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CHECKPOINT

The soy checkoff's mission is to maximize profit opportunities for soybean farmers. That starts in the field with checkoff-funded research.

Improving White Mold Knowledge and Management Recommendations

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The fungus *Sclerotinia sclerotiorum* causes white mold disease, also known as Sclerotinia stem rot, in cultivated crops such as legumes, brassicas, sunflower, canola, and potato. This pathogen can persist for long periods of time in the soil as sclerotia, black rock-like structures. When conditions are favorable, the sclerotia germinate and form mushroom-like structures that produce millions of spores which infect soybean flowers.

Economic losses in soybean due to white mold have been documented in Pennsylvania most years since 1996. However, the variable frequency of epidemics between regions and even between fields makes it difficult to determine the extent of the problem in soybean. Since weather influences flowering time and the fact that both soybean plants and S. sclerotiorum are sensitive to environmental factors, the variability of white mold disease in Pennsylvania may be due to microclimatic conditions.

There is limited knowledge on the genetic diversity of the pathogen in Pennsylvania, which influences sclerotia production and fungicide efficacy. Therefore, our research and educational objectives are to map the prevalence of white mold across Pennsylvania at a regional and field scale, identify the extent of the white mold problem, and characterize the genetic diversity of the pathogen. New knowledge will help us develop better management strategies for white mold across the state.

During Summer and Fall 2019, diseased soybean plants and soil samples from fields located in Centre, Cambria, Crawford, Erie, Lancaster, Lebanon, and Tioga county were collected. In the laboratory, *S. sclerotiorum* was isolated from each sample. We also received isolates from our collaborator at Cornell University to be able to compare genetic diversity of *S. sclerotiorum* between different northeastern regions. These efforts have enabled us to collect 191 isolates, which are currently being used for genetic studies.

Another aspect of the research is to improve our understanding of white mold at the field scale, as this will improve how we design field trials and establish best management practices for growers. To map the spatial distribution and genotypic diversity of the pathogen within a field, six fields from different regions of Pennsylvania were intensively sampled. Because the pathogen overwinters by surviving in the soil, sampling was done by gridding fields and collecting 3 kg of soil from each of the approximately 30 plots. Soil was dried and sieved to look for sclerotia. Sclerotia were then surface-sterilized and grown on petri plates for germination testing and genetic analysis. Over the winter we will report on results of those assays and what they mean for farmers in the state.

Damage in field from white mold. *Photo: Paul Esker*

At the end of the 2020 growing season, we would like to conduct a survey of Pennsylvania soybean farmers to determine the extent of white mold based on your observations. The survey will focus on identification of symptoms for scouting, estimating the yield loss due to white mold, and assess the feasibility and willingness of Pennsylvania soybean farmers to adopt or modify current management practices to combat white mold. This multifaceted approach to research and education will help give us the best options to work with farmers in the state to better manage white mold.

If you have any questions about scouting or managing white mold, please contact Karen Luong (kml6400@psu.edu) or Tyler McFeaters (tsm31@psu.edu).

Deep Ripping in Long-term No-till Fields

Andrew Frankenfield, Senior Extension Agronomy Educator, Penn State

The spring and early summer of 2020 has been considerably drier than the previous few years. This has provided a good opportunity to use a no-till deep ripper prior to planting full season soybeans in May and a chance to rip some plots after small grain harvest before double-crop soybeans were planted.

This year, Penn State Extension Educators and Specialists have established plots with cooperating farmers in fields in Cambria, Lancaster, Montgomery, and Schuylkill Counties. We also have plots that consist of a spring ripping and planting date and an early summer ripping and planting date at the Penn State Agronomy Farm in Rock Springs, Centre County and at the Southeastern Pa. Research and Extension Center in Manheim, Lancaster County. We are also evaluating the corn that was planted into the plots that were ripped last season.

We have been collecting data such as penetrometer readings pre- and post-ripping, early season plant populations, height measurements at V5 and then again at R2 and any visual observations. The critical data collection will happen at harvest time. Having the plots spread out geographically and on various soil types will help us make better agronomicdecisions when it comes to managing soil compaction in no-till cropping systems.

Currently we rely on a soil penetrometer which measures the force or PSI it takes to push the metal rod into the soil. The challenges with that is the soil needs to be saturated or at least moist and it does not work well on soils that have any rocks. The other concern with the penetrometer is that it may not be an accurate reading since roots and earthworm channels do not follow a straight line into the soil profile as the testing probe does. Stay tuned for results coming at the end of the year.

Deep ripping plot in early July in Souderton, Montgomery County, Pa. *Photo: Andrew Frankenfield*

Research Results at Your Fingertips

The United Soybean Board's Soybean Research & Information Network website is designed for farmers to read about the benefits of research they spend checkoff dollars on in their states.

Read articles and summaries about research projects and see up-close information about soybean diseases and pests. You'll also find the latest publications and resources and can see what's new in soybean research on the Soybean Research & Information Network (SRIN) website at **www.soybeanresearchinfo.com**.

LEARN MORE AT PASOYBEAN.ORG

Pennsylvania Slug Monitoring Project

Liz Bosak, Extension Agronomy Educator, Penn State

Slugs can be a serious pest in no-till fields during the spring planting season and again in the fall when cover crops and forages are seeded. As crops begin to germinate, slugs will feed on the seedlings and at high populations under favorable weather conditions can eliminate an entire field. Farmers are left with no alternative but to purchase more seed and re-plant the field. Baited pellets containing a molluscicide can be broadcast to reduce the slug population, but it can be challenging to apply during rainy weather. The short-term goal of the Pa. Slug Monitoring project is to provide farmers with an in-season weekly report of slug populations across Pennsylvania during the spring planting season. In the future, the data will be used to develop a predictive tool or "slug forecast" that farmers can use to improve their management of this pest.

In 2018, 2019, and 2020, Penn State Extension Educators in eighteen counties monitored slug populations at over thirty field sites. Problem slug fields were identified by the cooperating farmer. Slug traps were placed in each field to monitor juvenile and adult slug species each week before planting. After the crop emerged, crop damage was monitored. For all three seasons, no monitored fields were replanted due to excessive damage by slugs. Crop damage was assessed by looking at each individual plant in ten row feet and scoring the damage at 0, 25%, 50%, or 75% leaf area removed. The average crop damage for all three years never exceeded 25%. Slug populations remained low for all three growing seasons. Despite low counts for the past three years, it is important to continue long-term monitoring because a problematic slug year will occur again.

Weekly reports from 2020 can be accessed at https://extension.psu.edu/2020-pennsylvania-slug-monitoring-project.

Shingle trap in a field with a cover crop mixture this spring. Traps are cut from white roofing shingles to minimize heat accumulation underneath the trap. *Photo: Liz Bosak*