Soybean Commodity Cooperative Agricultural Pest Survey: Vigilance Against Potentially Invasive Species

Principal Investigators

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Executive Summary

The NYS IPM program has partnered with NYS Dept. of Agriculture and Markets and USDA Animal and Plant Health Inspection Service (APHIS) for many years on various commodity surveys to monitor for potentially invasive species that would be of concern to NYS agriculture. For the first time, in 2019 we were asked to lead efforts on coordinating a soybean commodity survey for two moth species that are not known to exist in North America, and the soybean cyst nematode which has only been confirmed in one field in Cayuga County in 2016. Six NYS IPM and CCE collaborators surveyed 25 soybean fields in 16 counties from May until October. No moths of the two potentially invasive species were caught, demonstrating that they still aren't a present threat to NY farmers. The soybean cyst nematode was identified in soil samples collected from seven fields in six counties. This means that the soybean cyst nematode is likely much more widespread in NYS than initially suspected, and should now be considered a pest of concern for soybean growers. Outreach and education efforts are underway to inform farmers of this new threat, what the best management practices are, and why it's important that they increase efforts for testing for this nematode, which is considered the number one pest of soybeans nationally and globally, causing >109 million bushels of yield loss in the US alone in 2017.

Issue

Annual funding in the Plant Protection Act 7721 supports the Cooperative Agricultural Pest Survey (CAPS) pest detection program, led by the USDA Animal and Plant Health Inspection Service (APHIS), to safeguard against introductions of potentially harmful plant pests and diseases. These surveys ensure the early detection of potentially invasive species that could negatively impact U.S. agriculture and/or environmental resources. The NYS Department of Agriculture and Markets (NYSDAM) works with APHIS to prioritize the potentially invasive species to monitor in economically important commodities in NY each year. In 2019, NYSDAM partnered with the NYS Integrated Pest Management (IPM) program to coordinate a soybean CAPS survey to monitor for two potentially invasive moth species, as well as to expand monitoring of the soybean cyst nematode across New York soybean production areas.

The overarching goal of the CAPS program is to monitor for species that shouldn't be here, and to confirm that they still aren't in NY or even the U.S. These surveys are often the result of cooperation among state and federal employees, such as APHIS pest inspectors, NYSDAM inspectors and extension specialists. This 'boots on the ground' approach allows for broad coverage of the surveys across the state involving many individuals with agricultural and pest identification expertise.

The soybean cyst nematode (SCN) is considered the number one pest of economic concern of soybean nationally and globally, potentially causing 10-30% yield loss in the absence of above ground symptoms. In 2017, national estimates reported over 109 million bushels lost to this pest in the U.S. alone. Considering that this pest is confirmed in surrounding states and provinces, and given its potential to spread, statewide survey efforts have been underway since 2013 to determine the presence or absence of the soybean cyst nematode in NY. From 2013-2016, numerous fields in 17 counties were sampled and tested as part of a statewide soybean disease survey led by Cornell's Field Crops Pathology program, funded by Northern NY Agricultural Development Program and NY Corn and Soybean Growers Association. In 2016, SCN was confirmed in one field in Cayuga County by Cornell's USDA ARS Nematology lab, albeit at very low levels. Since then, survey efforts have continued, including this soybean CAPS survey effort, because it is widely assumed that SCN is much more prevalent in NY.

Progress Summary

The soybean commodity CAPS survey was coordinated and executed in 2019 according to established protocols, in cooperation with NYS Dept. of Ag. and Markets. A total of 25 fields in 16 counties were monitored for two potentially invasive moth species (Golden Twin Spot Moth and Silver Y Moth) using pheromone traps from May through September (Fig. 1). Fortunately, no target moths were caught. In October – November, collaborators collected soil samples from each of the 25 fields to have tested for the presence of the soybean cyst nematode.

Unfortunately, seven of those fields tested positive in six different counties. This means that the soybean cyst nematode has now been confirmed in eight fields in seven total counties (Cayuga, Columbia, Dutchess, Jefferson, Monroe, Tompkins and Wayne) (Fig. 2). Egg counts in each positive sample were <500 eggs per cup of soil, which is very low compared to population levels of SCN in other states where it is very well established and problematic. We are in a good position to stay ahead of this potentially devastating pest with good integrated pest management practices.

Figure 1. Distribution of the 2019 soybean CAPS survey locations.

Outreach and education efforts are underway to inform all soybean stakeholders (growers, consultants and agribusiness associates) about the risks and challenges of managing SCN. We are involved with the national SCN Coalition to stay up to date on research and recommendations, and coordinate communication efforts with the NY's field crops pathologist and USDA nematologist. This was an invited topic for presentations at a number of winter extension meetings. These results were presented at the advanced training sessions at the annual northeast certified crop advisors training, crop congresses, and winter pest management workshops.

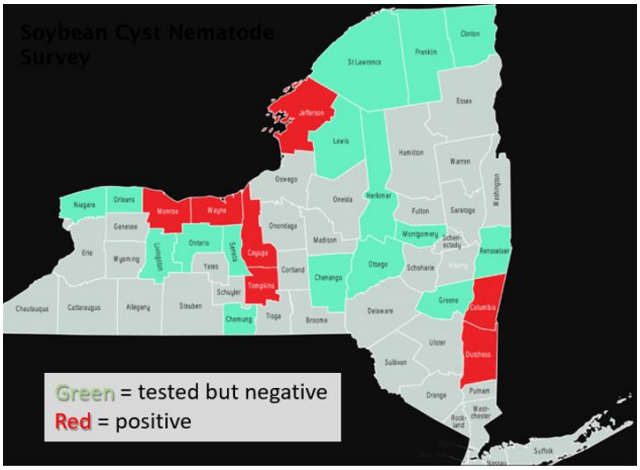

Figure 2. Soybean cyst nematode survey efforts since 2013. Counties colored in green had fields tested with negative results, and counties colored in red had one or more fields that tested positive for SCN. The first positive result was in Cayuga County in 2016. In 2019, as a result of the CAPS survey, six more counties tested positive.

Expected and Observed Impact

On a positive note, it is good that we didn't catch any moths of the two target species. For now, at least, these are two pests our growers don't need to be concerned about. Growers who were made aware of this CAPS survey gave positive feedback, indicating that they were glad these sort of efforts were underway, and some offered their farms as additional survey sites in future years. An article on the CAPS survey was posted on Cornell's Field Crops What's Cropping Up blog and published in the newsletter, potentially reaching thousands of subscribers.

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We will continue our outreach efforts in coming years, and expect that as growers learn and understand how important this pest can be, they will increase their own testing efforts and adopt integrated pest management tactics towards minimizing losses. We also hope to continue the soybean commodity CAPS efforts in future years to provide testing services in additional counties to gain a better understanding of the SCN distribution and race structure in NYS.

Project Conclusion

No Silver Y or Golden Twin Spot moths were caught during this survey, which likely means that they still are not species of concern to NY farmers. However, the expanded detection of the soybean cyst nematode is cause for concern. We are fortunate that the SCN populations are at low levels. This means we are ahead of the curve compared to other states where this pest can be devastating. We hope to continue the soybean CAPS survey efforts in 2020, and potentially beyond, and will be vigilant in our efforts on SCN education and encouragement of testing with an emphasis on an integrated management approach for this new pest.