

Tillage and residue management practices affect weed dynamics and wheat grain yield

S.D. Sharma, Samar Singh, Harpal Singh and Sandeep Narwal

Department of Agronomy, CCS Haryana Agricultural University, Regional Research Station, Karnal 132 001 Haryana, India

Summary A field experiment on the effects of different tillage and rice residue management practices on wheat and weed dynamics was conducted at CCS Haryana Agricultural University, Regional Research Station, Uchani, Karnal, India during *Rabi* (Autumn) 2000–01 and 2001–02. The physico-chemical properties of the soil were examined at the start of the experiment. The soil was a clay loam, slightly sodic, having a pH of 9.0, electrical conductivity (EC) of 0.5 dS m⁻¹, 0.48% organic carbon, 10 kg ha⁻¹ (low) available P, 204 kg ha⁻¹ (medium) available K, 1.21 mg g⁻¹ of soil Zn, 5.08 mg g⁻¹ of soil Mn, and 26 mg g⁻¹ of soil Fe.

Seven treatments were laid out in a randomised block design with three replications. They were: T1 removal of straw followed by zero tillage (ZT) sowing; T2 straw chopped and mixed with disc harrows followed by three disc harrowings and drill sowing; T3 straw retained and ZT sowing; T4 straw incorporated with a mould board plough followed by three disc harrowings and drill sowing; T5 straw incorporated with the disc plough followed by three disc harrowings and drill sowing; T6 straw incorporated with the disc harrows followed by three disc harrowings and drill sowing; and T7 straw burning and ZT sowing.

All the residue management treatments were carried out after pre-sowing irrigation. Tillage operations occurred on 15 November 2000 and 12 November 2001

in the respective plots. Straw removal and burning occurred four days before sowing on 2 December 2000 and 2001. The crop was sown with a Pantnagar zero till seed-cum-fertiliser drill between 6 and 7 December 2000 and 7 and 8 December 2001. Wheat (*Triticum aestivum*) var. PBW-373 was sown at a rate of 125 kg ha⁻¹. Each treatment plot was 32 × 6 m.

The density of *Phalaris minor* Retz. 30 days after sowing was highest in plots where straw was incorporated under conventional tillage followed by burned plots under ZT, and was lowest in plots where the straw was retained under ZT.

The density of broadleaf weeds was relatively high in ZT plots compared with the straw incorporated plots. The exception was where straw was retained with ZT sowing during 2001–02.

In 2000–01, straw burning with ZT produced significantly higher grain and straw yields than the other treatments with the exception of where straw was retained with ZT sowing and where straw was incorporated with the disc harrows. In 2001–02, significantly higher grain yield was obtained in plots where straw was retained under ZT. The exception was straw burning under ZT and straw incorporation with the disc harrows.

Keywords Tillage, residue management, wheat, weeds.