



Northern NY Agricultural Development Program 2016-2017 Project Report

Diagnosis and Assessment of Diseases of Corn and Soybean in Northern New York

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- **Essex County:** Lee Garvey, George Sayward
- **Franklin County:** Dick Eakins, Jason Fox, Steve Gokey, Hutchins Farm, Gary Monica, Randy Ooms
- **Jefferson County:** Fairlawn Farm, Dennis Forrester, Mike Gracey, Morning Star Farm, Murcrest Farm, Murrock Farm, North Harbor Farm, Plessis Farm, Reedhaven Farm, Roggie Farms, Windsong Farm, H. Wood Farm
- **Lewis County:** Shawn Bender, Conway Farms, Hancor Farms, Matt Hoppel, Moserdale Farm, Terry Pominville, Silvery Falls Farm, Emmanuel Widrick
- **St. Lawrence County:** Steve Carr, Conrad Cook, Mark Decker, Greenwood Dairy Farm, Andy Hurlbut, Doug Lowry, Mapleview Dairy, Jim Putman, River Breeze Farms, Peter Schiltz, Stauffer Farms, Dave Stout

Background:

Corn for silage and grain is a foundational crop for the economic wellbeing of Northern New York (NNY) dairy and cash grain farms. Soybean shows great economic promise in NNY and the acreage in the region has expanded over the last decade.

Emerging and re-emerging plant diseases are a continual threat to the sustainability of these crops and the profit margin for crop producers is often a narrow one. Production of both corn and soybean is expanding to include more marginal, poorly drained soils in NNY and this raises questions about the impact of diseases in stressful environments.

New diseases arise and formerly minor diseases become more damaging on a regular basis. Frogeye leaf spot, sudden death syndrome, brown stem rot, and *Soybean vein necrosis virus* were each confirmed in individual soybean fields in NNY in 2012, and northern stem canker in 2014 for the first time, yet we have no idea how widespread or severe these diseases may be across the breadth of NNY farms.

Gray leaf spot has become a highly damaging disease of corn in humid valleys in the Southern Tier and Hudson Valley regions of New York State; there are similar environments in parts of NNY yet gray leaf spot occurrence has not been detected.

In 2013-2016, northern corn leaf blight was the dominant disease in corn fields throughout northern NY, indicating that it is widespread and undermanaged on many farms. However, in 2017, **northern corn leaf spot** was more commonly found than northern corn leaf blight.

Corn head smut is a re-emerging disease of concern, which was identified in 2014, 2015 and 2017 in Jefferson County for the first time in the region since the 1980s.

Common rust had an epidemic year in 2017 and may warrant management with fungicides in the future.

Fusarium root rot and wilt of soybeans was identified for the first time in 2015 and again in 2016.

Potentially serious soilborne diseases of soybean, including **Phytophthora root rot and charcoal rot** were each confirmed for the first time in northern NY in 2016.

In 2017, **white mold, stem canker and pod and stem blight** were the most commonly identified diseases of soybeans throughout the region.

Prior to the inception of this survey in 2013, no systematic assessment of corn and soybean diseases has been made in NNY in recent decades and was long overdue. Continuing this proactive disease assessment program helps protect the security and profitability of corn and soybean production in NNY.

Results of this research are being used to map the distribution of corn and soybean diseases in NY and will be made available to NY growers through extension outreach to

aid in their management decisions. All educational materials are posted on the disease management section of fieldcrops.org.

Increased local knowledge of crop diseases is the main benefit from this project. Northern NY farmers are increasingly faced with important management decisions that require knowledge of plant diseases such as:

- 1) What corn hybrids and soybean varieties should I grow? What diseases do I need genetic resistance to and at what levels in the hybrid or variety?
- 2) Should I apply a foliar fungicide(s)? Does the disease pressure in my field or in the general area warrant a chemical application?
- 3) What crop rotation sequences and tillage practices makes most sense for my farm? Are plant disease organisms building up in my soil or crop debris that suggests I need to change my cropping sequence or tillage practices in particular fields?

The greatest needs for disease assessment and proper disease identification concern leaf blights, ear rots, and stalk rots of corn; and foliar blights, stem and root rots, pod rots and other systemic diseases of soybean.

Methods:

Disease symptoms were noted and quantified, and representative diseased samples were collected and submitted to the Bergstrom Lab at Cornell University in 2017 by CCE field crop educators by Mike Hunter and Kitty O'Neil whenever problems were found during routine visits to farms in Jefferson, Lewis, Clinton, Essex, Franklin, and St. Lawrence counties.

