Nebraska Crop Management Conference

Testing Downforce Pressure Planting Systems in Corn

Sarah A. Sivits

Cropping Systems Extension Educator

Dawson-Buffalo-Hall Counties

Background

- Planting concerns
  - Soil type
  - Field topography
  - Residue management
  - Weather conditions
  - Time
- Get a good start
  - Proper planting depth
  - Proper seed placement
  - Avoid sidewall compaction
  - Avoid rootless corn syndrome

Downforce Pressure Study

- Proper downforce pressure on each row unit.
  - Spring adjustment on row units
  - Hydraulic down force system

- Using downforce pressure
  - Different pressures
  - Different speeds

- Ag Leader
  - SureForce
    - Planter hydraulic downforce with uplift
  - SureDrive
    - Electric drives for the planter/meter

Downforce Pressure Study

Downforce Pressure Study

- Testing Ag Leader SureForce system at different pressures
  - Manual—100 lb to weight of boxes (check)
  - Medium—100 lb downforce at gauge wheel (active)
  - Heavy—150 lb downforce at gauge wheel (active)

    - All planted at ~6 mph
    - SDI field

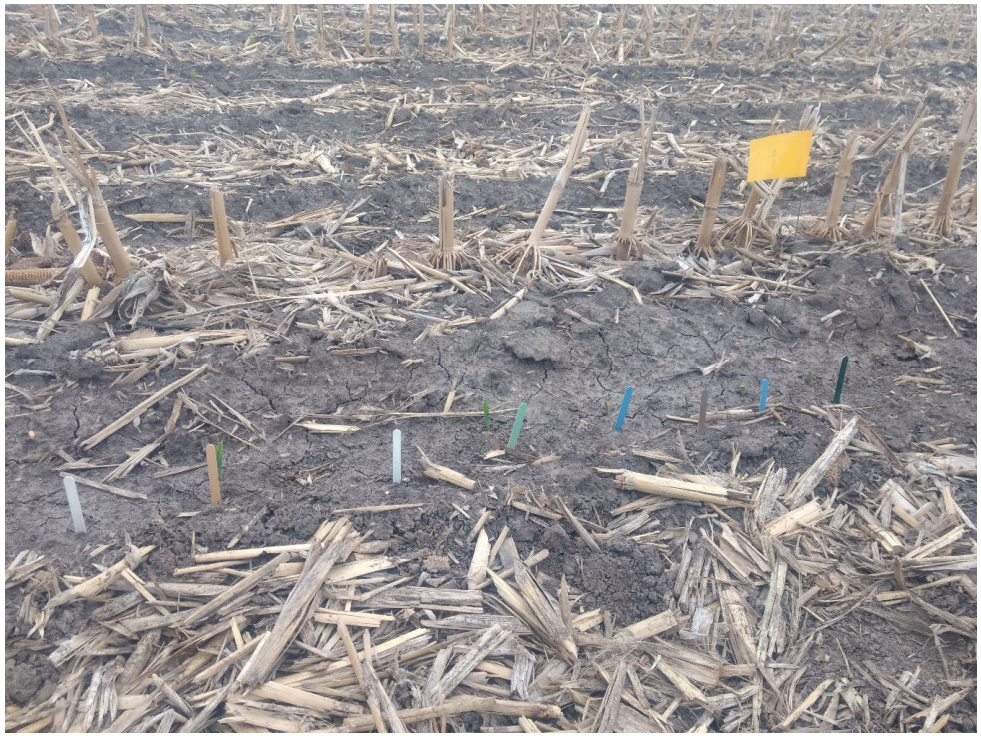
Data Collected

- NOFRN
  - Emergence counts
  - Early season stand counts (V4-V6)
  - Harvest stand counts
  - Yield
  - Moisture
  - Net return

