

Mid-Year Report 2022 Pennsylvania Soybean On-Farm Network

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The 2022 Pennsylvania Soybean On-Farm Trial Network increased this year by incorporating two existing programs (Soybean Sentinel Monitoring and Nematode Survey) and creating three new research programs (saved seed, production agronomy, and refining two-pass herbicide programs to improve soybean seed trait technologies stewardship.) Figure 1 shows the general distribution of our 2022 program, although, in several counties, there are multiple trials or monitoring locations.

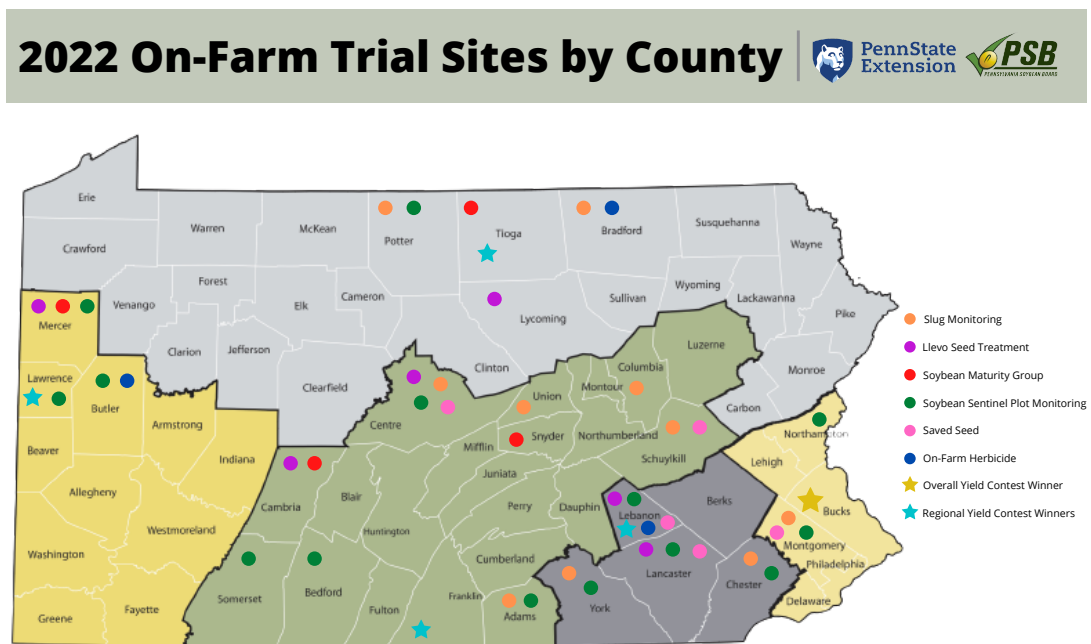


Figure 1. Soybean on-farm network 2022. Special thanks to all our on-farm cooperators and to

Best management practices for slugs: For spring 2022, slugs were observed in low numbers, and feeding damage was minimal across the state. Slugs seemed to disappear earlier than usual under the dry conditions, and scouting efforts ceased by mid-June. Weekly reports from 2022 can be accessed at <https://extension.psu.edu/2022-pennsylvania-slug-monitoring-project>.

Comparing pre-harvest broadcast and post-harvest drilled cover crops: So far, the research farms have been flagged for the 2021-2022 growing season and are ready for broadcast as soon as they hit R6. We have at least one cooperator signed up in Lancaster who plans to use a drone

to seed. We have approximately three additional leads for cooperators in other counties but are hoping to finalize agreements. The aim is to broadcast at the end of August - mid-September, compared to late September-October last year. A [simplified summary](#) of 2020-2021 was in FCN a few weeks ago.

Ilevo seed treatment trials: Trials in 2022 were established in (1) Centre County, (2) Cambria County, (3) Lancaster County, (4) Lawrence County, (5) Lebanon, and (6) Lycoming County. Bulk soil samples were collected from each site before planting and used to determine soilborne fungal pathogen density, plant parasitic nematode density, and soil nutrient profile. Root ball samples were sampled for microbiome work at VE, VC, and V1 stages using a selected block. GreenSeeker readings were recorded at the R2 growth stage to evaluate normalized difference vegetation index (NDVI) and determine crop health. At the R2 growth stage, the initial plant stand of each Ilevo treated and control plot was recorded. Fifteen plants per plot were collected for destructive measurements and were evaluated in the lab for disease incidence. At harvest, the yield from each plot will be collected separately.

We have received nematode and nutrient profile data and are currently receiving data from educators for non-destructive measurements. Microbiome samples are also being processed in our laboratory. Data will be analyzed soon after we have a complete data set.

Saved seed trial: There are two main research locations. One is located at the Southeast Agricultural Research and Extension Center in Manheim, and the second is at the Russell E. Larson Agricultural Research Center at Rock Springs. These two locations aim to assess the viability of using saved soybean seed and the resulting cost savings in a small, replicated block design. There are also four on-farm locations where growers compare their soybean varieties to the saved seed in large side-by-side trials. The locations are in Montgomery, Schuylkill, and Lebanon (two trials) counties. Data collected this season include germination at planting, mid-season population height, NDVI measurements, and nodulation counts. The focus is on yield and estimating the relative ROI for the on-farm locations.

