



## Final Report

### **Insects On-Line: Forecasting insect management for nursery and Christmas tree growers**

**FVI 16 013**

**Duration:** July 1, 2016 - June 30, 2019

**Elizabeth Lamb**

#### **Impact Data**

Number of Producers Participating: 26. Notes: Growers participating in the weekly emails in 2019.

Number of Producers Advising: 26. Notes: The original advisory group did not function well, but we used the 26 growers.

New Full-Time Jobs: 0. Notes: Most Christmas tree farms in NYS are small and family operated so pest management is done by existing employees.

Retained Full-Time Jobs: 0. Notes: No net loss in jobs. I'm not sure how to assign a number here.

Research/Extension Employed: 0. Notes: In this project, there was funding for 2 Extension positions and 1 technical.

Increase in Gross Revenue: \$0.00. Notes: Not measured.

New Gross Savings: \$0.00. Notes: No specific information on amount saved but 6/15 said that using the GDD emails saved them money on pest management and 9/15 said it saved them time. 10/15 said it reduced pesticide applications (which should lead to cost savings).

New Capital Investment: \$0.00. Notes: Not expected.

Potential Industry Impact: \$0.00. Notes: The potential industry impact on reduction of pesticide use has associated impacts on reduced production costs. While we are encouraging increased scouting, which could increase labor costs if growers were calculating them, more than half said it reduced their time spent on pest management. We don't have any specifics on how much money was saved.

Articles/Publications: 1. Notes: Kara Dunn wrote an article for American Agriculturalist but none for us yet – waiting to get models active.

Presentations (less than 3 hours): 9. Notes: Nursery and Christmas tree industry meetings in 2017 and 2019.

Total Producers Reached: 180. Notes: 120 growers at 2019 CTFANY winter meetings heard presentation on NEWA and GDD tools 59 Nursery/landscape and Christmas tree growers answered survey 2017 for background information.

Matching Funds: \$0.00. Notes: Unofficial match in grower time for increased scouting.

#### **Change to Baseline Farm Data**

The typical Baseline Farm Data collected covers income and number of employees for an operation. It is unlikely that the impacts created from improving growers' ability to manage insect pests would create measurable changes to either. There is potential impact on the time and labor required for insect pest management but it is likely very specific to the individual farm, depending on the amount of time currently spent scouting and applying pesticides or other pest management activities. In some cases, the time and labor expense could increase, while in others it could decrease. In neither case is it likely to shift total farm sales. It is also conceivable that, for a large operation, a significant increase in scouting duties would encourage a grower to increase the work force by hiring a dedicated scout. Our results to date haven't shown that.

The project specific questions on which and how insect pests are managed are also not expected to change. Depending on the original answer given, it is possible that project activities might encourage a grower to change how they determine when to apply a pesticide and the amount spent on insect control in a year. At this point, we do not have the information to report those changes. As we continue this project, we will gather that information as part of working with growers and Integrated Pest Management.

### **Profitability, Competitiveness, Sustainability Improvements**

The 26 growers (25 farms) that were involved in the Growing Degree Day (GDD) emails throughout the summer of 2019 are our best measure of profitability and sustainability. Future improvements are based on the assumption that, when the insect GDD models are available, growers will access NEWA to get the information on scouting and management. There is some evidence from the survey that growers would be less willing to go find the information themselves, as opposed to having it provided. However, the 15 growers that responded to the survey suggested that having information to assist them in scheduling scouting and pesticide applications saved them money on pest management (6), saved them time on pest management (9), and reduced pesticide applications (10).

We assume that reducing pesticide applications while maintaining levels of pest management increases environmental sustainability. It may or may not result in a concurrent increase in profitability or economic sustainability as costs of labor for scouting and costs of pesticides/labor for application may move in opposite directions. While there is some public interest in Christmas trees with lower or no pesticide applications, it has not been a widely used marketing tool, so there is currently no price or competitive advantage for trees grown with IPM practices including reduced pesticide use. As many NYS Christmas tree farms are small and family operated, there are some direct benefits to the growers in not having to apply pesticides as frequently, however.

Expanding the use of GDD for scheduling pest management to the nursery and landscape industries will increase the number of users, certainly, but may also not affect profitability in a measurable way. Based on a recent IPM focus group with nursery owners, they try to limit pesticide applications whenever possible, choosing to tolerate some level of insect damage. This GDD NEWA system should help them in ensuring that pesticide applications are indicated in order to not exceed their tolerance of damage.

For landscapers, there could be a market advantage of advertising low/no pesticide use to their clientele and which therefore might encourage them to use GDD system for pest management. NYS Department of Environmental Conservation and other organizations have promoted 'green' landscaping and the Northeast Organic Farming Association does accredit Organic Land Care Professionals in the Northeast. ([http://www.organiclandcare.net/sites/default/files/upload/2019\\_list\\_of\\_nofa\\_accredited\\_professionals\\_7-15-19.pdf](http://www.organiclandcare.net/sites/default/files/upload/2019_list_of_nofa_accredited_professionals_7-15-19.pdf)). The number of people accredited is relatively low and doesn't really indicate the potential for use of the GDD NEWA system, however.

We will continue to work to gather this information as the project continues past the end of the funding period.

### **Knowledge Gain**

The use of GDD to schedule scouting and determine treatment for insect pests of woody ornamentals is the basis for using the GDD based models to be included in the NEWA program. Growers were exposed to the use of GDD several times throughout the project; to assess current use and to explain the NEWA model system.

At a 2016 Landscape IPM program on Long Island, the NEWA GDD project was introduced and growers

were asked for suggestions of insects to include. While the evaluation asked the more general question of 'Did you learn any specific information today that you plan to incorporate into your business?', 5 of the 35 growers who wrote in comments mentioned the NEWA project.

