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CONSERVATION TILLAGE, OPTIMAL WATER AND ORGANIC NUTRIENT SUPPLY ENHANCE SOIL MICROBIAL ACTIVITIES DURING WHEAT (*TRITICUM AESTIVUM L.*) CULTIVATION

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ABSTRACT

The field experiments were conducted on sandy loam soil at New Delhi, during 2007 and 2008 to investigate the effect of conservation tillage, irrigation regimes (sub-optimal, optimal and supra-optimal water regimes), and integrated nutrient management (INM) practices on soil biological parameters in wheat cultivation. The conservation tillage soils has shown significant ($p<0.05$) increase in soil respiration (81.1%), soil microbial biomass carbon (SMBC) (104%) and soil dehydrogenase (DH) (59.2%) compared to the conventional tillage soil. Optimum water supply (3-irrigations) enhanced soil respiration over sub-optimum and supra-optimum irrigations by 13.32% and 79% respectively. Soil dehydrogenase (DH) activity in optimum water regime has also increased by 23.33% and 8.18% respectively over the other two irrigation regimes. Similarly, SMBC has also increased by 12.14% and 27.17% respectively in soil with optimum water supply compared to that of sub-optimum and supra-optimum water regime fields. The maximum increase in soil microbial activities is found when sole organic source (50% Farm Yard Manure+25% biofertilizer+25% Green Manure) has been used in combination with the conservation tillage and the optimum water supply. Study demonstrated that microbial activity could be regulated by tillage, water and nitrogen management in the soil in a sustainable manner.

Key words: Conservation Tillage, Integrated Nutrient Management (INM), Soil Respiration, Soil Microbial Biomass Carbon (SMBC), Dehydrogenase Activity (DH).

INTRODUCTION

India contributes approximately 12% (77.63 mt) of the global wheat (*Triticum aestivum L.*) production (12). It is an input intensive crop, grown on 13% of the cropped area in the Indo-Gangetic plains (IGP). Wheat is cultivated as a component of rice-wheat cropping system (RWCS) in IGP. The majority of Indian soils are low in N and therefore loading of urea (46% N) is practiced. Integrated nutrient management practices and resource conservation technologies are used to enhance crop productivity in sustainable agriculture (19). This has become more important in the wake of global climate

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