


2022 Indiana CCA Conference

Precision Technology Considerations to Improve Planter Performance and Crop Emergence

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"the sins of planting will haunt you all season" - anonymous

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Current Planting Trends

- ❑ Timely and uniform emergence is important for maximizing yield potential early in the season.
- ❑ Narrow planting windows due to weather and/or equipment challenges every season.
- ❑ Increased interest in **maximizing planter performance** and efficient with crop inputs (i.e. variable-rate seeding)



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Planting Technology

- *Improved planting feedback*
- *Precise seed metering*
- *Precise seed placement*
- *Vary seeding rates within the field*
- *Plant at higher than nominal speeds*
- *..... & many more*



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Timely and Uniform Stand Establishment

- ✓ Seeding Rate
- ✓ Seed Placement
 - *Seed Spacing*
 - *Seed Depth*
 - *Seed-to-soil contact*



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An Important Planting Technology!

Seed Monitor*

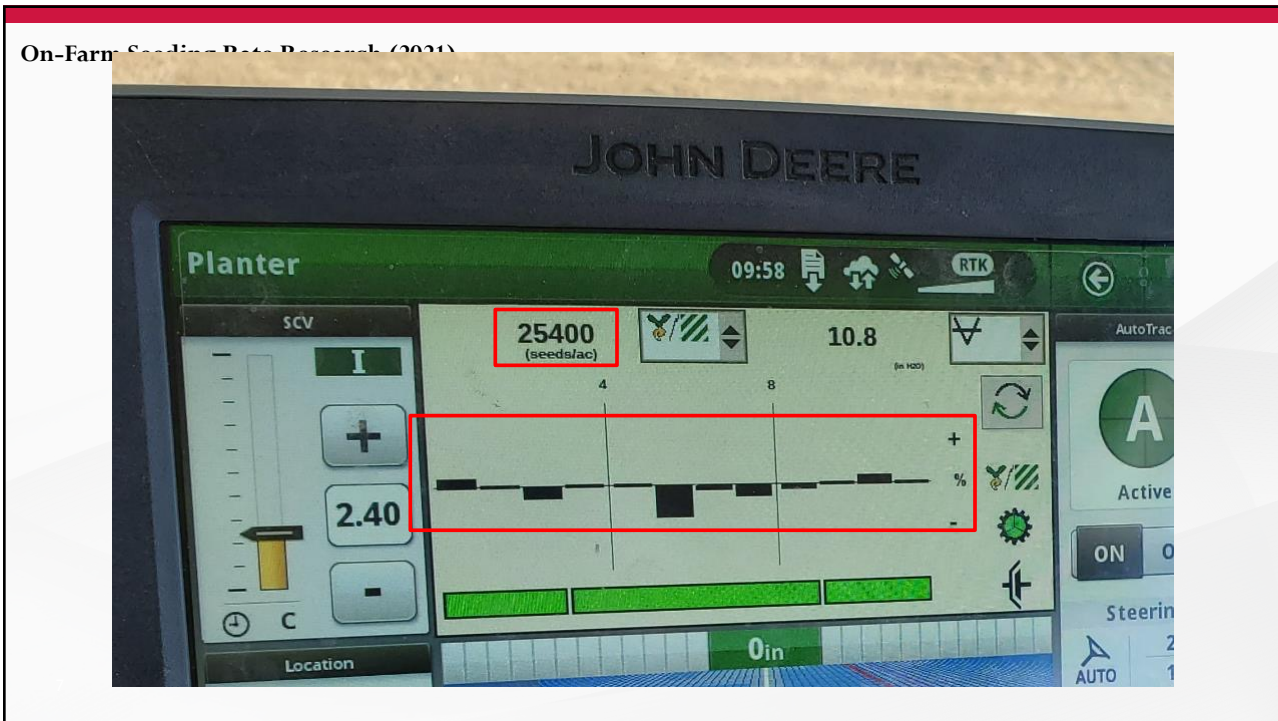
- Population (over or under)
- Seed Singulation (98 - 100%)
- Seed Spacing (<> target)
- Spacing Quality (95-100%)

**by-row planting feedback*



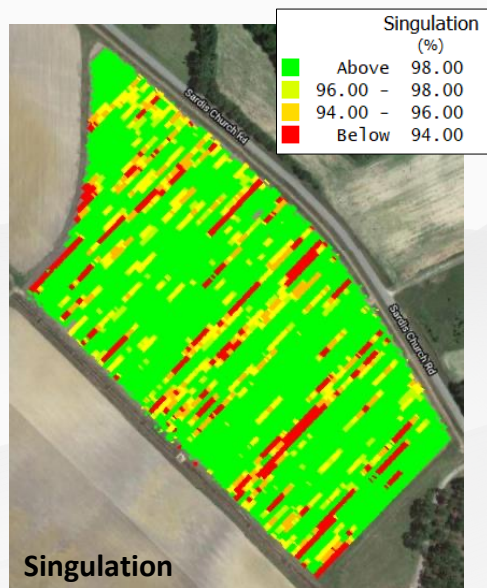
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On-Farm Seeding Rate Research (2021)



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Is Planted Population enough to assess planter performance?



