2019 New York Sweet Corn Pheromone Trap Network (SCPTN)

Project leader

Marion Zuefle New York State Integrated Pest Management Program

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Cooperators

Adam Abers, Kennedy; Anne Bloomfield, Hudson Valley Farm Hub; Brian Boerman and Jessica Dueppengiesser, ACS; Derek Johnson, Unadilla; David and Sarah Krist, Portville; George Krul, Oswego; Jeff Kubecka, Kirkville; Ashley and Matt Merle, Attica; Bruce Reed, Geneva; Keith Slocum, Our Green Acres; John Steele, Avon; Allie Strub, Williamson; Linda Underwood, Preble; Jen Wilcox, independent consultant; Andy Young, Carlton; Mike Hunter, CCE Jefferson Co.; Kitty O'Neil, CCE Franklin Co.; Abby Seaman, NYS IPM; Elizabeth Buck, John Gibbons, Christy Hoepting Cornell Vegetable Program; Chuck Bornt, Ethan Grunberg, Natasha Field, Elisabeth Hodgdon, Teresa Rusinek, and Crystal Stewart, Eastern New York Commercial Horticulture Program

Abstract

For 25 years, the Sweet Corn Pheromone Trap Network has been monitoring the flight of three important insect pests of sweet corn, European corn borer, corn earworm, fall armyworm, and more recently, 2010, Western bean cutworm. These insects cause damage to sweet corn ears in their larval stage. These pests are moths in their adult stage and can be monitored using traps baited with pheromone lures specific for each species. Traps are placed near sweet corn fields to monitor moth flights. The weekly trap catch information allows growers, consultants, Cooperative Extension and vegetable processor field staff to track the flights and make informed decisions about when sweet corn fields need to be scouted or treated with an insecticide. This project was funded in part by in-kind contributions from growers and consultants who host and check traps.

Background and Justification

Sweet corn for the fresh and processing markets is an important crop throughout NY. In 2018 sweet corn was planted on 30,600 acres in New York with a value of 36 million dollars (USDA 2018 Vegetable Summary). Four major pests of sweet corn, European corn borer (ECB-E and ECB-Z), corn earworm (CEW), fall armyworm (FAW) and Western bean cutworm (WBC) can be monitored in their adult stage using pheromone traps. Pest management is an especially important aspect of fresh market sweet corn production because the unhusked ear is marketed, and buyers are frequently very sensitive to insect damage or the presence of larvae in the ear. Harvest quality requirements are different for processing corn, which usually receives fewer insecticide applications than fresh market corn. Integrated pest management practices are widely used on both crops to determine the need for insecticide applications. Pheromone trap catches provide valuable information to growers, consultants, and processor field staff making pest management decisions. Pheromone trap catches help growers and consultants decide when to start scouting fields for egg masses and larvae, reinforce what scouts are finding, help growers choose the best spray materials for the pest complex that's present, and alert the industry to the arrival of the migratory pests, CEW and FAW.

Pheromone Trap catches from 24 sites in western NY and 14 sites in Eastern NY (Figure 1) were an integral part of the weekly pest update newsletter, *VegEdge* and *Veg Update*. VegEdge is sent by the Cornell Vegetable Program to subscribers in 14 counties and *Veg Update* is sent by the Eastern NY Commercial Horticulture Program (ENYCHP) to subscribers in 17 counties. The Trap catches were also posted weekly to the sweet corn pheromone trap network blog, linked through the NYS IPM Program website, the Network for Environment and Weather Applications website, and posted to a regional website (PestWatch) that includes trap catches from

several northeastern states, making the information available to a large number of growers and extension personnel.

Objectives

1. Establish and maintain a network of pheromone traps for sweet corn pests in NY.
2. Provide regional trapping information and recommendations to extension field staff and consultants working with sweet corn growers.
3. Provide regional trapping information to growers, along with scouting and threshold recommendations.

