Planting Considerations

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No-Till Drill Design

- Fluff-and-plant
  - Coulters
- Slice-and-plant
  - Single disk
  - Double disk
Fluff-and-Plant

- Refers to coulter cart type drills
- Coulters cut residue and till the soil ahead of the openers
- Requires additional down force (weight) for coulters
- Potential crusting if the right conditions exist
Coulters Till and Mix Residue
Residue Condition
Slice-and-Plant

- No coulters (single or double disk openers)
- Openers slice the soil and residue to place seed in the slot
- Slot may reopen in heavy soils if crop is drilled too wet and is not followed by a rain
Changing Soil Moisture
Which Configuration is Best?

• What is the situation?
  – Crop you are planting
  – Previous crop residue

• What type of soil and soil conditions?
  – Texture
  – Moisture

• How you manage seeding depends on which type of drill that you use.

• Long term no-till can be dry on top and very wet at seeding depth.
2003 Drill Study

• Soybeans were drilled into corn and milo stubble at 5 fields in NE Kansas
• Planted on May 14, 15, 22, and 28
• We used 3 drills (Deere 1590, GP 1510P, Sunflower 9412) on 7.5” spacing, the farmer’s planter (30”), and GP twin row
• Four replications at each field
Drill Calibration

We calibrated each metering cup on the fluted feed drills.

Then we knew which row we were on when we counted stands for emergence percentage.
Stand Counts

Emergence vs. Days After Planting

No-till Oklahoma
# Emergence Results

<table>
<thead>
<tr>
<th></th>
<th>Staggenborg</th>
<th>Hofmann</th>
<th>Larson</th>
<th>Kramer</th>
<th>Karl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deere</td>
<td>80(^{a,b})</td>
<td>12.4(^{a,b})</td>
<td>93</td>
<td>11.7(^{a})</td>
<td>96(^{a})</td>
</tr>
<tr>
<td>GP 7.5</td>
<td>81(^{a,b})</td>
<td>11.7(^{b})</td>
<td>95</td>
<td>10.9(^{b})</td>
<td>90(^{a})</td>
</tr>
<tr>
<td>GP TR</td>
<td>75(^{b})</td>
<td>10.4(^{c})</td>
<td>99</td>
<td>11.0(^{a,b})</td>
<td>92(^{a})</td>
</tr>
<tr>
<td>Sunflower</td>
<td>56(^{c})</td>
<td>9.9(^{c})</td>
<td>95</td>
<td>10.4(^{b})</td>
<td>77(^{b})</td>
</tr>
<tr>
<td>SBS</td>
<td>78(^{a,b})</td>
<td>13.5(^{a})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planter</td>
<td>82(^{a})</td>
<td>13.2(^{a})</td>
<td>87</td>
<td>10.2(^{b})</td>
<td>93(^{a})</td>
</tr>
</tbody>
</table>
EP Observations

• Deere either had the greatest EP or was not significantly different than the seeder with the greatest value
• EP for the GP TR was not significantly different than the seeder with the greatest value at 3 of 5 fields
• EP for the planter was not significantly different than the seeder with the greatest value at 3 of 5 field
ERI Observations

• Deere either had the greatest ERI or was not significantly different than the greatest at all fields
• The GP twin row ERI was not significantly different than the seeder with the greatest ERI at 4 fields
• The planter ERI was not significantly different than the seeder with the greatest ERI at 3 fields
## Yield Results

<table>
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<th>Larson</th>
<th>Kramer</th>
<th>Karl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deere</td>
<td>21.2</td>
<td>15.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>14.4</td>
<td>20.5</td>
<td>33.0</td>
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<tr>
<td>GP 7.5</td>
<td>21.5</td>
<td>14.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>14.5</td>
<td>21.8</td>
<td>31.8</td>
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<tr>
<td>GP TR</td>
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<td>16.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>17.3</td>
<td>22.0</td>
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<tr>
<td>Sunflower</td>
<td>23.5</td>
<td>15.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>16.3</td>
<td>21.6</td>
<td>32.8</td>
</tr>
<tr>
<td>Planter</td>
<td>21.6</td>
<td>20.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>17.1</td>
<td>21.4</td>
<td>32.5</td>
</tr>
</tbody>
</table>
Other Observations

• We planted into good soil moisture at every field.
• All fields received rainfall within five days of planting.
• Variation in seeding depth could have influenced results.
• Drills were operated by company reps.
Operating Speed

- Research has shown that seed placement is compromised when planters are operated at higher speeds.
- For wheat, this may not be a major issue.
- Canola, soybeans, and grain sorghum are likely more sensitive to marginal seed placement.
Row Unit Vibration

![Graph showing mean absolute acceleration vs. ground speed (mph). The graph compares JD 1590 and FC 6000 models.]
Depth Control

- In general, depth control has been supplied by press wheels.
- Longer swing arms means less consistent control over rolling terrain.
- Single disk openers with gauge wheels near the seed tube offer some of the best depth control.
- Parallel linkage systems also offer more consistent depth control.
Depth Control

• Down force on the opener can dictate depth control in challenging seeding conditions.
• Opener disk angle and operating speed can also affect depth control by creating upward forces on the seeding unit.
• These forces could also impact seed-soil contact if press wheel pressure is reduced or they lose contact with the soil.
Cutting Residue

- Coulter drills effective cut through crop residue and mix it with soil.
- The ability to cut crop residue increases with disk diameter.
- Increasing down force doesn’t always mean you can cut residue better.
Summary

• The no-till drills that we have today are much better than their predecessors and are approaching row crop planters.
• Adjustment and operation are much more important than design or attachments.
• Think about what you want to accomplish when considering no-till drills.
QUESTIONS