Internat. J. Agric. Sci. Vol.4 No.1 January, 2008 : 165-172

Effect of combine harvested paddy straw management and K levels on growth, growth indices and yield of succeeding rice

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ABSTRACT

Field experiments were conducted during 1999-2000 and 2000-2001 at Agricultural College and Research Institute, Madurai to study the effect of combine harvested paddy straw management and Potassium (K) levels on growth, growth indices, yield attributes and yield of succeeding rice crop. The experiments were laid out in split plot design with three replications. Rice variety ADT 36 was used as test variety. The treatments consist nine main plots *viz.*, combine harvested paddy straw with different microbial inoculants and its combinations. Three levels of potassium were adapted in the sub plots. Among the straw managements, incorporation of combine harvested paddy straw with *Silica Solubilizing Bacteria*, *Trichoderma* and *Pleurotus* along with 100 per cent recommended K recorded higher growth like plant height, number of tillers and Dry matter Production at harvest stage. Growth indices viz., Leaf Area Index (LAI), Leaf Area Duration (LAD), Crop Growth Rate (CGR) and SPAD 502 at active tillering and flowering stages, yield attributes like Days to 50 per cent flowering, number of panicles m^{-2}, panicle length, number of filled grains per panicle were recorded higher values in the above said treatment which in turn positively reflect on rice grain and straw yield. The above said treatment was comparable with application of 75 per cent recommended K resulted to save 25 per cent of the recommended K fertilizer through the straw management with microbial inoculants.

Key words : Combine harvested paddy straw, K levels, Growth, Growth indices, Yield attributes and Yield.

INTRODUCTION

In most of the rice growing areas, rice crop over a large area comes to harvest at a stork, which results in labour shortage. Delay in harvest, increases to shattering loss and also reduces turn around time for taking the next crop. The Tamil Nadu state Department of Agriculture has introduced combine harvester for rice, which is capable of harvesting, threshing, cleaning and packing at a time. The main limitation of combine harvester is leaving the straw in entire field area in chopped form which poses difficulty in collecting the same and feeding it to the cattle. A huge quantity of such rice straw in chopped form has to be burnt in the field which may result in pollution problems and wastage of valuable resources. Hence, an alternate way to utilize the combine harvested paddy straw effectively become essential. The straw can be effectively utilized to supplement the potassium (K) fertilizer as it is rich in K content. In India about 106 million tonnes of rice straw is produced annually and it adds 0.61, 0.27 and 1.76 million tonnes of N, P and K, respectively (Manna and Ganguli, 1998). The present investigation was undertaken to study the effect of combine harvested paddy straw management with K levels on growth, growth indices, yield attributes and yield of succeeding rice.

MATERIALS AND METHODS

Field experiments were carried out at Agricultural College and Research Institute, Madurai during *rabi* season of 1999-2000 and 2000-2001. The soils of the experiments were sandy clay loam. It was rated as low in available Nitrogen (235 kg ha^{-1}), medium Phosphorus (13.5 kg ha^{-1}), high in available Potassium (319 kg ha^{-1}) and Organic carbon content (0.43%) with a pH of 7. The experiments were laid out in split plot design with three replications. Rice variety ADT 36 was used as test variety. The treatments consist of nine main plots *viz.*, combine harvested paddy straw with different microbial inoculants and its combinations. Three levels of 100, 75 and 50 per cent recommended potassium were adapted in the sub plots. The preceding crop of combine harvested paddy straw @ 5.5 t ha^{-1} was *in-situ* incorporated five days before the transplanting of succeeding rice. The microbial

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