In addition, an intensive field survey/assessment was conducted for disease detection and diagnosis in 12 sentinel fields of corn and 21 sentinel fields of soybean, chosen to maximize diversity of environment and cropping practices in each county. Each sentinel field was assessed one to three times during the growing season to include various growth stages of the crop.

In the Bergstrom Lab at Cornell, samples were cultured for pathogen isolation and examined microscopically, and pathogens were identified. Results have been collated and summarized and are shared with individual producers via CCE educators and at extension meetings.

Important new disease findings will be published through national databases and publications; pathogen isolates archived in the Cornell University Field Crop Pathogen Culture Collection; and DNA sequences submitted to GenBank.

Results:

Four corn diseases and **four soybean diseases** in total were identified and diagnosed among farm fields from the six counties surveyed in 2017.

Given the wet season, it is no surprise that **white mold** was an issue for many soybean growers (Fig. 1). **Northern stem canker** continues to be problematic for NNY growers, as well as **pod and stem blight**. It was surprising to see such low levels of **northern corn leaf blight** in a year that had weather conducive for an epidemic. **Northern corn**

leaf spot and **common rust** were more prevalent than usual this year, and the resurgence of **head smut** is concerning.

Conclusions/Outcomes/Impacts:

The wet spring conditions of the 2017 growing season surprisingly resulted in moderately low overall disease pressure for corn and soybeans across the Northern NY region. Many growers are successfully growing varieties and hybrids with some level of disease resistance and have adopted fungicide programs to combat a number of foliar diseases. The variability of weather conditions from year to year underscores the need for multiyear surveys to better understand the breadth of diseases potentially present to affect growers in NNY.

Northern corn leaf blight was observed, though not universal and at low levels, in Northern New York corn fields in 2017. Some BMR cornfields, which are more susceptible, were sprayed with foliar fungicides for northern corn leaf blight. The amount of fungal inoculum in corn debris continues to be elevated in the region, so farmers are urged to plant corn hybrids with moderate resistance to NCLB in 2018.

Head smut was observed again in 2017, and NNY growers should be aware of a potential resurgence of this disease which hasn't been a major concern for northern NY growers in almost three decades (Fig 2).

Common rust was one of the biggest challenges to corn growers in 2017 (Fig 3). Given the southern rust epidemic observed in the Midwest and other corn growing regions in 2017, Extension scouts were diligent in their efforts to identify this potential new threat. However, all samples received in the Bergstrom Lab in 2017 were diagnosed as common rust and southern rust was not confirmed in NY.

Many soybean fields suffered white mold infections, and some growers elected to treat with fungicides for this devastating disease.

The frequency of finding northern stem canker outbreaks in NNY in recent years is concerning, especially since genetic resistance is not widely available and many growers are not spraying to manage this disease because it is not likely cost effective to do so.

The soilborne systemic diseases of soybean, including white mold, Phytophthora root rot, northern stem canker and brown stem rot are potentially serious with long-term implications for crop rotation sequence and these diseases deserve further assessment in the region.

Despite five years of surveying for the soybean cyst nematode, it has not yet been confirmed in the NNY counties. If soybean cyst nematode is confirmed in the region, this will have important implications for soybean production in NNY. More intense nematode assay survey will be warranted and affected farms will need to plant soybean varieties with resistance to the nematode if it is discovered.

Outreach:

Results of the survey are being shared with growers and CCE educators via extension meetings in the region. A database of soybean diseases diagnosed by county is available at fieldcrops.org.

Next Steps:

Multi-year surveys better capture the reality of disease occurrences in the region due to the variation in weather from year to year, because each disease may be favored by specific weather conditions. We will continue the corn and soybean disease survey in 2018 to expand our database of which diseases occur in the counties of northern NY.

Acknowledgments:

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Reports and/or articles in which results of this project have been published.

Cummings, J.A., and G.C. Bergstrom. 2014. Northern stem canker: A new challenge for New York soybean producers. *What's Cropping Up?* Volume 24, No. 5:47-48 (<http://css.cals.cornell.edu/extension-outreach/whats-cropping-up>)

For More Information:

Soybean Disease Survey Results by County:

<https://fieldcrops.cals.cornell.edu/soybeans/diseases-soybeans/soybean-disease-survey/disease-diagnoses-county>

Diseases of Corn in NYS: <https://fieldcrops.cals.cornell.edu/corn/diseases-corn>

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