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Effect of different system of rice intensification on yield, water requirement and water use efficiency

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ABSTRACT

A field experiment was conducted at Agricultural Research Station, Siruguppa,Karnataka, during the *Kharif*, 2005 to study the influence of age of seedlings under different system of rice intensification. Modified SRI method recorded significantly higher grain yield (6342 kg ha^{-1}) and straw yield (7233 kg ha^{-1}) over normal method of planting (5105 and 6180 kg ha^{-1} grain and straw yield, respectively). In present study water requirement was maximum in normal method of planting (124.96 cm) as compared to SRI methods (84.96 cm). While the water use efficiency was higher in modified SRI method (74.66 kg ha^{-1} cm^{-1}) closely followed by recommended SRI method (73.13 kg ha^{-1} cm^{-1}) which were significantly superior over normal SRI method (40.85 kg ha^{-1} cm^{-1}).

Key words : Rice intensification, Water requirement, Water use efficiency, SRI method

INTRODUCTION

Rice (*Oryza sativa*) is an important food crop of the world. With the growing world population, paddy production has to be increased to 810 million tones by the year 2025 (Rosegrant *et al*.,1995). Similarly Indian rice production has to be stepped up to 140 million tones (Mishra, 2004). Increasing the production and productivity of rice with decreasing land and water resources is a herculean task. Agriculture accounts for 80 per cent of the total water consumption in India and about 60 per cent is consumed by paddy alone. Traditionally flooding method of irrigation is used for growing paddy with 2-3 centimetres of water on the field throughout the growing period. Paddy fields are allowed to dry-up only before the harvesting. This practice of irrigation results in large scale evaporation losses and low water use efficiency. In Karnataka, the crop is being grown over an area of 1.45 million hectare with a production and productivity of 3.72 million tonnes and 2699 kg/ha, respectively (Anonymous, 2002) and the productivity is low when compared to developed countries. Appropriate method of planting together with a suitable high yielding variety should be adopted for commercial cultivation to increase the production and productivity.

MATERIALS AND METHODS

A field experiment was carried out during the *Kharif,* 2005 (one year study) at Agricultural Research Station, Siruguppa. The soil was deep black clay in texture, pH (8.22) and low in electrical conductivity (0.28 ds/m). It was low in available nitrogen (265 kg ha^{-1}), high in available phosphorus (30.5 kg ha^{-1}) and medium in available potassium content (365 kg ha^{-1}). There were 15 treatment combinations comprising of three methods of planting (M_1- Normal method, M_2- Recommended SRI method, M_3- Modified SRI method)as main treatments and five age of seedlings (9, 12, 15, 18 and 21 days) as sub treatments and were laid out in split plot design with three replications. The gross plot size was 4 m x 3 m. IET-16933 was used as test variety. The spacing followed was 20 cm x 10 cm (M_1), 25 cm x 25 cm (M_2 and M_3). The crop received a fertilizer dose of 150:75:75 kg NPK ha^{-1}. Full dose of P_2O_5 and K_2O and 50 per cent of nitrogen was applied at the time of transplanting and remaining 50 per cent of nitrogen was applied in two equal splits at 30 and 55 days after transplanting. All the recommended cultivation practices were followed. The crop was harvested after attaining physiological maturity.

RESULTS AND DISCUSSION

The grain yield of rice was significantly higher with modified SRI method (6342 kg ha^{-1}) followed by recommended SRI method (6213 kg ha^{-1}) over the normal method of planting (5105 kg ha^{-1}). This may be attributed to wider spacing, optimum water and sufficient nutrient in root zone to support the tillering. This inturn helped in conversion of more of tillers into panicles. Thus, owing to the integration of all favourable yield components *viz.* number of grains per panicle, panicle length, test weight,

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