The saved seed costs about \$13.00 per bag, an additional \$3.50 for cleaning charge, and \$6.00 per bag to treat with Apron Max and Cruiser. In comparison, the average price for one unit of soybean seed from companies is around \$60, meaning that there needs to be approximately a three-bushel difference between commercial varieties and the saved seed. Saved seed materials were also submitted to the Pennsylvania Soybean Performance test to determine the yield comparison with elite varieties. A student intern Andre Lopez was hired this summer and has collected all needed assessment data and entered the data in the excel forms, which will then be analyzed at season end. This season was dry and had a couple of bouts of insect feeding; however, yields appear to be likely average for the season. We hypothesize that one potential fit for saved seed is as part of the double crop market where the risk is much higher in

planting later after wheat or barley and may prove economical for soybean growers to consider, particularly as seed costs increase. Pre-planted, we noted that seed germination for the saved seed was nearly 98% vs. the 85% reported on the purchased soybean seed for this season. Lastly, four soybean lines are grown this season in separate blocks that will be used as a seed source for these trials in 2023.

Soybean sentinel program:

This is the eleventh year in a row that we have conducted the soybean sentinel plot program, which aims to track insect and disease pest populations in typical soybean fields around the state and share this information with growers. Eleven extension educators around PA participate in this effort, tracking populations in about 25 fields in 18 counties. Most educators are scouting fields themselves and reporting the data to me. Soybean Board funds are paying for travel to sites and any needed supplies for these educators. A few educators hired interns to handle scouting and reporting, so Soybean Board funds are paying the wages for these scouts and their mileage to fields. Thus far, we have published 10 reports from our scouting efforts in Penn State's Field Crop News email newsletter, which has a distribution list of around 11,000 recipients.

2022 scouting reports are published weekly with a Tuesday date in the URL. Two example reports are provided below:

1. <https://extension.psu.edu/soybean-sentinel-plot-report-june-14-2022>
2. <https://extension.psu.edu/soybean-sentinel-plot-report-august-16-2022>

Nematode monitoring program: The team continues advertising free nematode testing for farmers across Pennsylvania. In 2022, 42 samples from 18 counties were processed and analyzed for soybean cyst nematode (SCN) and other plant parasitic nematodes. In addition, twelve samples from research plots have been analyzed, for a total of 54 samples. Soybean cyst nematode was found in one sample from Lancaster County, which is the county where the nematode was first reported in Pennsylvania.

We also continue to discuss the importance of sampling and testing for nematodes through our outreach efforts. Some events where SCN has been a prominent topic include winter meetings hosted in Mifflin, Huntingdon, and Centre Counties, Ag Progress Days, and the Dotterer's Open House in Clinton County.

Information about our testing program has been published in Field Crop News:

"Spring is here, test your fields for soybean cyst nematode"

<https://extension.psu.edu/spring-is-here-test-your-field-for-soybean-cyst-nematode>

“When was the last time you checked your soybean roots for soybean cyst nematode?”

<https://extension.psu.edu/when-was-the-last-time-you-checked-soybean-roots-for-soybean-cyst-nematode>. This article was recently published in Lancaster Farming.

Production agronomy (maturity groups): On-farm trials were established in Cambria, Snyder, Mercer, and Tioga counties, in addition to a trial located at the Southeast Agriculture Research and Extension Center located in Lancaster County. We compare a set of 4-7 varieties varying in relative maturity at each location. Relative maturity groups range from 2.8 to 4.1 in Lancaster, 2.4 to 3.7 in Cambria, 2.8 to 4.1 in Snyder, 2.8 to 3.6 in Mercer, and 0.8 to 2.4 in Tioga. At the Lancaster, Cambria, and Tioga locations, the varieties were planted on two dates (slightly earlier or later than usual). In contrast, the varieties were planted only on one date at the other locations, representing most fields in the region. Soil samples were taken at all locations before planting for soil characterization, and field history was obtained from cooperators. Since planting, we have been monitoring crop development. We noted each variety's flowering date (R1 stage) and are now starting to track the maturity dates (R7 and R8 stages). Crop conditions are generally good, although there has been extensive deer damage at the Tioga trial. Plots will be harvested individually, and yield and test weight data will be summarized.

Refining two-pass herbicide programs: Five on-farm trials were established across soybean growing regions, including western PA (Butler Co; n = 2), southeastern PA (Lebanon Co; n = 1), and the northern Tier (Bradford Co; n = 1). Soybean production practices differed among locations, including trait selection, row spacing, and use of a preceding cover crop. At each location, seven herbicide treatments were imposed with three replications. Herbicide treatments were designed to evaluate the value of multiple modes of action in soil-applied residual programs for tough-to-control weeds, with a primary focus on marestail control. Marestail emergence and control were evaluated at three timings (pre-plant, early-POST, and late-POST) at each location, which will help to identify regional differences in marestail emergence patterns and develop BMPs for marestail management. Plots were also soil-sampled 2-3 times, and soil samples will be used to conduct bioassays in the greenhouse to determine differences among herbicide treatments in the length of residual control. We will also collect marestail seed samples in support of herbicide resistance screening efforts by Dr. Caio Brunharo. Finally, on-farm trials have facilitated the identification of in-field Giant ragweed populations in western PA. We will monitor these populations and collect seeds supporting herbicide-resistance screening efforts.