- Ag Leader
  - Drone imagery/technology

150’ Altitude RGB – June 11, 2020; V3-V5

Nebraska Crop Management Conference



Downforce Results—Emergence

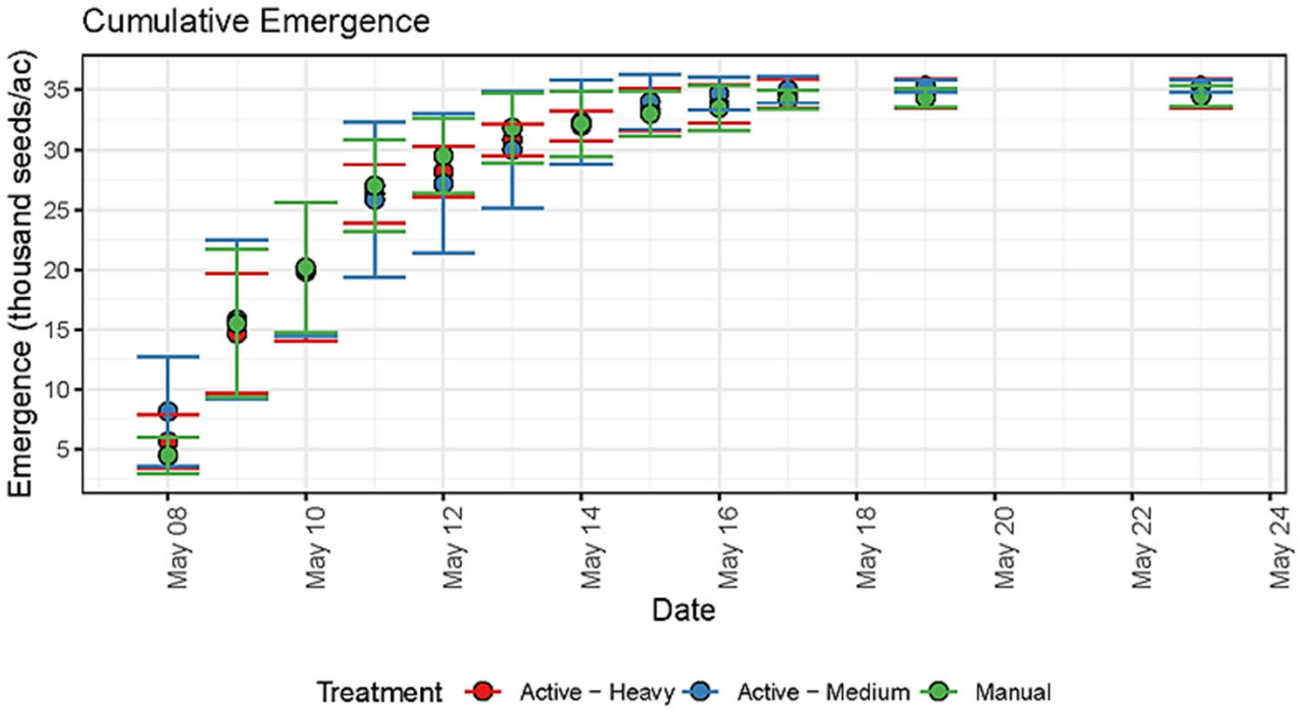


Figure 1. Cumulative emergence by date for manual downforce, active downforce at medium pressure, and active downforce at heavy pressure.

Downforce Results—Other

	Early Season Stand Count (plants/ac)	Harvest Stand Count (plants/ac)	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
Manual Downforce (100 lb added)	34,167 A*	32,722 A	17.7 B	224 A	785.16 A
Active Downforce - Medium pressure (Net 100 lb at gauge wheel)	34,667 A	32,389 A	17.7 AB	234 A	820.01 A
Active Downforce - Heavy pressure (Net 150 lb at gauge wheel)	34,278 A	32,056 A	17.7 A	222 A	778.75 A
P-Value	0.364	0.427	0.078	0.270	0.282

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre corrected to 15.5% moisture.
‡Marginal net return based on $3.51/bu corn and $1.90/ac for active downforce ($20,000 cost for active downforce system spread over 1500 acres and prorated over 7 years).

