

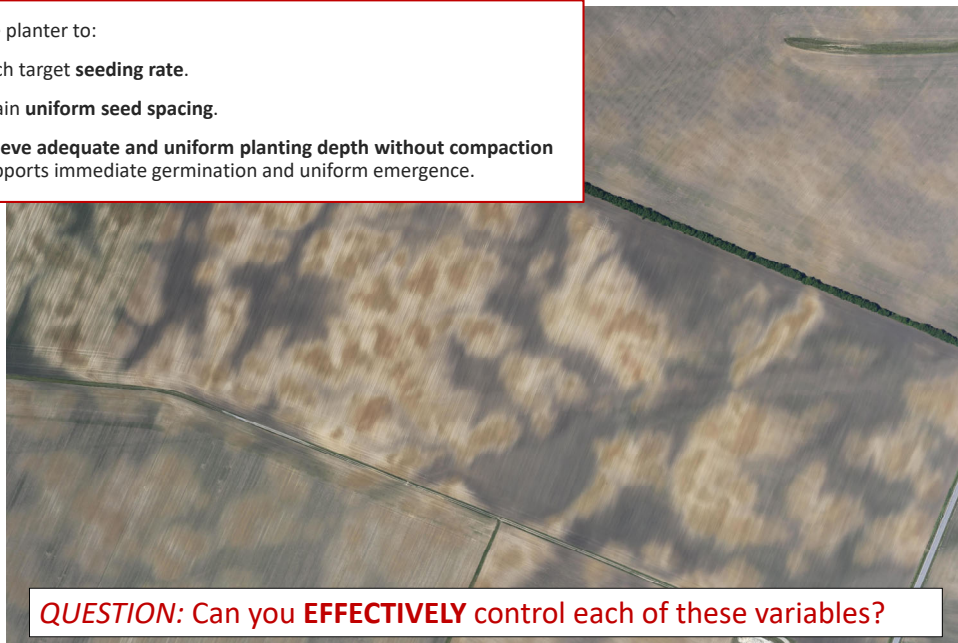
Planter Performance

- Reach target **seeding rate**.
- Obtain **uniform seed spacing**.
- **Achieve adequate and uniform planting depth without compaction** - supports immediate germination and uniform emergence.

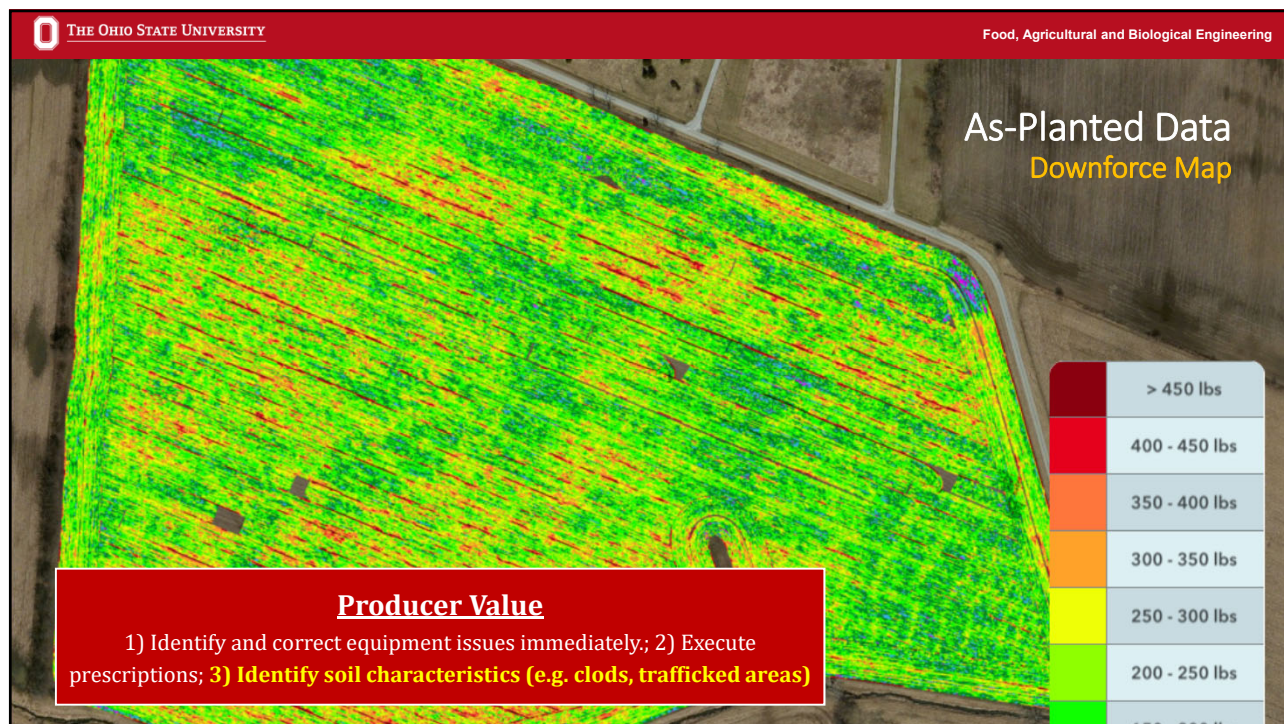


Ability of the planter to:

- Reach target **seeding rate**.
- Obtain **uniform seed spacing**.
- **Achieve adequate and uniform planting depth without compaction** - supports immediate germination and uniform emergence.



QUESTION: Can you **EFFECTIVELY** control each of these variables?



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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

- 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.

| Target Depth (in.) | Downforce TRTS | | AVG Depth (in.) | CV Depth (%) |
|-----------------------|----------------|----------|--------------------|-----------------|
| 2 | none | 0 lbs. | 1.84 | 14.5 |
| 2 | optimal | 100 lbs. | 2.20 | 5.1 |
| 2 | heavv | 195 lbs. | 2.28 | 7.8 |



Shallow Placement

Non-active Downforce

- 1.3" placement depth
- Increased depth CV by 13 points



Non-uniform Depth

Seeding Depth CV = 33.5%





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2" Target with Active DF

(100 lbs with active downforce)
Uniform Spacing and Emergence

**192 bu/ac****2" Target with Mechanical Springs**

(nominal 125 lbs)
Non-Uniform Spacing and Emergence

**178 bu/ac**

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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