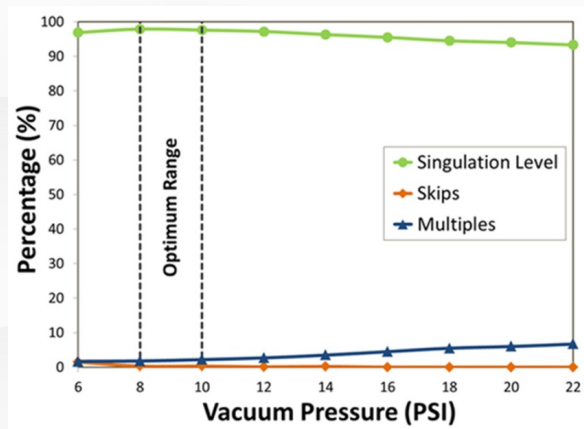
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Seed Singulation

$$\text{Singulation (\%)} = 100 - \text{skips (\%)} - \text{multiples (\%)}$$

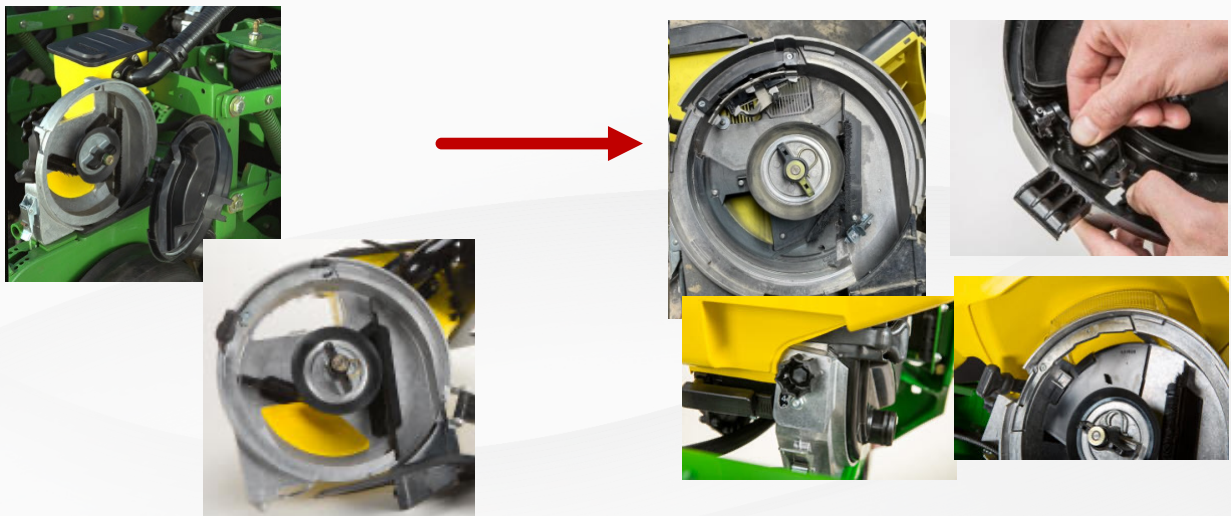
What affects singulation?

- Seed meter setup
- Planter settings (e.g. vacuum)
- Ground speed
- Row-unit vibration



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How to Improve Singulation?



Singulator/Doubles Eliminator, Knockout Wheel

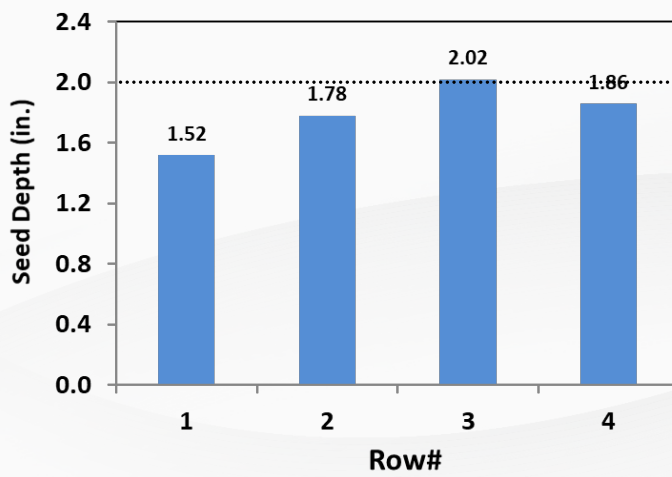
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Seeding Depth



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Seeding Depth



- Check planted depth behind every planter row
- Depth setting can be different among the rows
- Adjust depth & downforce to minimize variations