Procedures

1. Sets of one each of ECB-E, ECB-Z, CEW, FAW, and WBC traps were placed at each of 38 trapping locations, 24 sites in western NY and 14 sites in eastern NY (Figure 1). Scentry Heliothis net traps were used to trap ECB and CEW. The BCS/Agrisense Unitrap was used for FAW and WBC. Lures from Trece Inc. were used for both races of ECB. Lures from Scentry Inc. were used for CEW, FAW and WBC. All lures were replaced every two weeks.
2. ECB, CEW, and FAW traps were set up in late-May at fresh market locations, and as processing fields approached tassel emergence in other locations. WBC traps were set up in early to mid-June.
3. Traps were placed at least 40 meters apart in grassy areas near sweet corn fields, avoiding areas near hedgerows where air circulation is poor. Heliothis traps were mounted on posts such that the bottom of the trap is ~6" above the grassy canopy. Unitraps were hung from short stakes to which angle brackets had been attached and were placed either in the field or at the edge of the field. Whenever possible, traps were moved to new fields as the previous fields matured (silks became dry) and became less attractive to moths.
4. Cooperators checked traps weekly on Monday or Tuesday and sent trap catch numbers to Marion Zuefle via phone or email. Weekly catches for each location were collated and posted, along with interpretation and scouting and thresholds recommendations for fresh market sweet corn, on the sweetcorn.nysipm.cornell.edu blog.
5. Information posted on the blog was used directly by subscribing growers, incorporated into crop and pest updates distributed weekly by regional extension programs, or provided to growers via direct contact with collaborating consultants. All catches were also posted on the PestWatch website