Initial surveys on use of GDD and phenology and source of GDD information were done in 2017 at the Christmas tree growers (37 responses) summer meeting and a fall meeting of the nursery/landscape industry (22 responses). Results of the surveys are attached. Similar questions were asked in the Christmas tree IPM adoption survey run in Summer 2019 (204 responses - related questions attached) and the Nursery IPM adoption survey currently running (108 responses to date). While it is difficult to assess knowledge gain from merely asking someone if they are doing something, I was reminded by a focus group member for the Nursery survey that survey questions do act to spark the memory of things one could or should be doing.

The seven growers' meetings held throughout the state in early 2019 were more specifically aimed at increasing grower knowledge. There were approximately 120 attendees who all heard about the use of GDD and the way that NEWA does insect modeling. The 26 growers who volunteered to be part of the 2019 trial of GDD emails went beyond knowledge gain to implementation.

### **Outreach**

The spreadsheet of outreach activities is attached. Early presentations were to introduce growers to the project and elicit information on what their needs and understanding of forecasting methods were. Later presentation were workshops to show growers how the system will ultimately work and to acquaint them with the NEWA system.

An article based on the 2019 grower email GDD project was written by Kara Dunn. K.L. Dunn, 2019, Data drives Christmas tree grower's IPM program, September 2019, American Agriculturalist, <https://www.farmprogress.com/crops/data-drives-christmas-tree-grower-s-ipm-program> (there may also be a print version)

### **Industry Changes**

Evaluations after presentations throughout the grant period indicate that growers are interested in using GDD to determine when to scout and manage insect pests. From a Christmas tree IPM survey in 2007, 22% of growers (157 respondents) indicated that they used GDD to determine when to treat insect pests. From a similar survey in 2019 (204 responses), 29% used GDD regularly and an additional 23% sometimes used it to determine when to treat. There are several potential impacts of the expanded use of GDD to determine pest management timing. Using GDD to time scouting would be labor saving for growers who scout for insects. While it would potentially increase labor costs for those who don't currently scout, it could result in improved pest management by efficiently allowing growers to determine which insect pests they have and when so they can be controlled. The primary impact for growers who use pesticides is a reduction in pesticide use, with its associated reduction in cost of product and labor, by avoiding unnecessary applications and timing the remaining applications to increase their efficacy. Growers who don't apply pesticides would still benefit from using GDD to monitor pest levels by implementing non-chemical pest management tactics such as traps at the appropriate time. Those growers who participated in the GDD email project this summer were a self-selected group who had enough interest in the project to volunteer so they may not completely represent the general population of growers. However, of the 60% of the group who responded to the survey, 33% used GDD frequently before the study, 33% used it occasionally and 33% never used it, similar to what we found in the broader 2019 IPM survey of NYS Christmas tree growers. To extrapolate to a broader industry change, I will use the percent who say they will continue to check the GDD values on NEWA (more work than having them sent directly as they were in 2019) to determine the percent of the larger population who would use the

NEWA insect pest models (=53%). Therefore, 53% of NYS Christmas tree growers will use the GDD information to determine when to scout, and 49% will use it to determine what to look for when they scouted. Forty-six percent will use the information to determine when to treat the insect pests. We will continue to do outreach on this project after the end of the project period. As we collect grower success stories, it becomes easier to encourage growers to adopt the practice of using NEWA GDD-based insect models to determine their pest management.

### **Farm Success Stories**

While I have email correspondence from some of the growers during the summer project, letting me know that the information was useful and that they were using GDD to scout and apply pesticides, the most complete farm level success story I have is the one that Kara Dunn research for her article. From my emails, I know that Brian reevaluated the weather station best for his farm, used white pine weevil traps to help with scouting, and felt that the GDD information was helpful in pinpointing his scouting. Kara's story has the quotes that make it clearly a success.

Brian Skeval, 1949 Pompey Ctr Rd., Fabius 13063, 315 313-2972

<https://www.farmprogress.com/crops/data-drives-christmas-tree-grower-s-ipm-program>

### **Photos, Presentations, Charts, Publications**

#### **Outreach events (Outreach events.xlsx)**

12/23/19 A spreadsheet of presentations on the GDD project

#### **Christmas tree IPM adoption survey 2019 (2019 Christmas tree ipm adoption - GDD.pdf)**

12/23/19 Relevant questions on GDD use from the NYS Christmas tree IPM survey Summer 2019

#### **Christmas tree grower GDD survey 2017 (GDD background - Christmas tree growers.pdf)**

12/23/19 Evaluation survey after presentation on GDD and phenology use for scheduling insect scouting and management to Christmas tree growers in 2017

#### **2017 Nursery grower GDD survey (GDD Background - nursery growers.pdf)**

12/23/19 Evaluation survey after presentation on GDD and phenology use for scheduling insect scouting and management to nursery/landscape industry in 2017

### **Final Report Summary Statement**

Christmas tree growers and nursery/landscape professionals use growing degree days (GDD) - a method of measuring temperature to evaluate an insect pest's stage of development and population increase - to make pest scouting more efficient and reduce unnecessary pesticide applications. This project has helped us refine the information to create pest insect models for the Network for Environment and Weather Applications (NEWA) so growers have the tools they need specific to their environmental conditions. As part of the project, we presented information on GDD methods and NEWA to over 400 people from 2016-2019 and gathered input on which pests to include and how best to get the information out. We also ran a season-long trial of GDD updates with 25 farms in 2019. As one grower commented "Knowing exactly when to react allows me to treat just the affected trees, leaves money in my pocket, and the trees look great."