Downforce Pressure—Summary

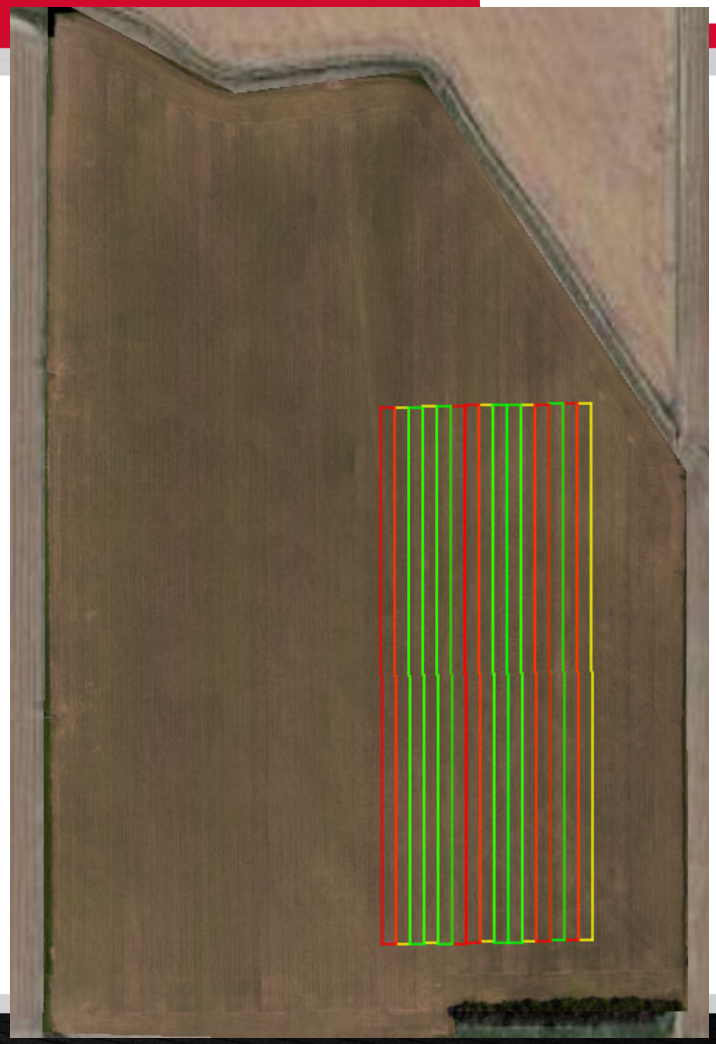
- There were no statistically significant differences
  - Emergence
  - Stand counts
  - Yield
  - Net return

Travel Speed Study

Travel Speed Study

- Testing Ag Leader SureForce SureDrive system at different travel speeds
  - 5 mph (check)
  - 7 mph
  - 10 mph
    - All planted with 100lb downforce at gauge wheel (medium app in 1st study)

