.6). The soil was of medium status in organic carbon content (0.52 %). With reference to the fertility status of the experimental site, the soil was low in available nitrogen (172 kg ha^{-1}), high in available phosphorus (24 kg ha^{-1}) and medium in available potassium (176 kg ha^{-1}). The eleven treatments comprises, eight integrated N management (four organic manure sources with two levels (100 % and 150 % recommended dose) in combination (100 % organic manures + 100 % inorganic N level and

* Author for correspondence.