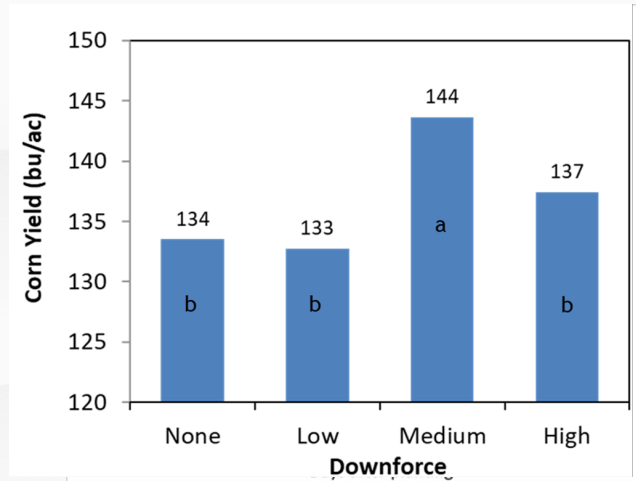
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Planter Downforce/Downpressure

An Optimal downforce is required for good seed placement!



Uniform field conditions – one downforce can work (seed depth)



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Planter Downforce/Downpressure

Varying field conditions –

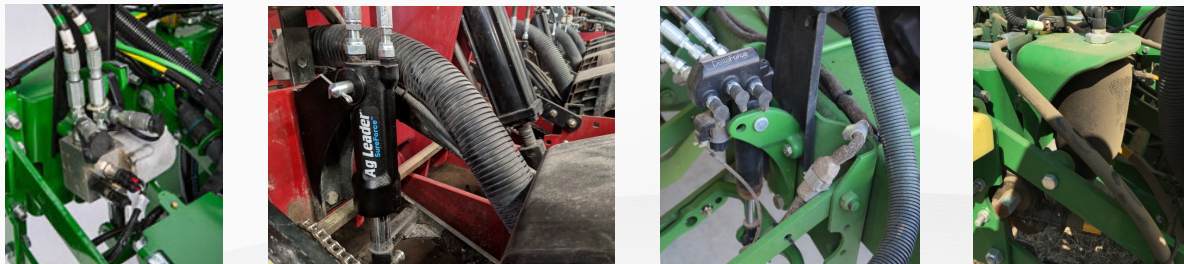
- Soil type/texture
- Soil moisture
- Conservation tillage
- Crop residue
-

Each condition may need a different downforce to maximize emergence!



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Downforce Technology



Active Downforce Systems

Benefits:

- Enable automatic downforce adjustments as field conditions change
- Improves seed placement in varying field conditions


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Downforce Technology




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Precision Seed Metering





Benefits:



- Eliminates chains, sprockets and other mechanical components
- Precise seed metering and control



