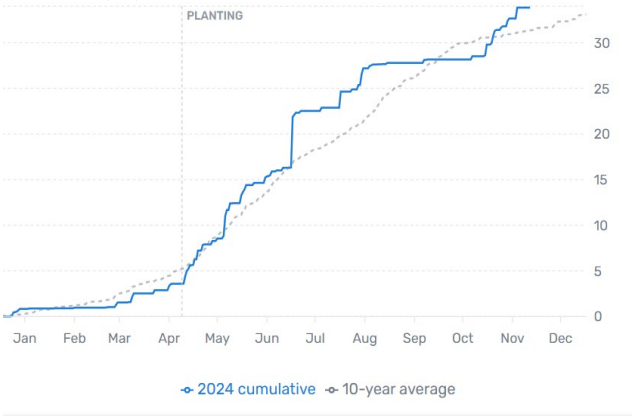
Comparing John Deere Planters at Varying Speeds

Study ID: 0928155202401
County: Saunders
Soil Type: Yutan silty clay loam; Filbert silt loam
Planting Date: 4/23/24
Harvest Date: 9/17/24
Population: 32,000
Row Spacing (in): 30
Hybrid: DEKALB® DKC66-18
Reps: 5
Previous Crop: Soybean
Tillage: No-till
Herbicides: ***Pre:*** 17.4 oz/ac Verdict® + 7.8 oz/ac DiFlexx® + 21.3 oz/ac glyphosate ***Post:*** 2.9 oz/ac Laudis® + 31 oz/ac atrazine + 21.4 oz/ac glyphosate
Seed Treatment: Standard seed treatment
Foliar Insecticides: None
Foliar Fungicides: None
Fertilizer: Pre-plant 170 lb/ac NH3
Irrigation: Pivot
Rainfall (in):



Introduction: With technological advances, planter units are capable of accurately metering and delivering seed to the furrow at faster planting speeds. Using this higher speed, a farming operation would be able to plant more acres per day versus going to a wider planter. However, this can lead to uneven planting depth and emergence if downforce is not able to keep up with the increased speed.

This is the first year of this study, which compares the farm standard John Deere® 1795 MaxEmerge™ planter with pneumatic down pressure and pin adjust row cleaners to a John Deere® 1775NT ExactEmerge™ planter with hydraulic down pressure, pneumatic row cleaners, and frame weight distribution to study if faster planting speeds are possible when using a brush belt delivery system and an active down pressure system. The MaxEmerge™ planter was run at the farm standard planting speed of 5 mph and 7.5 mph, while the ExactEmerge™ planter was run at 5 mph, 7.5 mph, and 10 mph. A gap of 200 feet was included between treatments to allow time for the tractor and planter to speed up or slow down to the targeted speed (Figure 1). Due to available equipment, the ExactEmerge™ plots consisted of two 24 row planter passes, while the MaxEmerge™ plots consisted of three 16 row planter passes. Five replications of each treatment were run.

Figure 1. Plot layout showing replications.

The study evaluated the impact of the planter and speed on early season stand counts, coefficient of variation, harvest ear counts, moisture, yield, and marginal net return. Early season and harvest counts were conducted by flagging areas so the same distance of 17 feet 5 inches was evaluated both times, with 8 counts taken per rep. Additionally, stands were evaluated early in the season by measuring the distance between individual emerged plants for a distance of 17 feet 5 inches, with 4 counts taken per rep. This was then analyzed with a stand count calculator to identify skips, doubles, average plant spacing and coefficient of variation. Coefficient of variation equal to zero means that the plants are equally spaced. Yield and moisture were calculated by cleaning the yield map collected with a calibrated yield monitor.

Results:

Planter Equipment and Speed	Early Season Stand Count (plants/acre)	Late Season Ear Count (ears/acre)	Plant Spacing CV (in/in)	Potential Skips (plants/acre)	Potential Doubles (plants/acre)
MaxEmerge™ 5 mph	32,100 A*	30,425 A	0.29 A	303 A	253 A
MaxEmerge™ 7.5 mph	31,075 AB	30,475 A	0.46 B	1215 B	1923 B
ExactEmerge™ 5 mph	30,975 B	29,400 A	0.28 A	507 A	0
ExactEmerge™ 7.5 mph	31,050 B	29,425 A	0.32 A	352 A	406 A
ExactEmerge™ 10 mph	30,600 B	29,950 A	0.33 A	703 AB	302 A
P-Value	0.017	0.3	0.002	<0.001	0.002

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

Planter Equipment and Speed	Moisture (%)	Yield (bu/ac)†
MaxEmerge™ 5 mph	29.1 A	226 A
MaxEmerge™ 7.5 mph	29.1 A	221 A
ExactEmerge™ 5 mph	29.6 A	221 A
ExactEmerge™ 7.5 mph	29.0 A	224 A
ExactEmerge™ 10 mph	29.6 A	226 A
P-Value	0.99	0.52

The stand count calculator histograms (Figure 2) show the range in spacing for each planter and speed. The black line indicates the desired spacing, with the red bars indicating the percentage of plants that had spacings ranging from 0 inches to over 20 inches.

