



## Northern NY Agricultural Development Program 2016-2017 Project Report

### Ear Damage Evaluation and Mycotoxin Screening of Corn Silage Hybrids: NNY Trials

#### **Project Leader(s):**

Cornell University Cooperative Extension North Country Regional Ag Team Field Crop Specialists:

- Mike Hunter, 315-788-8450, [meh27@cornell.edu](mailto:meh27@cornell.edu)
- Kitty O'Neil, 315-854-1218, [kao32@cornell.edu](mailto:kao32@cornell.edu)

#### **Collaborator(s):**

- **Joe Lawrence**, PRO-DAIRY, Cornell University, c/o 5274 Outer Stowe St., Lowville, NY 13367
- **Margaret Smith**, Plant Breeding and Genetics, Cornell University, Ithaca, NY 14853
- **Elson Shields**, Entomology Department, 4144 Comstock Hall, Cornell University, Ithaca, NY 14853
- **Gary C. Bergstrom**, Department of Plant Pathology and Plant-Microbe Biology, Cornell University, 334 Plant Science Building, Ithaca, NY 14853-5904
- **Jaime Cummings**, Research Support Specialist, Department of Plant Pathology and Plant-Microbe Biology, Cornell University, Ithaca, NY
- Kenneth Wise, NYS IPM Program, 2715 U.S. 44, Millbrook, NY 12545

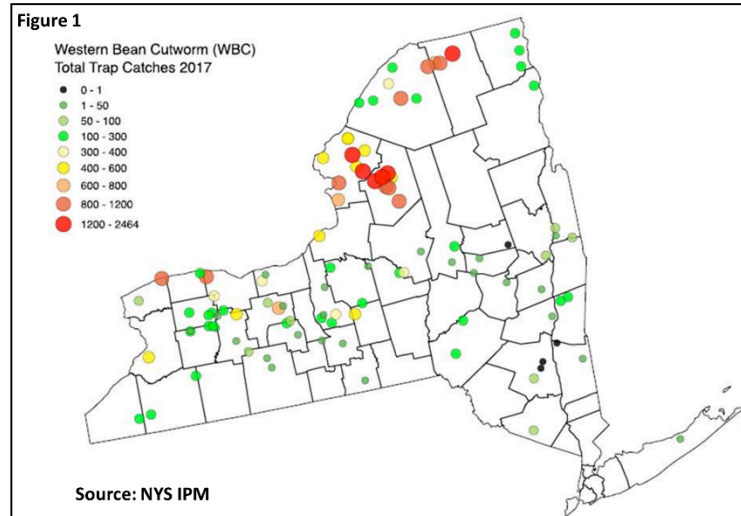
#### **Cooperating Producers:**

- Greenwood Dairy, St. Lawrence County

#### **Background:**

The presence of Western Bean Cutworm (WBC) in New York corn fields continues to expand as shown in the WBC Pheromone Trap Network coordinated by the NYS Integrated Pest Management (IPM) program, though the insect's apparent population varies significantly across the state (Figure 1).

Where WBC populations are high, the corresponding ear damage from WBC feeding can leave wounded corn ears more susceptible to pathogen development, but a clear relationship between ear damage and mycotoxin development has not been documented. A number of mold species may develop on corn ears and relatively few of these produce mycotoxins. Principal concern in New York is with the mycotoxins deoxynivalenol (DON or vomitoxin) and zearalenone, both produced by the fungus *Fusarium graminearum*.



While WBC damage to corn ears can be significant and may have detrimental effects on corn grain yield and quality, the economic impact on corn silage is less understood. For corn silage growers, understanding whether or not this pest significantly impacts the yield or quality of the forage is critical to their decision making for managing this pest.