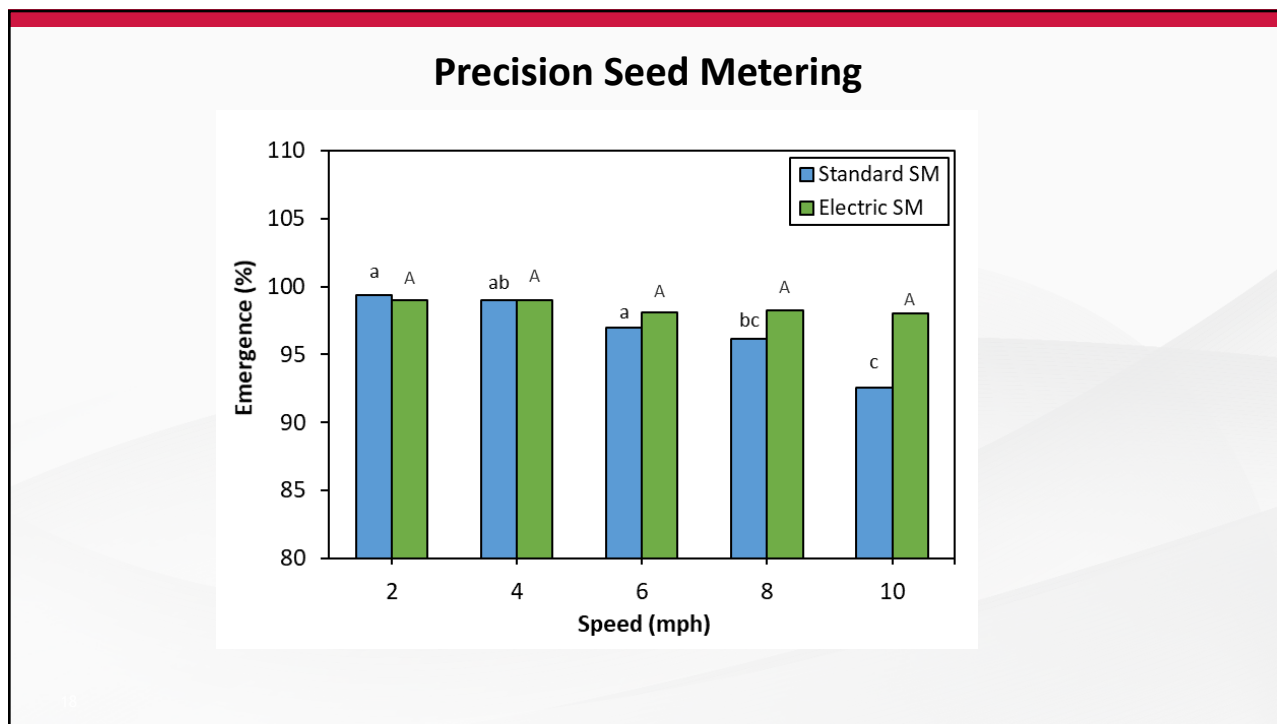
Mechanical Seed Meters

Electric Seed Meters/Drives

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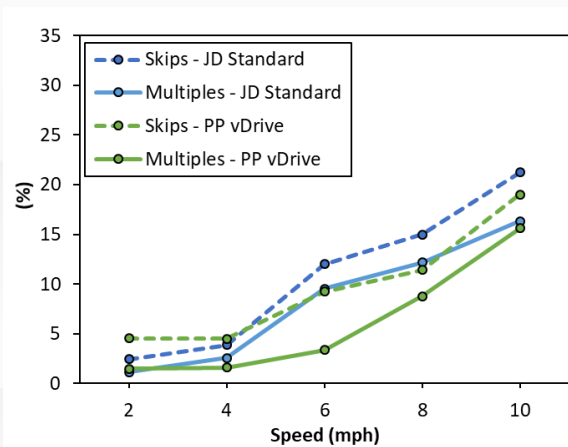
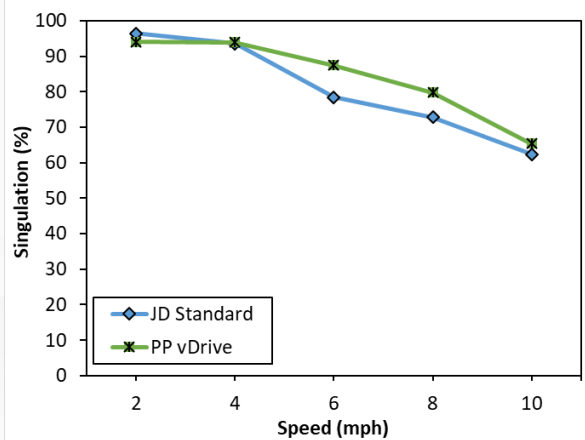
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Individual Row Control



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Precision Seed Metering



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Precision Seed Delivery/Placement

Benefits:

- Control seed delivery to the furrow
- Enable high speed planting (8 – 12 mph)



Gravity Seed Tube



Brush/Belt Type Delivery

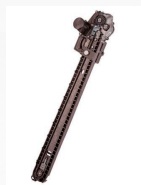
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Seed Metering and Delivery Accuracy

JD Standard Gravity Seed Tube



Precision Planting SpeedTube



VR Seeding Rx:

Four Seeding Rates:

(ksds/ac)