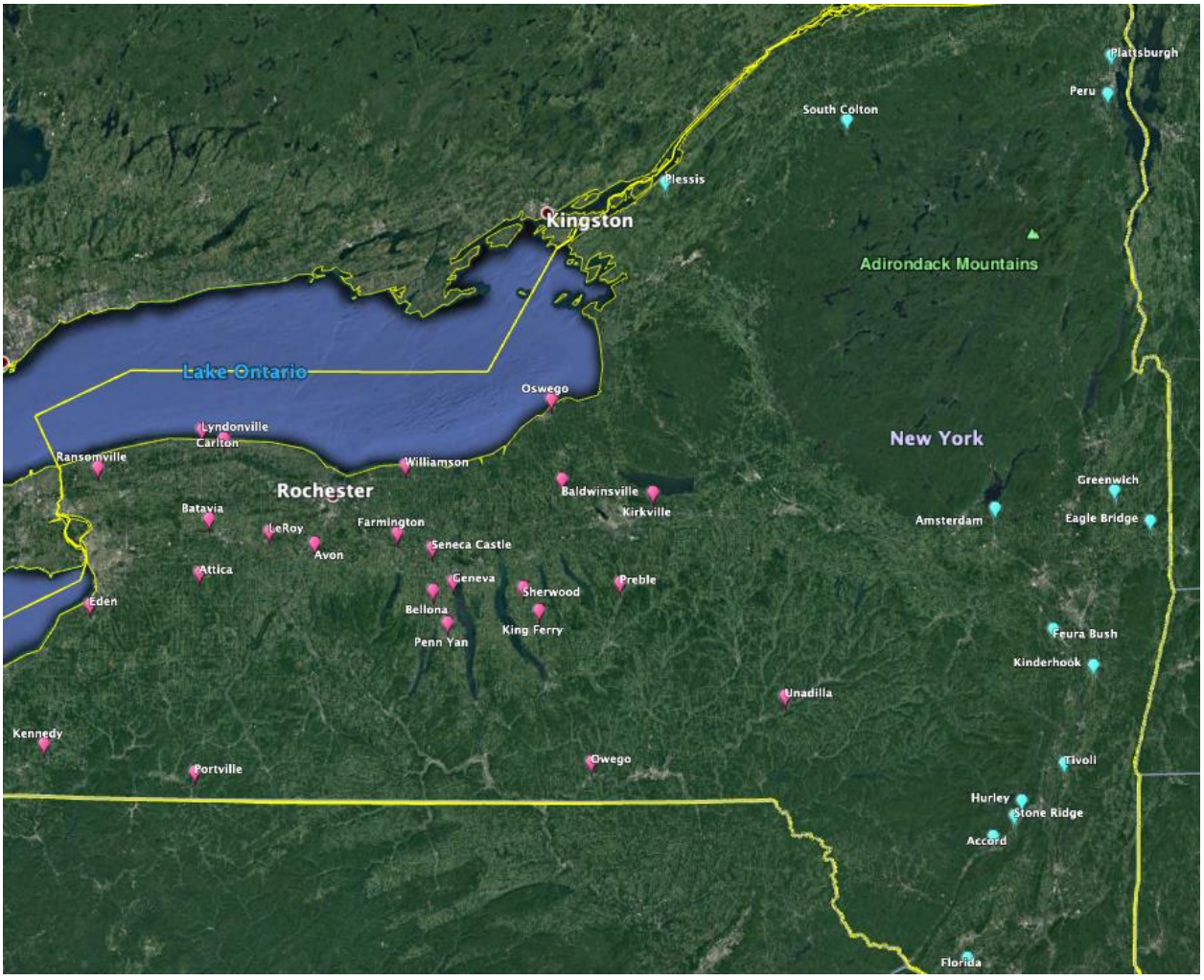

Figure 1. Map showing the 24 trap locations in western NY (pink) and the 14 trap locations in eastern NY (blue).

Results and Discussion:

The overall trend for the flights of the five moth species is represented in Figure 2, which gives the average trap catch for all 38 sites. ECB-E and ECB-Z remained fairly low throughout the season, this is similar to what we experienced in 2018 (Figure 3) and 2017. Peak flight for both ECB-E and ECB-Z averaged below 5 moths per week. There were two peak flights for ECB-E in 2019, the first peak occurred June 4th and the second occurred August 6th. For ECB-Z, the peak flight was much lower with an average of 1 moth caught per trap which occurred on June 11th. Both of these moths continue to decline overall when looking at the 26-year trend

(Figure 4), with the biggest drop seen after 2006. This decline has been attributed in part to the increase use of Bt field corn.

In 2018 we had the third highest CEW flight since 1997, but in 2019 the flight was back down near the average (Figure 5). Peak flight for CEW happened on September 10th with an average of 18 moths (Figure 2). This is down 72% from the previous year. Fall armyworm trap catches for 2019 were slightly higher than in 2018 but followed a similar pattern. In both years there were two peak flights. The first occurred late August and the second occurred 3-4 weeks later. These are the only two years that have shown to separate peaks, all other years show a single peak in early to mid-September. The average FAW caught per location remains close to the average for the last 22 years at about 6 moths (Figure 5).

In 2010 we began monitoring the flight of Western bean cutworm in NY. Trap catches steadily increased for the first 5 years of monitoring but seemed to have leveled off over the last 5 years (Figure 5). Flight usually begins in late July and lasts through the end of August. In 2019 WBC peaked August 13th with an average trap catch

of 25 moths (Figure 2). This was nearly two weeks later than 2018 (figure 3) and partly due to the cool spring which delayed their development.

Pest pressure varies greatly among years but also within a year depending on the site location. This can be seen in the cumulative trap catch for each moth species at the 38 different sites (Table 1). For this reason, it is important to continue monitoring the flights throughout NY with traps placed in representative areas of the state.

