

Residual effects of integrated plant nutrients management practices (IPNM) on yield attributes and yield of succeeding black gram and available soil nutrient status

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ABSTRACT

A Field experiment was carried out at Agricultural College and Research Institute, Madurai during 2001 - 2002 to study the residual effect of cotton crop residue management practices and levels of inorganic fertilizer N and K applied to preceding rice on succeeding black gram (*Phaseolus mungo* L.) in rice [*Oryza sativa* (L.)] - black gram (*Phaseolus mungo* L.) cropping system. After harvest of rice, Black gram was sown as residual crop. No inorganic fertilizer was applied to the black gram. The results revealed that incorporation of cotton stalks @ 5 t ha⁻¹ with *Trichoderma viride* to preceding rice crop significantly improved yield attributes (number of pods per plant, number of seeds per pod and 1000 seeds weight) and yield of black gram and soil available nutrient status. Similar improved yield trend and soil available nutrient status was observed in increasing levels of N and K fertilizers applied to rice.

Key words : Cotton crop residue incorporation, Fertilizer levels, Black gram, Soil properties, IPNM.

INTRODUCTION

Rice-black gram is one of the major cropping systems in Tamil Nadu, India. The wider adoption of this system by the farmers is due to its better economic return. Growing high yielding varieties, fertilizer response hybrids and adoption of intensive cultivation resulted in large volume accumulation of crop wastes viz., leaves, twigs, stubbles in our agricultural land. Their disposal is a major problem. But, their effective use in agriculture is limited due to low nutrient content, bulkiness and difficulty in direct application. By proper degradation with appropriate bio-agents the crop residues can be used effectively (Bhudhar and Palaniappan, 1994). Depending on chemical fertilizers alone for increasing production will cause environmental pollution, degradation of soil health. Hence, a judicious combination of organics, crop residues, bio agents and inorganic fertilizer will sustain productivity and maintain soil health. An integrated approach of plant nutrient management will achieve the sustainable productivity.

Application of crop waste to rice crop has exhibited its beneficial effect on the succeeding crops, since crop waste are having substantial residual effect. Incorporation of composted coir pith (5 t ha⁻¹) and rice straw (5 t ha⁻¹) in rice had residual effect of P and K on green gram (Sharma and Mittra, 1991). Incorporation of cane trash at 5 t ha⁻¹ showed considerable residual effect on the succeeding maize due to the improvement in soil

physico-chemical properties of soil and also increased nutrient availability (Srivastava and Omprakash, 1998). Ranganathan and Selvaseelan (1994) reported that mushroom spent rice straw compost could serve as a good reserve of plant nutrient which increased the yield of residual crop of green gram substantially due to enhanced supply of N, Ca and Mg.

The application of wheat straw to rice with inorganic fertilizer has residual effect on subsequent gram, which produced higher grain yield (Babou *et al.*, 2001). The literatures perused indicated that there is better scope for inclusion of bio-inoculants treated crop residue as organic source along with inorganic in rice.

Therefore, investigation on the possibility of utilizing the crop waste as a source of nutrient in combination with or without bio-inoculants and inorganic fertilizer in rice based cropping system was carried out during 2001-2002 at Agricultural College and Research Institute, Madurai, India to find out a suitable and economical methods of black gram cultivation for improving their production potential in the prevalent rice-black gram system, different integrated plant nutrients management methods were compared under field conditions.

MATERIALS AND METHODS

A field experiment was carried out at Agricultural College and Research Institute, Madurai, during 2001-

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