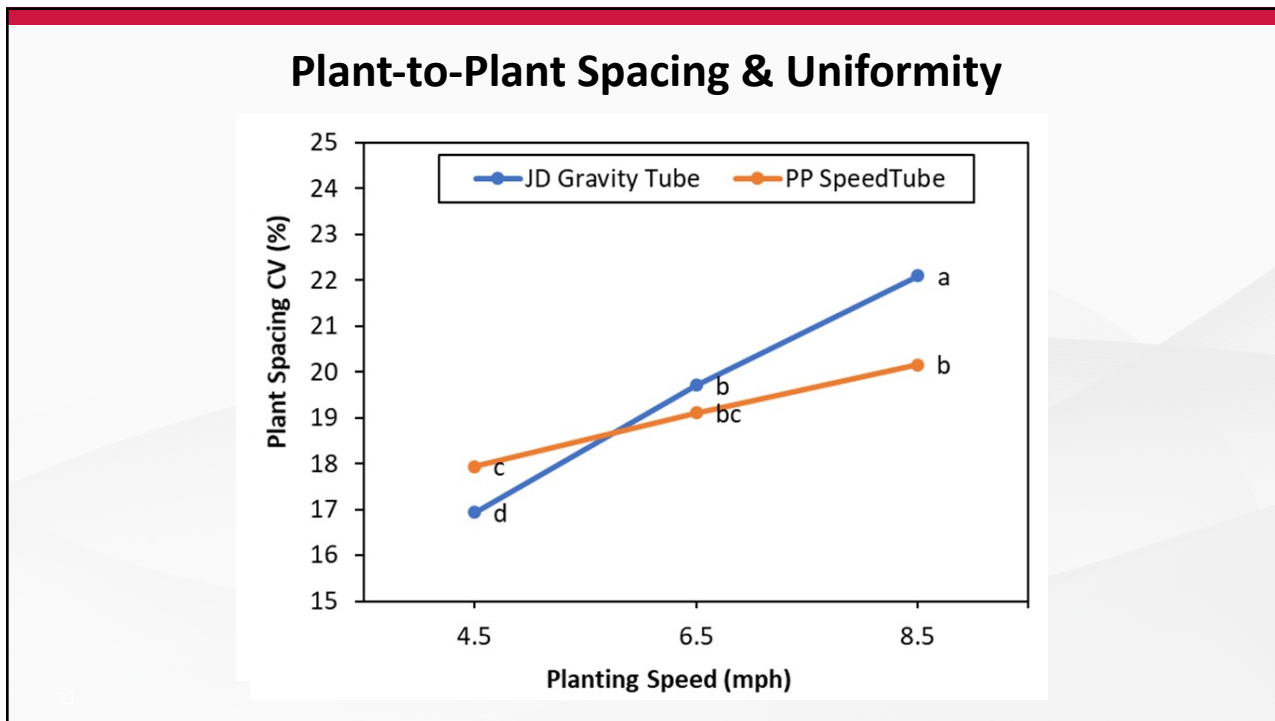
- 24
- 28
- 32
- 36

Three Speeds:

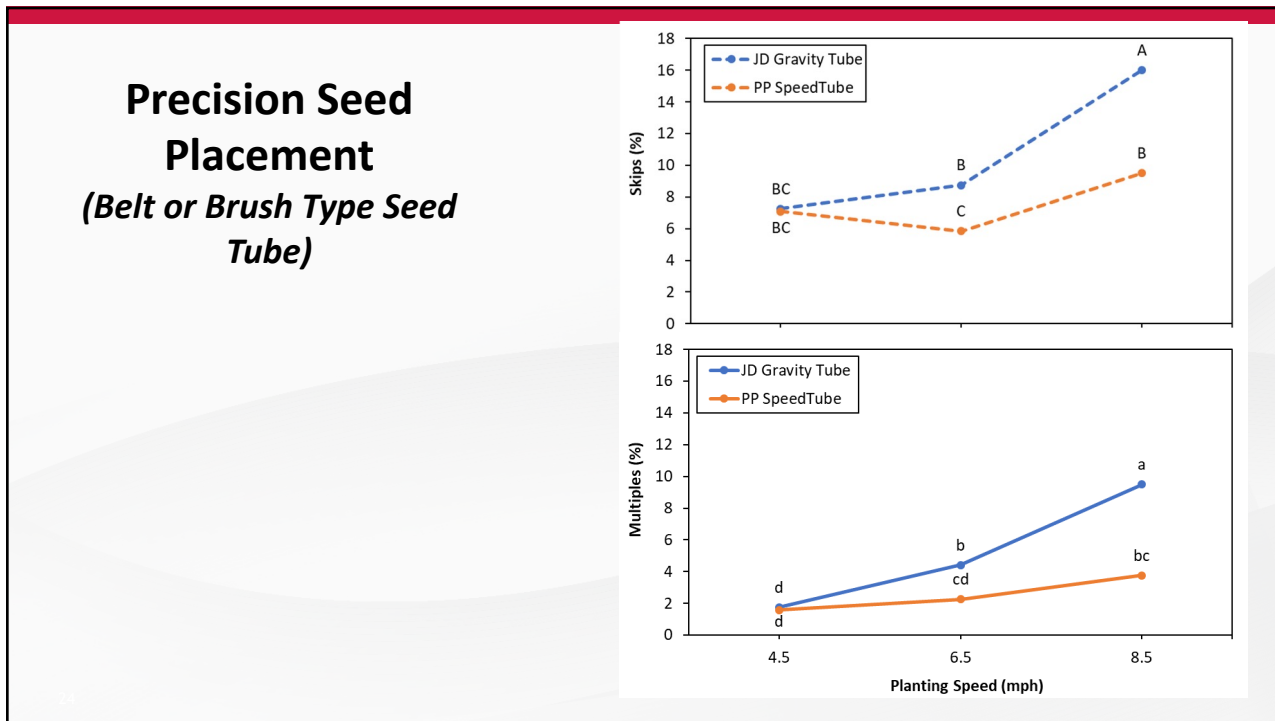
(mph)

