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Fate of Fertiliser N Applied to A Guar-Wheat Rotation System as Influenced by Crop Residue Incorporation in A Semi-Arid Vertisol

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Abstract

Guar or cluster bean (*Cyamopsis tetragonoloba*) is an interesting crop adapted to the semi-arid tropics. Nitrogen recovery from inorganic fertiliser in the crop/soil systems was monitored for six seasons in a guar-wheat (*Triticum aestivum*) crop rotation using 10 % ¹⁵N atom excess urea (12,72 kg ha⁻¹). N₁₅ recoveries in wheat straw, wheat head and total recovery were 22.46 %, 15.55 % and 38.01 % , respectively on plots without crop residue removal and 21.16 %, 15.55 %, and 36.71 %, respectively, on plots with crop residue removal. It was observed that continuous incorporation of fertiliser without crop residue removal improved the N recovery with 20.46 % as compared to the application of inorganic fertiliser with crop residue removal. In the 2nd, 3rd, 4th, 5th and 6th crop cycle, incorporation of inorganic fertiliser without crop residue removal increased N retention of the topsoil by 4.6, 10.1, 3.4, 11.9 and 1.6 %, respectively, as compared to the inorganic fertiliser application with crop residue removal.

N derived from fertiliser (N_{dff}) in the seeds or pods through all seasons, except the 2nd season, was higher on plots with crop residue left and the application of inorganic fertiliser then on plots without crop residues and the application of inorganic fertiliser, by 8.98 %, 7.77 %, 33.33 % and 1.37 % for the, 3rd, 4th, 5th and 6th season, respectively. It could be concluded that continuous application of crop residues along with fertilisers improved N recoveries in a guar-wheat rotation.

Keywords: Crop residues, crop rotation, guar, N₁₅, semi arid, wheat