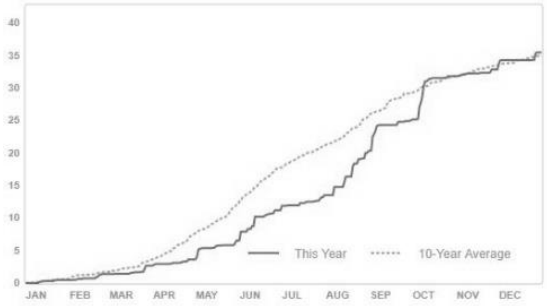
Impact of Soybean Planting Date and Variety on Yield

Study ID: 0821KS013201801
County: Brown, KS
Soil Type: Wymore silty clay loam 1-3% slope; Wymore silty clay loam 3-6% slopes
Harvest Date: 10/22/18
Population: 150,000
Row Spacing (in): 15
Reps: 4
Previous Crop: Corn
Tillage: No-Till
Seed Treatment: PPST, ILeVO®, Inoculant
Foliar Fungicides: applied 8/9/18

Irrigation: None
Rainfall (in):



Introduction:

The study was set up as a split plot design with planting date as the main plot and variety as the sub plot. Data has shown that planting soybeans earlier can increase yields. The purpose of this study was to evaluate how early soybeans could be planted without hurting yields. Four soybean dates were selected with a goal of spacing planting dates two to three weeks apart. Two soybean varieties were evaluated: Pioneer® P31A22X, a group 3.1 variety, and Pioneer® P40T84X, a group 4.0 variety. These maturity groups are typical for the area.

Soil temperature at planting was measured for each main plot (planting date). Stand counts were collected for each main plot on June 6. Moisture, test weight, and yield were evaluated using a test plot weigh wagon. Images of seed quality were also captured for each treatment at harvest.

Results: Data were analyzed using the GLIMMIX procedure in SAS 9.4 (SAS Institute Inc., Cary, NC). Mean separation was performed with Tukey's HSD. There was no interaction between variety and planting date (the varieties responded the same at all four planting dates); therefore, these factors are reported separately (for yield, planting date x variety P=0.1217). Soil temperature at planting and stand counts were collected only at main plot (planting date) level.

Planting Date	Soil Temp at Planting at 2.5" depth (°F)	Stand Count (plants/ac)	Moisture (%)	Test Weight	Yield† (bu/ac)	Marginal Net Return‡ ($/ac)
Mar 22	44 C*	94,916 C	11.3 A	53.1 C	56.3 C	364.51 C
Apr 11	47 B	107,917 B	11.3 A	53.6 BC	58.6 C	381.18 C
May 7	69 A	133,333 A	11.4 A	54.6 AB	62.4 B	409.68 B
May 22	69 A	129,500 A	11.2 A	55.5 A	67.1 A	444.37 A
P-Value	<0.0001	<0.0004	0.208	0.001	0.0001	0.0001

Variety	Moisture (%)	Test Weight	Yield† (bu/ac)	Marginal Net Return‡ ($/ac)
Pioneer® P31A22X	11.3 A	53.8 A	58.9 B	382.96 B
Pioneer® P40T84X	11.3 A	54.5 A	63.3 A	416.91 A
P-Value	0.348	0.325	0.01	0.007

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre corrected to 13% moisture.
‡Marginal net return based on $7.40/bu soybeans, $49.50/unit of 140,000 seeds for 31A22, and $48.15/unit of 140,000 seeds for 40T84.