- 4.5
- 6.5
- 8.5

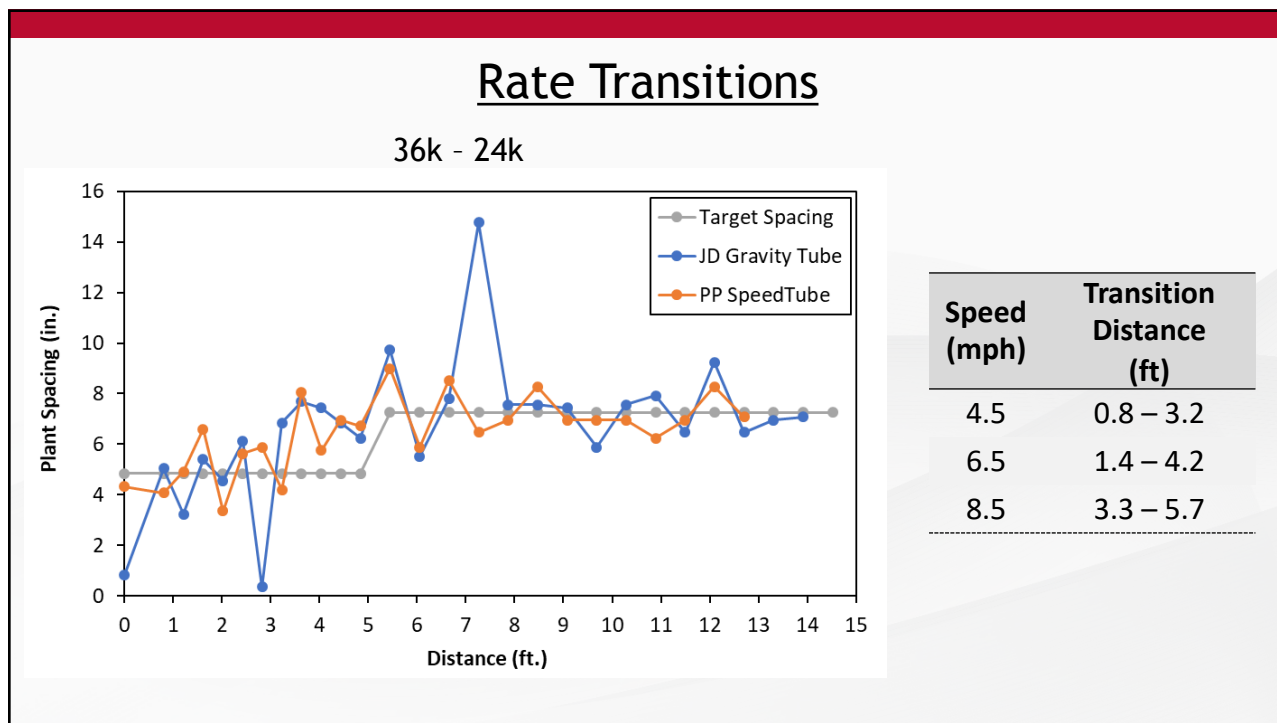
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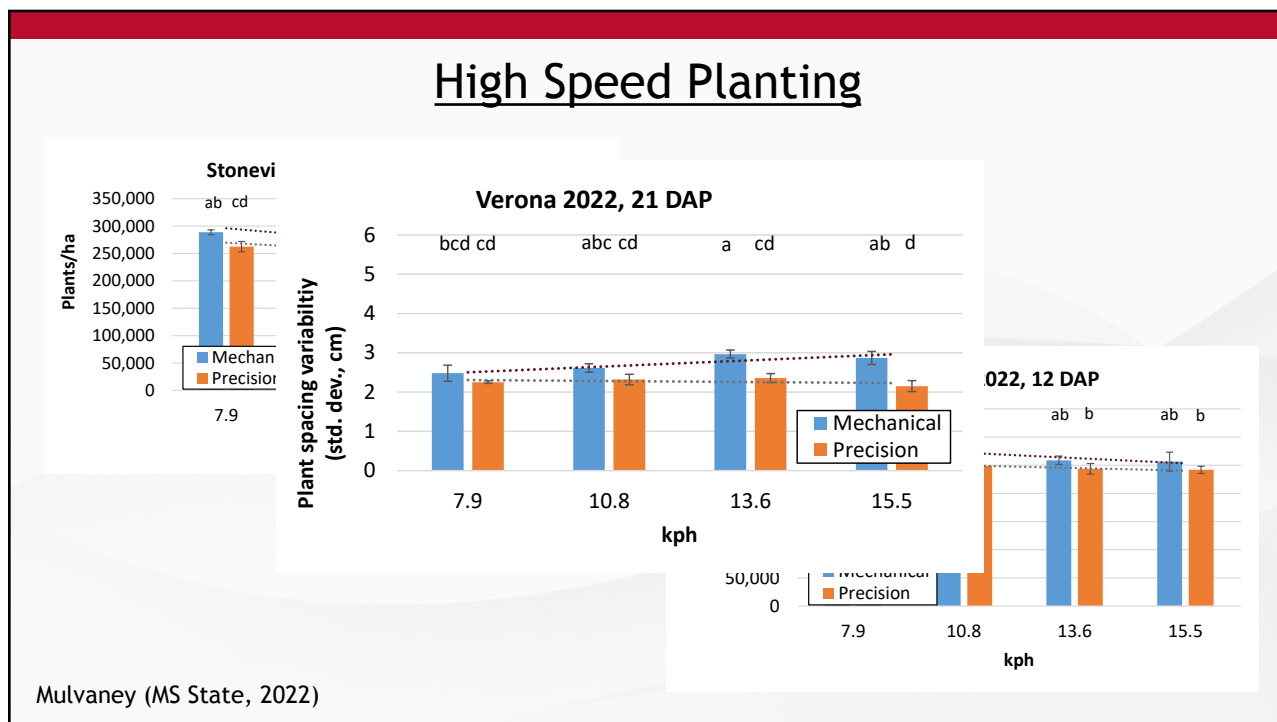
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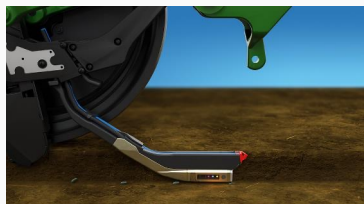