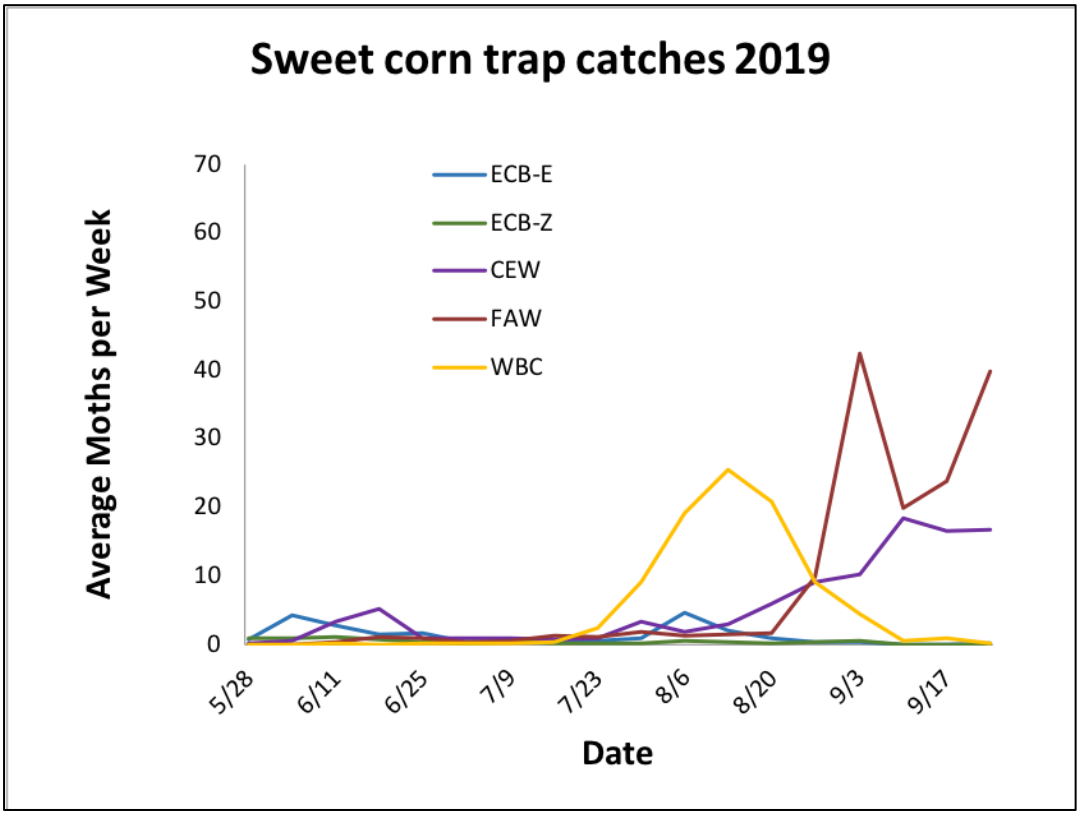

Figure 2. Average number of moths caught per week for all 38 sites in 2019.

