

Effect of organic on paddy-castor cropping system

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ABSTRACT

Two year field investigation was carried out to study the effect of fertilizer (No fertilizer; 75% RDF; 100:30:00NPK kg/ha) and organics (No organics; Sugarcane trash incorporation @ 20t/ha along with decomposing culture treatment; Bio-compost @ 20 t/ha; FYM @ 20 t/ha and in-situ green manuring with dhaincha) on transplanted paddy and its residual effect on succeeding rabi castor. Fertilizer application improves growth, yield attributes and yield of paddy and castor. Applications of organics have positive effect on growth and yield of paddy and have residual effect on castor crop. Application of bio-compost @ 20 t/ha have significantly higher paddy grain yield (4591 kg/ha) which was 1.5 time higher than no organic application. Next effective treatment was in-situ green manuring with dhaincha followed by FYM @ 20 kg/ha. The residual effect of organic on castor in respect of grain yield was higher with bio-compost followed by FYM, Sugarcane trash incorporation and in-situ green manuring. Similar trend was observed in paddy based equivalent yield. Soil organic carbon content was improved after two year of study under organic application plots.

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INTRODUCTION

Intensive agriculture without organics has depleted the inherent soil fertility and productivity leading to deficiency of important plant nutrients. Adequate, supply of nutrients plays an important role for obtaining the high productivity, but the source of nutrient is of prime importance. The soil became seak and unable to convert mineral nutrients in the utilizable form by plant due to reduction in biological activity in soil in absence of organic matter. Several long term experiments all over India indicated a decrease in rice productivity and deterioration of soil health due to continuous and excess use of costliest chemical fertilizers alone. Thus emphasis should be on reducing the use of chemical fertilizers. Integrated nutrient management (INM) has an important role here, owing to practice of combining organics and inorganics constitute an important component of INM and they provide regulated and balanced supply of plant nutrients. Sharma (2002) reported increased yield and nutrient use efficiency in rice with organics. Demand on organically produced farm products increasing with improvement in living standard and awareness of people for health. Nitrogen, the key nutrient element for paddy, is the major constituent of organic sources, which available after decomposition. Organic material degrades in soil as per its C : N ratios. Lower C : N ratio containing materials decomposed fast and released nutrients immediately available to the grouping crops which affect on crop growth and the yield.

The management of organics is considered for

cropping system as a whole rather than for individual crop, because they can not be fully utilized by crop to which these are added and a subsequent crops to which these are added and a substantial amount is left into the soil for subsequent crops (Ali and Misra, 2000). Incorporation of residues as a means of nutrient recycling in the soil-plant ecosystem is an essential component of sustainable productivity in nutrient exhaustive cropping system, as it alters the soil environment which in turn influences the microbial population and activity in the soil and subsequent nutrient transformation (Kumar and Goh, 2000). Application of organic-inorganic combination is very effective in realizing of high yield and high responses to added nutrients, while imbalance use of nutrients has detrimental effect. Incorporation of farm wastes as straw, stalk and bhusa or straw as well as practices of green manuring are viable alternative to FYM and compost for improving soil fertility and sustaining productivity of crops. Organic recycling has generated a higher importance especially in the cereal-based cropping systems. The residual nature of organic sources makes them more value-based for the whole system as compared to individual crops (Sarkar *et al.*, 1997). Multiple cropping and intensive input management is practiced to enhance land-use efficiency and to increase production. Judicious use of chemical fertilizers in combination with organic manures or recycling of crop residues is required to improve the soil health as well as to achieve sustainable production. Hence, the present investigation was carried out to study

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