- Data collected
  - Same as downforce pressure study
  - SDI field



Nebraska Crop Management Conference


Treatment
10 mph
5 mph
7 mph

Travel Speed Results—Emergence

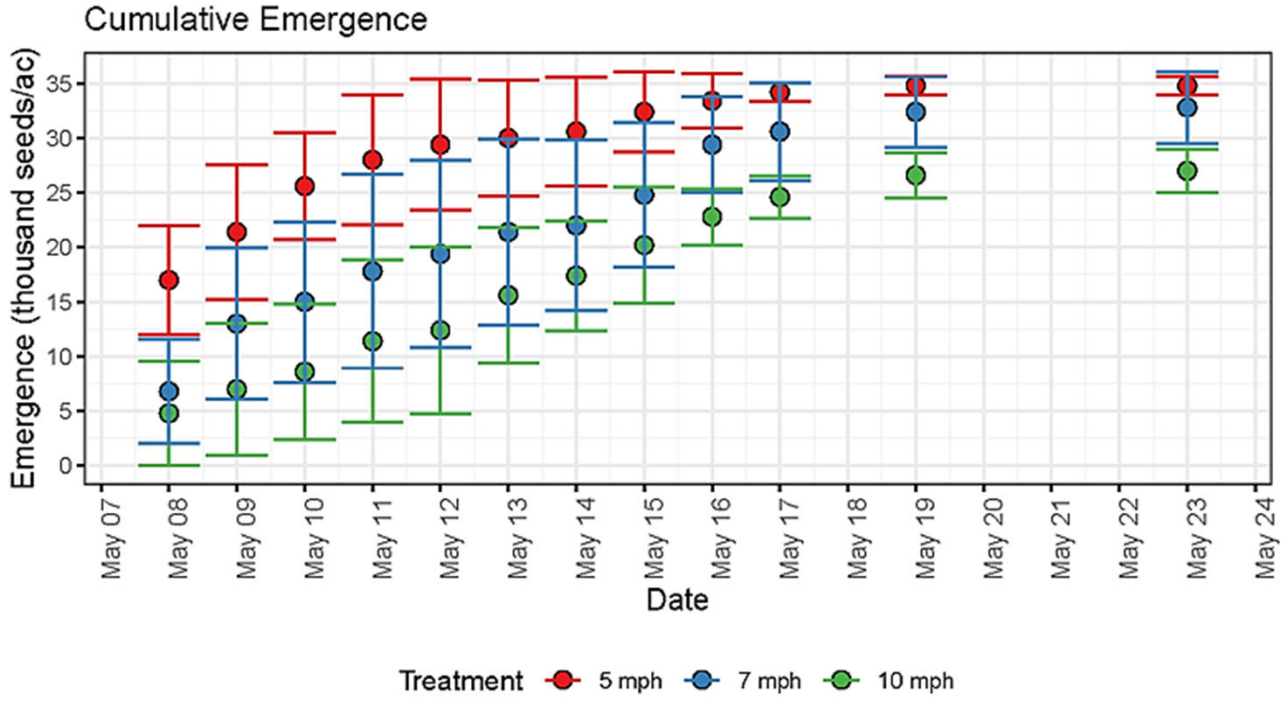


Figure 1. Cumulative emergence by date for 5 mph, 7 mph, and 10 mph planting speeds.

Travel Speed Results—Other

	Early Season Stand Count (plants/ac)	Harvest Stand Count (plants/ac)	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
5 mph	34,067 A*	32,400 A	17.8 A	240 B	841.64 B
7 mph	33,733 A	31,467 A	17.8 A	256 A	895.10 A
10 mph	27,667 B	26,267 B	17.8 A	235 B	821.05 B
P-Value	<0.0001	0.0001	0.546	0.006	0.006

*Values with the same letter are not significantly different at a 90% confidence level.

†Bushels per acre corrected to 15.5% moisture.

‡Marginal net return based on $3.51/bu corn and $1.90 for active downforce for the 7 mph and 10 mph treatment ($20,000 cost for active downforce system spread over 1500 acres and prorated over 7 years).

Travel Speed—Summary

- Emergence
  - 7 mph and 10 mph initially slower than the 5 mph
  - 7 mph eventually caught up to the 5 mph
  - 10 mph treatment lagged in emergence
- Stand Counts
  - Early & Harvest counts—10 mph had lower stand counts
  - 5 mph and 7 mph had similar stands statistically
- Yield & Net Return
  - Higher for 7 mph
  - Unclear why 7 mph treatment was higher
  - No yield difference between 5 mph and 10 mph

Future Plans

- Plan to repeat this study again in 2021?

  – Downforce Pressure
    - Yes, depending on field availability

  – Travel Speed
    - Maybe, 10 mph a little too fast for comfort!

Resources

- Nebraska On-Farm Research Network
  - Website: https://cropwatch.unl.edu/on-farm-research
  - Publications (print or online)

- Virtual Field Days
  - Twitter: @OnFarmResearch
  - YouTube: Nebraska Extension On-Farm Research Network Channel
  - WCREEC: https://mediahub.unl.edu/media/14308

- CropWatch
  - Website: https://cropwatch.unl.edu

Question? Thank You!

Sarah A. Sivits

Cropping Systems Extension Educator

Dawson-Buffalo-Hall Counties

sarah.sivits@unl.edu

308-324-5501

@centralNE_crops