

Management of Fresh Wheat Residue for Irrigated Winter Canola Production

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World Class. Face to Face.

Objectives

1. Determine how five different WW residue management practices affect WC health and yield.
2. Determine cause(s) for decline in WC vigor and yield as affected by WW residue management.
3. Test methods to retain WW residue without adversely affecting WC.
4. Disseminate results of research through field days, grower meetings, an extension bulletin, and a scientific journal article.

Treatments

(established on 100+ bushel winter wheat stubble)

1. Burn + disk
2. Mechanical straw removal + disked twice
3. Chop stubble + moldboard plow
4. Burn + direct seed
5. Direct seed into standing stubble

Equipment available at Lind

1. Stubble chopper, 10 ft wide
2. Swather, 12 ft wide
3. Baler
4. Double disk, 10 ft wide
5. Moldboard plow, 4 ft wide
6. Direct-seed drill, Cross slot openers, 8 ft wide
7. Commercial-scale combine
8. Plot combine
9. Solid set irrigation

Theories

1. Straw produces toxic compounds.
2. Decomposing straw immobilizes nitrogen.
3. Excess straw interferes with drill performance.
4. Excess straw keeps soils too wet and cool.
5. Straw shades WC seedlings and interferes with photosynthesis.
6. Straw serves as a food base for soil-borne pathogens, increasing disease, especially for Pythium and Rhizoctonia.







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10/11/2010

Direct seed

Burn + disk

Burn + direct seed

**Mechanical
remove +
direct seed**

04/07/2011

Measurements in Winter Canola

1. Soil water dynamics and water use efficiency
2. Plant stand establishment
3. Rhizoctonia levels in the soil
4. Rhizoctonia AG-8 and AG 2-1 on roots
5. Soil temperature
6. Weed pressure
7. Grain yield
8. Oil content

Laboratory Pot Experiment

- Take Lind soil to the greenhouse.
- Pasteurize half the soil to remove pathogens, leave the other half untreated.
- Three residue treatments: (i) no WW residue, (ii) fresh WW residue mixed with soil, (iii) fresh WW residue on surface only.
- Then plant WC in ½ gallon pots.
- Pot experimental design is a 2 X 3 factorial with five replications.

Hypothesis to be Tested

- If we do not see a WC growth reduction in the pasteurized soil but see a growth reduction in the normal soil, this will prove that soil pathogens or other microbes are responsible for the phenomenon.
- If we see a WC growth reduction in the absence of straw, this will show that straw is not responsible for the problem.
- With normal soil, if there is WC growth reduction with WW residue and not with the no residue added treatment, then planting methods to remove fresh residue from the seed row will be evaluated.

Two-Year Budget