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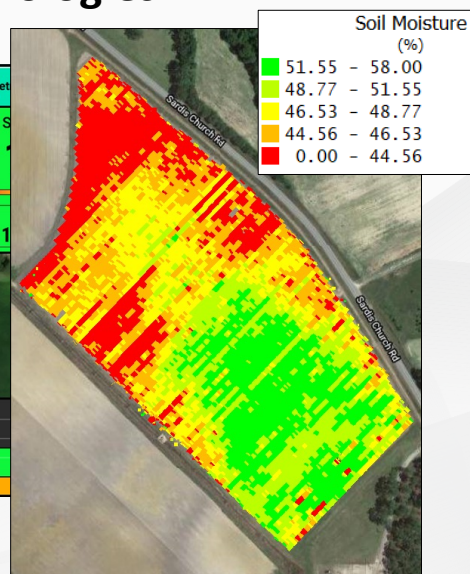
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Advanced Planting Technologies



SmartFirmer:

Provides real-time information on soil properties (moisture, temp and organic matter) during planting



Soil Moisture Map

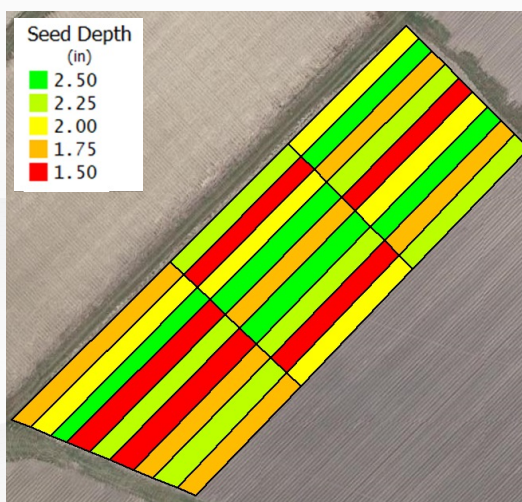
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Advanced Planting Technologies