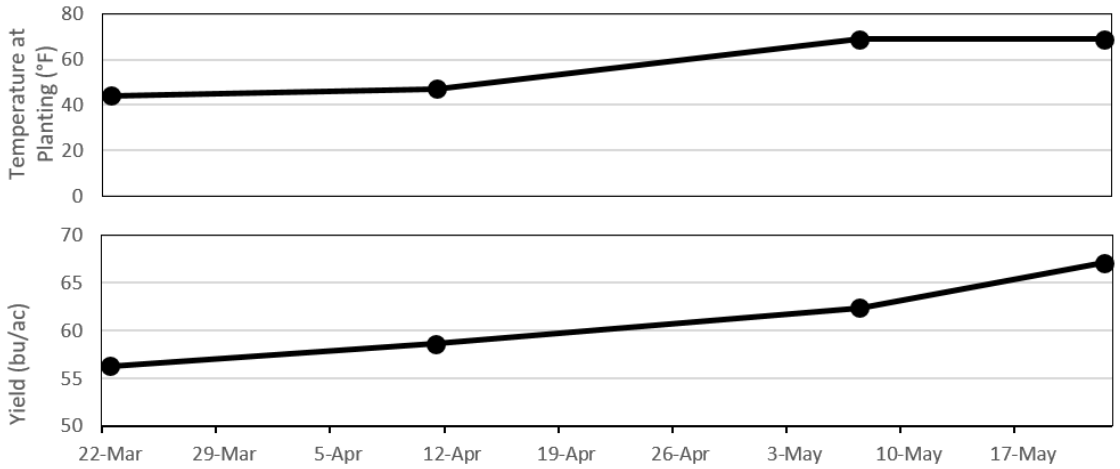


Figure 1. Soil temperature at planting at a depth of 2.5" (top) and yield (bottom) for each planting date.

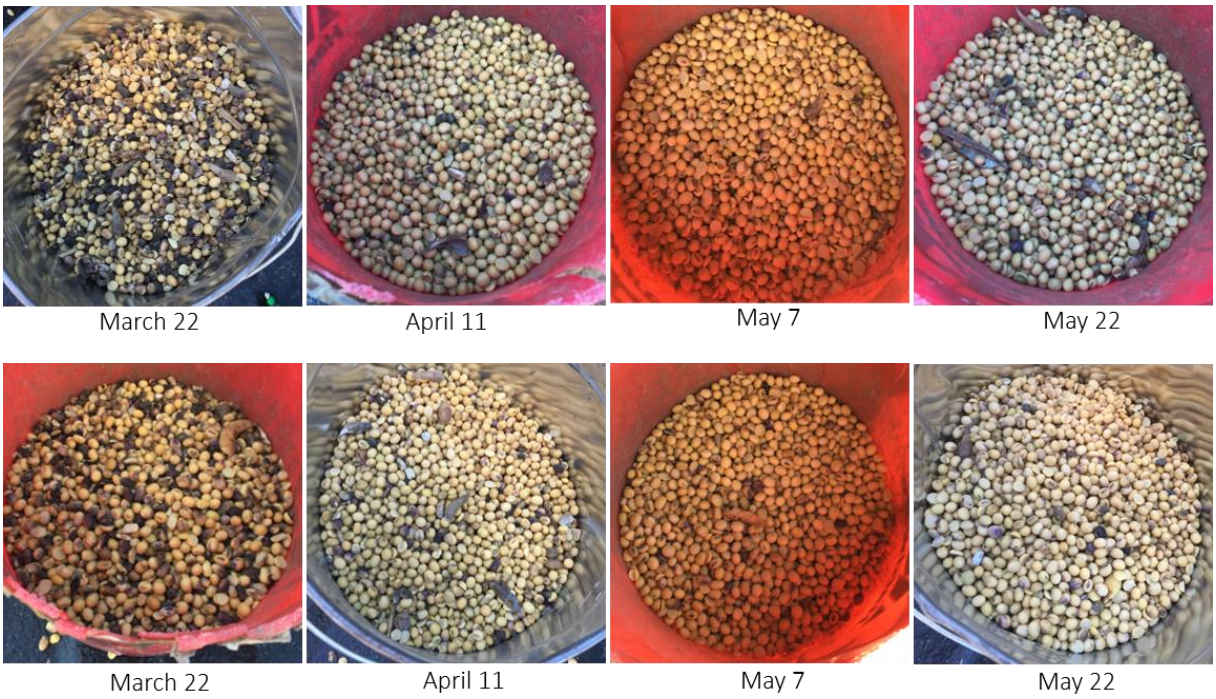


Figure 2. Images showing seed quality at harvest for P31A22X (top) and P40T84X (bottom) for each planting date evaluated.

Summary:

- Multiple snow events in April, followed by a very dry summer with D1 (moderate drought) and D2 (severe drought), created a challenging growing environment.
- From imagery of seed quality samples, we observed a greater amount of purple seed stain (Cercospora blight) in the earlier planting date samples. We also noticed that variety P31A22X had a greater amount of purple seed stain than P40T84X.
- Stand counts, yield, test weight, and marginal net return increased with later planting date, with the latest planting date of May 22 having the highest yield and net return.
- The P40T84X variety had a higher yield and net return than the P31A22X variety.

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