# Effect of Conservation Tillage and Crop Residue Management on Soil Physical Properties and Crop Productivity of Wheat


by
V P Chaudhary
Senior Scientist
Indian Institute for Farming Systems Research (ICAR)
Modipuram, Meerut -250 110 (UP)
INDIA
vp_ch@yahoo.co.in

Monalisha Parmanik
Scientist
Indian Institute for Farming Systems Research (ICAR)
Modipuram, Meerut -250 110 (UP)
INDIA

Anurag Patel
ICAR - Indian Institute of Farming Systems Research
Modipuram, Meerut (U.P.) -250110
INDIA



## Abstract

Field experiments were carried out on a sandy loam (Typic -Ustochrept) soil in hot dry semi-arid subtropical climate of Meerut to study the effect of tillage systems and crop residue mulching with fertilizer application doze combination on soil physical properties (aggregate size distribution, mean weight diameter (GMD) and bulk density), chemical properties (soil organic carbon (SOC) and soil microbial biomass carbon (MBC)) and its plant growth parameters and yield continuous wheat (Triticum aestivum L. emend. Fiori & Paol) system during 2008-11. Two tillage systems and four crop residue mulching with recommended doze fertilizer (RDF) combination were factorially combined in a split plot design with three replications and each plot size was 5 length and 4 m width. The tillage systems (main plots) were: no tillage (NT) and conventional tillage (CT), i.e. 4 harrowing +1 tine cultivating and one patella. The rice crop residue used as mulching and fertilizer combination treatments (sub-plots) consisted of four $M_1$ - No mulch + recommended dose of fertilizer (RDF), $M_2$ - Mulch (6 t $ha^{-1}$) + recommended dose of fertilizer (120:60:40 kg NPK) (RDF), $M_3$ - Mulch (0) + 125% recommended dose of fertilizer (RDF), $M_4$ - Mulch (6 t $ha^{-1}$) + 125% recommended dose of fertilizer (RDF). Results revealed that ZT had higher MWDs and lower GMDs than CT at both depths. The MWDs decreased with increase in soil depth for both tillage (T) treatments as well as rice crop residue mulching (M) treatments. The bulk density were not affected significantly ($P < 0.05$) by tillage systems and crop residue mulching × recommended dose of fertilizer (RDF) application at both 0-15 and 15-30 cm soil depth. Tillage system did not influence significantly on SOC at both depths but MBC influenced significantly ($P = 0.05$) at upper depth (0-15 cm). The SOC and MBC were affected significantly ($P = 0.01$) by crop residue mulching with combination of recommended fertilizer application rate at upper depth (0-15 cm) but 15-30 cm, SOC was significantly at $P = 0.05$ but MBC had no significant different. The SOC was significantly higher value in ZT (5.61 $gkg^{-1}$) than CT (4.69 g $kg^{-1}$) at 0-15 cm soil depth. The SOC and MBC were recorded in ordered $M_4>M_2>M_3>M_1$ which had significant difference value at $P = 0.01$.

The zero tillage showed significantly ($P = 0.01$) higher infiltration