No-Till Sowing into Standing Irrigated Stubble Instead of Burning

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Treatments

• Three-year rotation of winter wheat-spring barley-winter canola.

• Three residue management methods: Standing stubble, stubble mechanically removed, and stubble burned.

• Continuous annual winter wheat with burn and moldboard plow included as check.

• All treatments are replicated four times.
Irrigated Cropping Systems Plot Map, Lind, 2006 Crop Year

Rep 3

Stubble Burned
1
3
2
4
Rep 4

Stubble Burned & Plowed
1
3
2
Rep 1

Mech. Stubble Removal
1
3
2
Rep 2

Standing Stubble
1
3
2

T 1: Spring Barley
T 2: Spring Canola
T 3: Winter Wheat
T 4: Burn, Plow, Cont. WW
Irrigation

- Fall: six inches of water.
- Spring (after barley is emerged): three inches of water.
- Final: six inches of water applied mid-May to early-June.
- Total Water Applied: fifteen inches
Seeding

• All no-till plots seeded with the Cross-Slot drill

• The burn-plow plots seeded with a conventional disk drill
Fertility

• Total fertilizer per acre: 170 lb. nitrogen, 30 lb phosphorous, and 30 lb sulfur.

• Fall seeded crops: 120 lb nitrogen, with 50 lb nitrogen “top dress” in the spring.

• Spring seeded barley: Total nutrients applied at time of seeding.

• All direct seedings use liquid fertilizer with a dry fertilizer “top dress” (exception – spring barley uses all liquid).

• The conventional burn-plow treatments used only dry fertilizer.
Winter wheat
Barley - burned

Barley - standing stubble
Measurements

- Soil water dynamics
- Root diseases
- Weed ecology
- Soil microbiology
- Grain yield
- Economics
Rat-tail fescue
Oct. 30, 2002  Winter Canola ‘Inca’
Mech. removal

Burned

Standing stubble
Take-all on Winter Wheat, 2003

Continuous, burn-plow

Direct seeded, standing stubble
## Effect of Tillage Treatments on DNA Levels of *Ggt* (Take-all) in Winter Wheat, 2003

<table>
<thead>
<tr>
<th>Tillage Treatment</th>
<th>DNA (pg/g soil)</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burn &amp; Plow</td>
<td>1460 B</td>
<td>high</td>
</tr>
<tr>
<td>Mechanical Stubble Removal</td>
<td>26 A</td>
<td>low</td>
</tr>
<tr>
<td>Stubble Burned</td>
<td>28 A</td>
<td>low</td>
</tr>
<tr>
<td>Standing Stubble</td>
<td>27 A</td>
<td>low</td>
</tr>
</tbody>
</table>

Mean separation with LSD
Organic Matter

OM native soil

Year

BPWW
Burn
Removed
Standing

P≤0.05

Direct Seeding into Irrigated Stubble
Publications


Upcoming

Schillinger et al. Agronomy, weeds, water, grain yields
Kennedy et al. Soil quality
Young et al. Economics
Paulitz et al. Diseases
Lind Field Day
June 2006