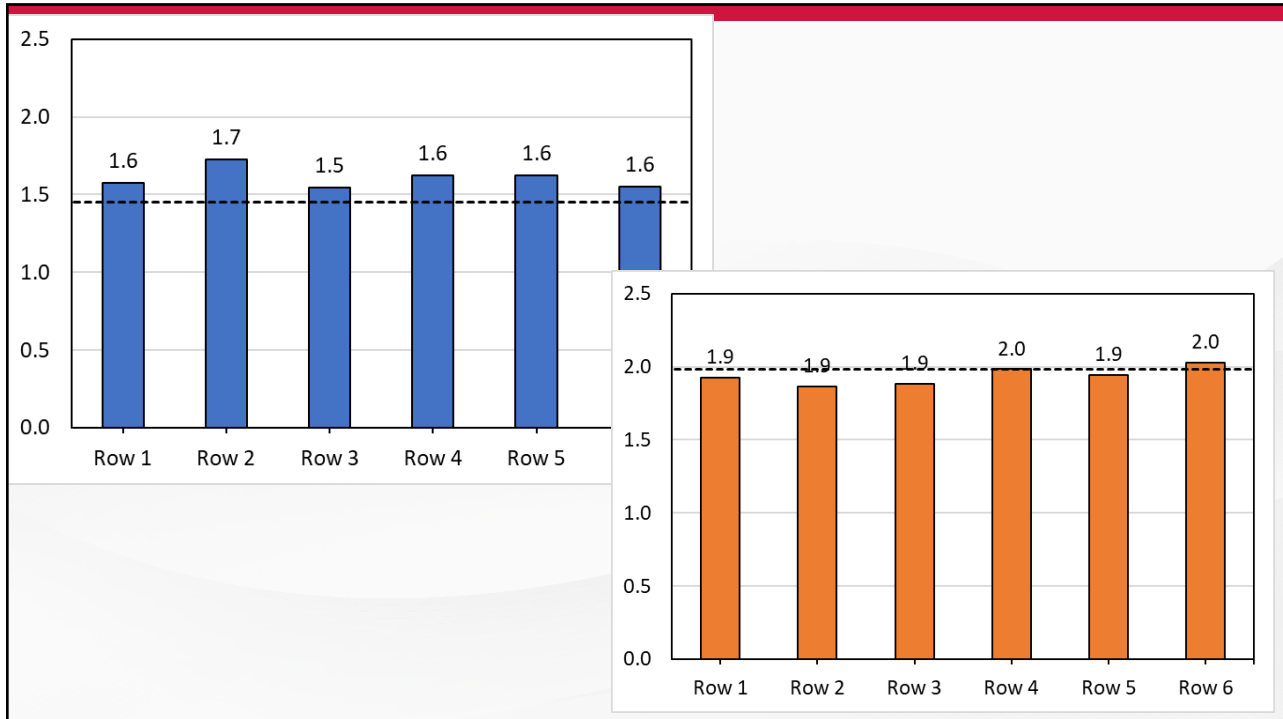


SmartDepth:

Enables real-time seed depth adjustments based on a preset range, soil moisture, or OM



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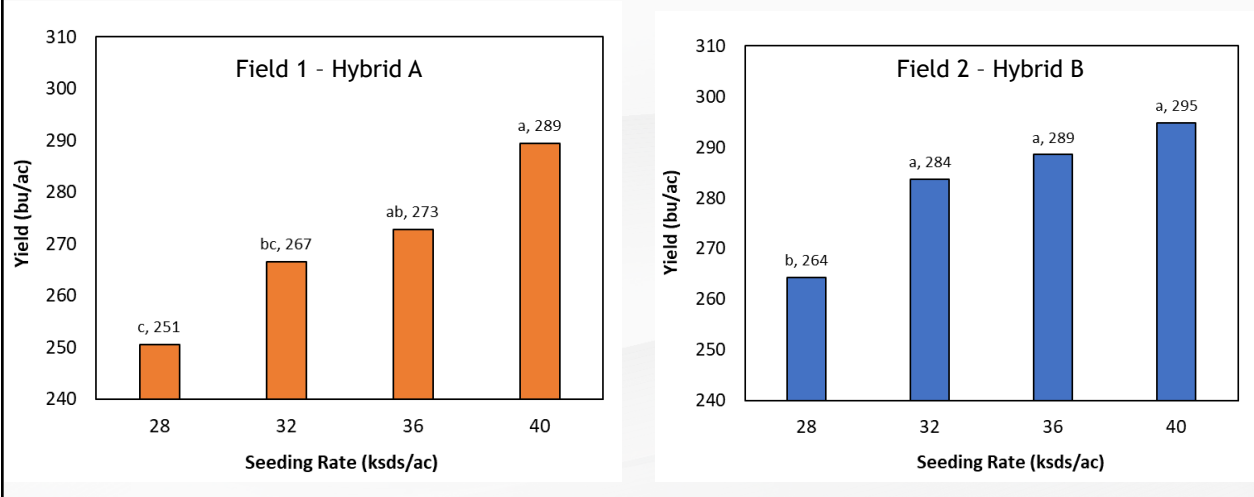
Putting Technology to Work

On-Farm Research

The complex block contains a photograph of a green tractor pulling a yellow planter in a field, and an aerial map showing population density with a legend. The legend indicates population in kds/ac with color-coded ranges: 40.00 (green), 36.00 (light green), 32.00 (yellow), and 28.00 (orange).

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Putting Technology to Work On-Farm Research



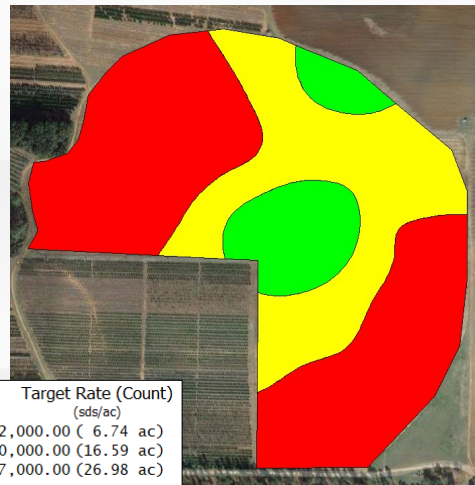
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Variable-Rate Seeding

Why? Optimize inputs spatially by matching population with productivity zones.

How? Management Zones can be based on:

- Soil Type
- Irrigation
- Yield History
- Soil EC (organic matter etc.)



Zones based on Soil Type and Yield History

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Final Thoughts

- Proper planter setup, operation and in-field checks are must to verify planter performance regardless of any technology.
- Consider utilizing and maximizing benefits from basic technologies first before investing in advanced systems.
- Investing in technology does not mean buying new equipment (retrofit options offered by most providers).
- As-applied planting data can provide valuable insights into your operation. Payback is greater when technology/data drives a decision.

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Thanks!

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