“Getting It Right”

Better Machine Performance | Improved Job Completion | Better Agronomic Decisions

Air Conditioning in the Cab

Smart phones / iPads / Tablets
Guidance technology
Rate controller (VRT)
Yield monitors
Planter Performance

Ability of the planter to:
- Reach target seeding rate.
- Obtain uniform seed spacing.
- Achieve adequate and uniform planting depth without compaction
  - supports immediate germination and uniform emergence.

In-cab Displays
Monitor In-field Performance

Implements field execution & on-farm research
In-cab Display

**Producer Value**
1. Identify and correct equipment issues immediately
2. Execute prescriptions;
3. Verification of seed placement
4. Identify soil characteristics (e.g. clods, trafficked areas)

In-cab Displays
Monitor In-field Performance

*Image courtesy of John Deere*
As-Planted Data

**Producer Value**
1) Identify and correct equipment issues immediately; 2) Execute prescriptions; 3) Identify soil characteristics (e.g. clods, trafficked areas)

Section / Row Control for Planters

**Corn**
- SAVINGS: **4.4%**
- YIELD: **17% less**
- HARVET LOSS: >**6 times higher**

Automatic Section Control Technology for Row Crop Planters (Auburn Extension Publication)
www.aces.edu/pubs/docs/A/ANR-2217/ANR-2217.pdf
Seed Depth = Downforce (DF)

Downforce is what helps us to maintain a uniform seeding depth
- TOO Much DF
  o Compaction
  o Seed placed too deep
- NOT Enough DF
  o Too shallow
  o Risk of seed depth variation

Considering texture and moisture variations, how do you maintain target depth?

Planter Row-Unit

Down Force Options

Mechanical Spring

Active Solutions

Pneumatic

Hydraulic
Active DownForce Technologies

- Soil physical properties vary spatially indicating planter performance could be improved by adjusting planter settings to field spatial variability.
- Seeding depth and downforce management are critical for optimization of planter performance (Hanna et al., 2010).
- Hydraulics provide quicker response and stability.

<table>
<thead>
<tr>
<th>Target Depth (in.)</th>
<th>Downforce TRTS</th>
<th>AVG Depth (in.)</th>
<th>CV Depth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>none</td>
<td>1.84</td>
<td>14.5</td>
</tr>
<tr>
<td>2</td>
<td>optimal</td>
<td>2.20</td>
<td>5.1</td>
</tr>
<tr>
<td>2</td>
<td>heavy</td>
<td>2.28</td>
<td>7.8</td>
</tr>
</tbody>
</table>

Food, Agricultural and Biological Engineering

Shallow Placement

Non-active Downforce

- 2” target depth
- 1.3” placement depth
- Increased depth CV by 13 points
Non-uniform Depth

Seeding Depth CV = 33.5%

2” Target with Active DF
(100 lbs with active downforce)
Uniform Spacing and Emergence

2” Target with Mechanical Springs
(nominal 125 lbs)
Non-Uniform Spacing and Emergence

192 bu/ac
178 bu/ac
Uniform Depth Placement @ Target Depth

- Seed Depth CV = 4% to 8% with active downforce
- 8% increase in Seed Depth CV without active downforce
- 10 bu/ac gain for good seed-to-soil contact
  - Need additional DF margin in dry years
  - Less DF margin in wet years