### **Methods:**

The Commercial Corn Silage Testing program conducted by Cornell University in collaboration with the University of Vermont and the Northeast dairy industry offers a good opportunity to evaluate numerous hybrids for ear damage from WBC and mycotoxins. In 2017, 49 corn hybrids were selected and planted in a replicated plot in St. Lawrence County in Northern New York. The plot was scouted prior to harvest for WBC feeding damage to the ears. Composite samples, of whole plant silage, for each hybrid were taken at harvest and submitted to the Dairy One forage laboratory for a mycotoxin screening package which included aflatoxins B1, B2, G1, G2, vomitoxin, 3-acetyl DON, 15-acetyl DON, zearalenone, and T2 toxin.

### **Results:**

The results of the WBC and mycotoxin screening project revealed large differences in the number of hybrids damaged by WBC, but surprisingly few hybrids tested positive for measurable mycotoxins (Table 1). Also see Evaluation of the Efficacy of Bt Corn for the Control of Western Bean Cutworm in NNY, posted separately at [www.nnyagdev.org](http://www.nnyagdev.org).

The most prevalent species of mycotoxin-producing mold found in the screening was *Fusarium graminearum* which can also infect corn ears through the silk channels at the time of pollination during favorable weather conditions and result in contamination of the grain and silage with the mycotoxins DON, 3-ADON, 15-ADON, or zearalenone. A

review of the 2017 weather data at this trial site showed wet conditions conducive to this type of infection. As expected for New York, no aflatoxins were detected.

		<b>Madrid, NY</b>
WBC Trap Counts (seasonal total)		356
# Hybrids		49
# Hybrids with WBC Damage		32 (65.3%)
Hybrids Positive for Mycotoxins DON or zearalenone	Total Hybrids	19 (38.8%)
	NO WBC Damage	6
	WBC Damage Present	13

**Conclusions/Outcomes/Impacts:**

While there are numerous ways in which molds can establish themselves in forages, this study reflects a common challenge researchers face while attempting to document the conditions where mycotoxin development is likely, thus recognizing that the results reported here are specific to the 2017 growing season, which was conducive for silk channel infections. A different relationship between WBC damage and mycotoxin development may be found during a growing season less conducive to silk channel infections.

These results from one year of data do not provide strong evidence that WBC damage is a significant concern for corn silage growers who are worried about mycotoxins in their silage. It is also important to note that these results do not reflect what may occur in corn harvested for grain as the time between silage harvest and grain harvest offers additional opportunities for infection and growth.

**Outreach:**

The results from this on-farm research trial are being disseminated to corn growers, crop consultants, agribusinesses, and extension field crops staff members throughout New York State. To date, the data from this project has been included in presentations at the Northwest New York Cornell Cooperative Extension Corn Congresses in Batavia and Waterloo, the North Country Crop Congress, the W.H. Miner Agricultural Research Institute Crop Congress, Hallett Spraying grower meeting, Lowville Farmers Co-op Forage Forum, Cayuga County Pesticide Meeting, Delaware County CCE Meeting, SCNY CCE Winter Crop Meeting, Oneida County Crop Congress, Channel Seed Dealer Trianing, Cornell Seed Conference, Certified Crop Advisor Training, Cornell Field Crop Dealer Meeting, and Cornell Nutrition Conference.

**Next Steps:**

Multiyear studies, including years of varying weather conditions, are required for further evaluating these risks and providing recommendations.

**Acknowledgments:**

The Northern New York Agricultural Development Program provided financial support for this project.

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

**For More Information:**

- Joe Lawrence, Dairy Forage Systems Specialist, PRO-DAIRY, Cornell University, 5274 Outer Stowe St., Lowville, NY 13367; [jrl57@cornell.edu](mailto:jrl57@cornell.edu); (315)3765-270
- Mike Hunter, Regional Field Crops Specislist, Cornell University Cooperative Extension Northern New York Regional Ag Team, 203 North Hamilton Street, Watertown, NY 13601; [meh27@cornell.edu](mailto:meh27@cornell.edu); 315-788-8450
- Kitty O'Neil, Regional Field Crops Specislist, Cornell University Cooperative Extension Northern New York Regional Ag Team, 2043B State Hwy 68, Canton, NY 13617; [kao32@cornell.edu](mailto:kao32@cornell.edu); 315-379-9192