# Final Report: Assessing the suitability of non-GMO soybeans in Northeast PA growing conditions

## *Background*

Soybean producers in northeastern Pennsylvania often struggle to find marketing opportunities for their crop due to a lack of available local grain buyers. This project explores the possibility of utilizing Sulfonylurea Tolerant Soybeans (STS) to gain access to non-GMO commodity markets in Lycoming County, Pennsylvania. This variety of soybean allows producers to produce soybeans for a niche market and price premium while providing additional options for the control of difficult weeds, like burcucumber.

## *Objectives*

1. Evaluate suitability of several STS soybean varieties by performing a replicated STS variety trial in Lycoming County, Pennsylvania.
2. Evaluate weed control (especially of marestail and burcucumber) as compared to modern dicamba-tolerant soybean varieties.
3. Compare profitability of non-GMO varieties with price premium to conventional varieties in local market conditions.

## *Methods*

On May 27, 2020, the STS variety trial was planted. We obtained three STS varieties for the trial; Pioneer P25t01s, Clewell CPM2920STS, and Pioneer P39a82s. There were four replicated strips per variety. The field was planted on 15-inch rows at a population of 157,000 plants per acre.

On June 1, the plot was sprayed with the pre-emerge program, containing the following rates and products: 5oz Verdict (saflufenacil and dimethenamid-P), 1.5oz Zidua (pyroxasulfone), and 24oz glyphosate.

On July 16, the plot was sprayed with the post-emerge program, containing the following rates and products: 1oz Synchrony (chlorimuron ethyl and thifensulfuron methyl) and 7oz TapOut (clethodim). Both herbicide passes were applied in the opposite direction of planting so that the tire tracks of from the sprayer would impact all replications equally.

Due to challenges related to the COVID-19 pandemic, we were not allowed to host a field day for local producers. The field was scouted in mid-August and harvested on November 6, 2020.

Weather Conditions

The plot was challenged early in the season with some wet weather. Shortly after planting, the area received approximately 4 inches of rain, and parts of the field were submerged for a couple of days. Some of the lower spots in the field (not included in the plot) showed some evidence of poor emergence, but it was not evident later in the season. Lycoming County also experienced a drought in 2020, receiving 13.5 total inches of rainfall from May through October which is 10.6 inches less than the annual county average of 24.1 inches for these months.

## *Results*

The final plant population averaged between 87,000 to 90,000 plants per acre for all varieties. Each variety was distinctly different in color. The Pioneer P39A82S variety had pods that opened early, resulting in seed loss.

Yields were calculated per individual strip and averaged across variety. We analyzed the means by analysis of variance (ANOVA; R studio version 1.3.1093) and used Tukey's posthoc test to separate LS-means. The Clewell CPM290STS variety was the highest yielding variety with an average yield of 55.5 bu/A (Figure 1). Pioneer P25T01S averaged 51.2 bu/A and Pioneer P39A82S averaged 48.3 bu/A. The difference between average yields for all varieties was statistically significant ($P \leq 0.05$).

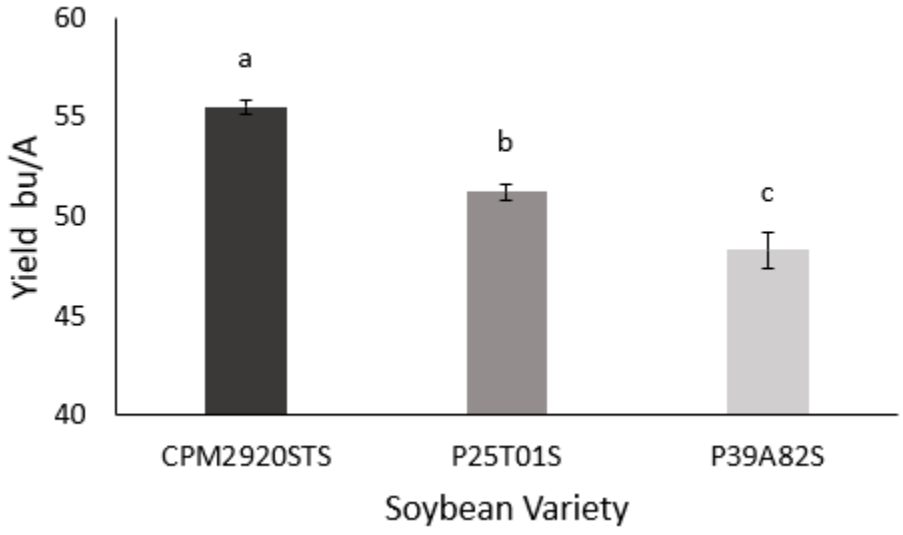


Figure 1. Average soybean yield (LS-means ± SE, n=4). Bars with different letters are significantly different based on Tukey's post-hoc comparisons at $P \leq 0.05$.

## *Conclusions*

Although all varieties had reasonable yields, the Clewell CPM290STS variety had significantly higher yields than the other two varieties. Drought conditions during the growing season may have affected overall yields. However, at 55.5 bu/A, the Clewell CPSM299STS variety had similar soybean yields to the farmer-cooperator's overall farm average of 54 bu/A, suggesting that STS varieties can produce competitive yields compared to conventional soybean programs in northeast Pennsylvania. With only three varieties in the trial and an unusually dry season, further STS variety trails at multiple locations would help determine more suitable STS varieties for this region.

Based on field observations and scouting, the STS herbicide program was effective. While some burcucumber plants were observed in early season scouting, there were no significant infestations found in August or at harvest. Some volunteer corn was present in August, but it was in decline due to the application of TapOut. No marestail was found.

Local market opportunities and profitability were driving factors behind this trial. The farmer-cooperator indicated that seed costs were comparable, and the herbicide program for the trial was somewhat less expensive than his traditional program. Additionally, compared to the overall farm average, the Clewell CPM290STS variety produced similar soybean yields. With the local premium for non-GMO soybeans reaching approximately $1.35 per bushel in November, an STS program provides an excellent opportunity to increase profitability for farmers in northeast Pennsylvania.