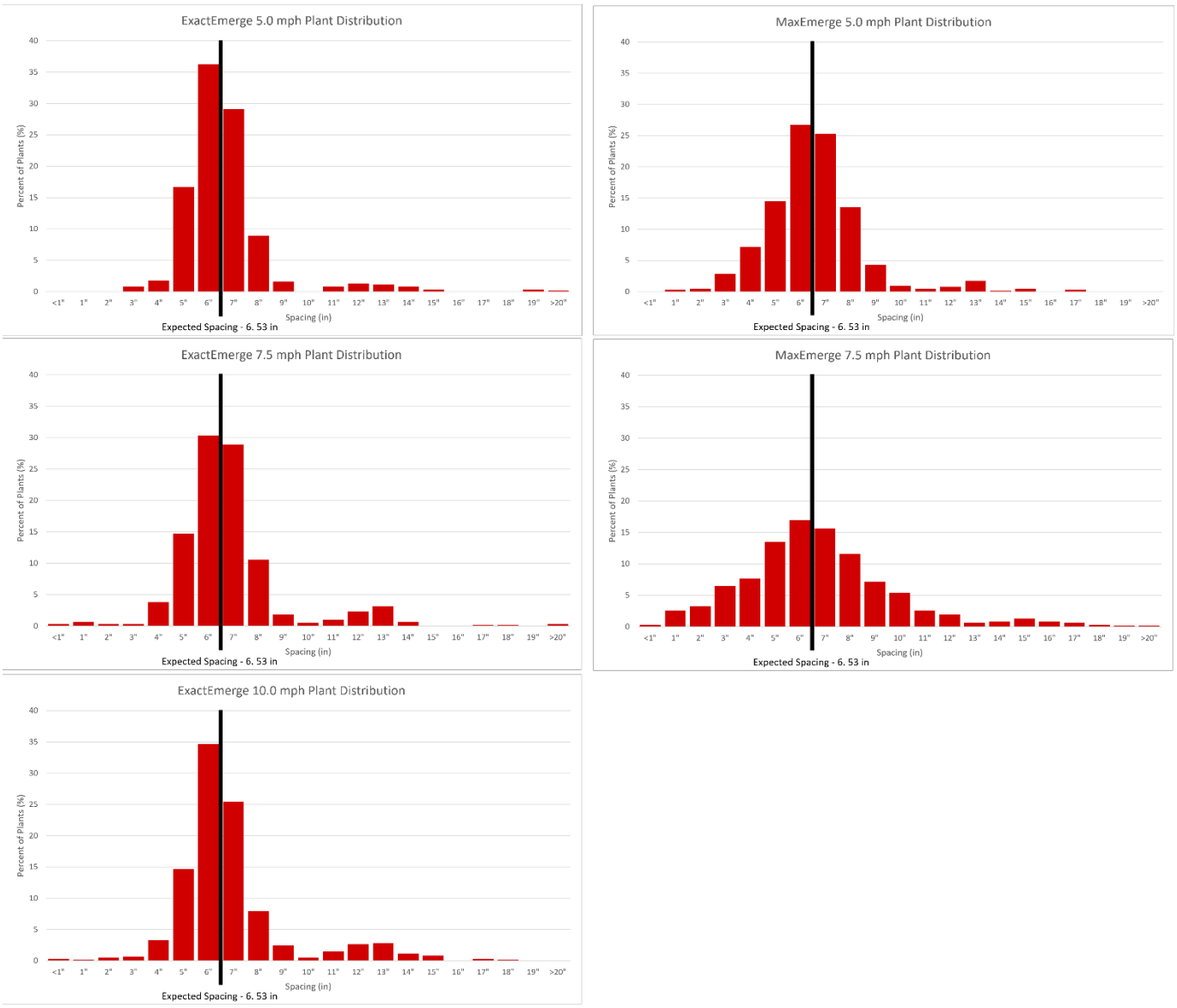


Figure 2. Histograms of spacing by planter type and speed. The black line indicates the desired spacing.

Summary:

- There were significant differences in early season stand counts, plant spacing CV, potential skips and doubles for the two planters and three speeds evaluated.
- There were no significant differences in ear counts, grain moisture, or yield for the two planters and three planting speeds evaluated.
- Net return was not calculated for the study as it depends on cost to upgrade to a new planter, as well as the revenue potential if increased planting speed allows for better timeliness of planting and labor savings.