

Evaluation of Soil Texture versus Planter Parameters for Uniform Crop Emergence

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Objective: To evaluate the influence of planting speed and downforce on seed depth, plant spacing, crop emergence and yield in loamy sand soils

Location: Southeast Research and Education Center, Midville, GA

Methods: The study was organized as a factorial arrangement of planting speed and downforce where three different planter downforces of 0, 200 and 400 lbs were implemented within each planting speed of 3, 5 and 7 mph. Each combination of a planting speed and downforce was replicated four times and implemented in strips within the field. A four row Monosem planter equipped with a mechanical downforce system was used for planting peanut in this study while different planting speeds were achieved by selecting different gear and throttle combinations on a CaseIH Puma 150 tractor. Peanuts were planted at a seeding rate of 87,120 seeds/ac (6 seeds per foot in 36 inch rows) and at a target seeding depth of 2 inches.



Data Collection: Seed depth and plant spacing data were collected after planting while crop emergence was assessed by performing stand counts (in the middle two rows of four row plots) at 7, 9, 14 and 16 days after planting. Yield was collected at harvest for each plot separately.

Results: Seed Depth, plant spacing, crop emergence and yield summary by speed and downforce.

Speed (mph)	Seed Depth (in.)	Plant Spacing (in.)	Emergence (%)	Yield (lbs/ac)	Down force (lbs)	Seed Depth (in.)	Plant Spacing (in.)	Emergence (%)	Yield (lbs/ac)
3	1.5 a	3.7 a	47 a	5,764 a	0	1.4 a	8.0 a	30 b	5,054 a
5	1.5 a	4.7 a	37 b	5,671 a	200	1.5 a	5.1 b	37 a	5,230 a
7	1.4 a	10.5 b	18 c	4,525 b	400	1.5 a	5.9 b	34 a	5,675 a

Means with the same letter within the same column are not significantly different from each other at $p < 0.05$.

Summary: There was no significant interaction between planting speed and downforce in this study so data is presented separately for each variable. Planted seed depth for all treatments was shallower than the target seeding depth of 2.0 inches. Plant spacing increased with an increase in planting speed due to more skips or multiples and uneven seed placement at higher speeds, which also resulted in significantly reduced emergence, especially at the highest planting speed of 7 mph. For downforce, the lowest downforce (row-unit weight itself) resulted in poor plant spacing which also led to decreased emergence when compared to the crop emergence at 200 and 400 lbs of downforce. Downforce had no significant effect on peanut yield while significantly lower yield was noticed at the planting speed of 7 mph. The study results suggested that planting above 5 mph can result in a yield penalty due to poor singulation and seed placement at higher speeds. A downforce of 200 or 400 lbs is recommended for achieving more uniform seed depth.