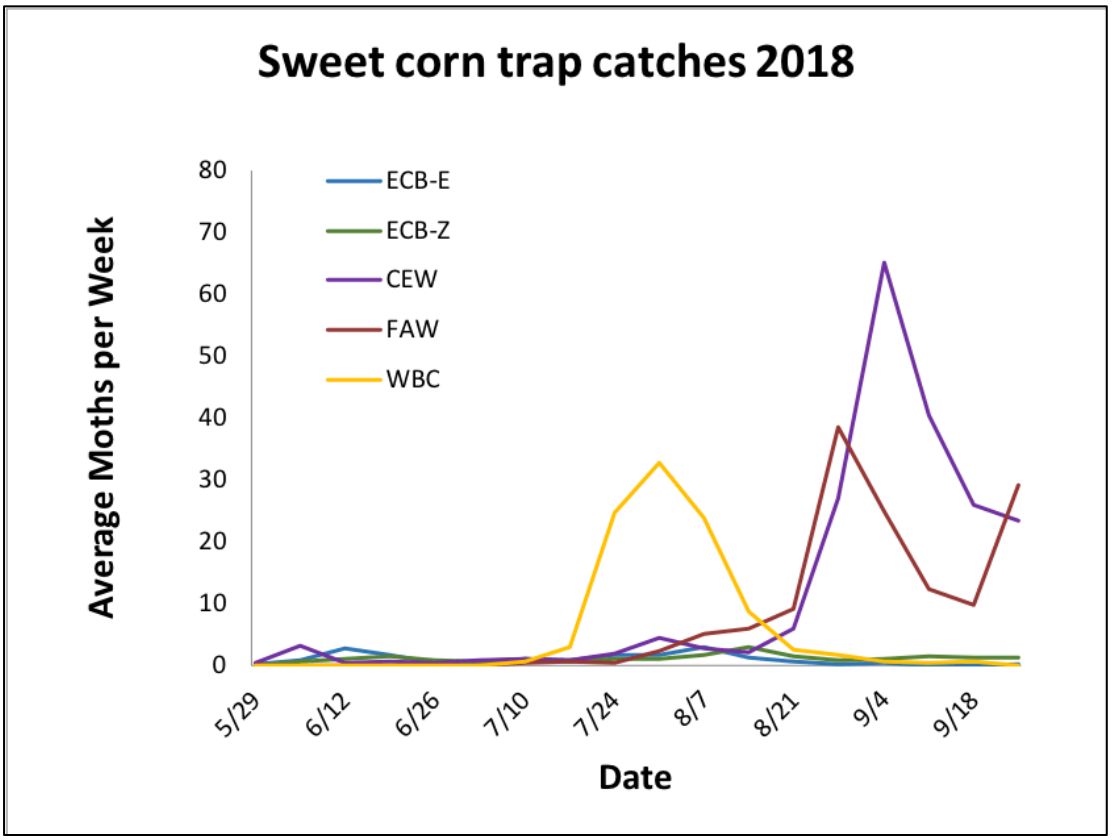

Figure 3. Average number of moths caught per week for all 37 sites in 2018

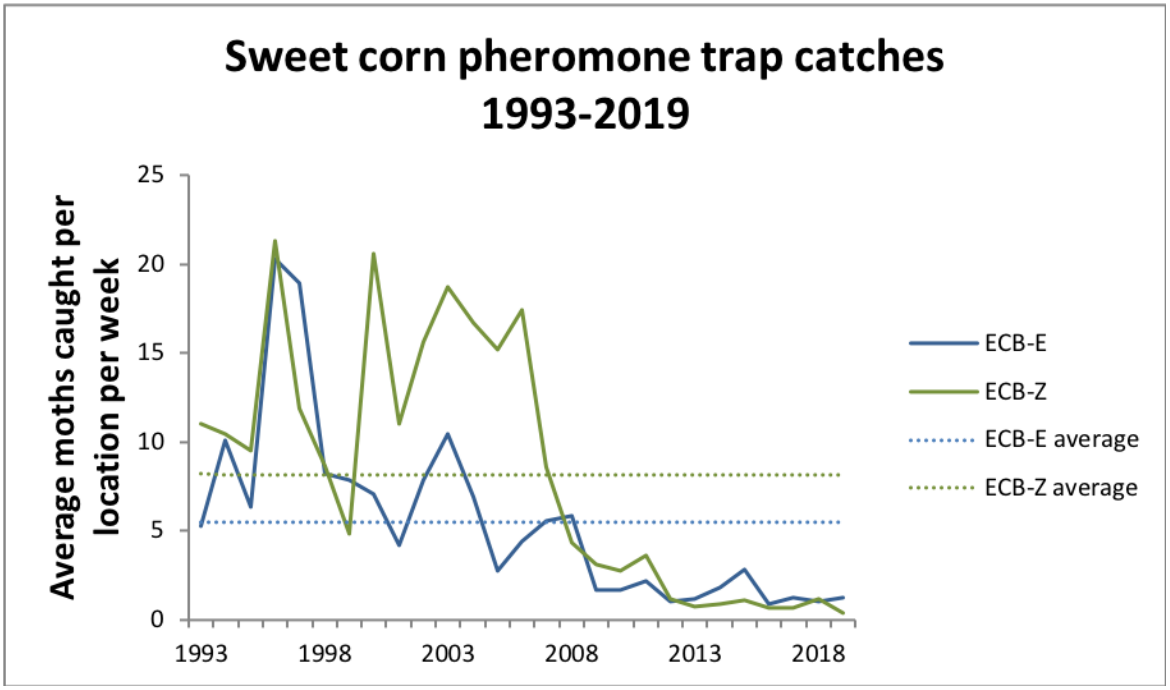

Figure 4. Average number of European corn borer, both E and Z race, moths caught per trapping location per year from 1993-2019.

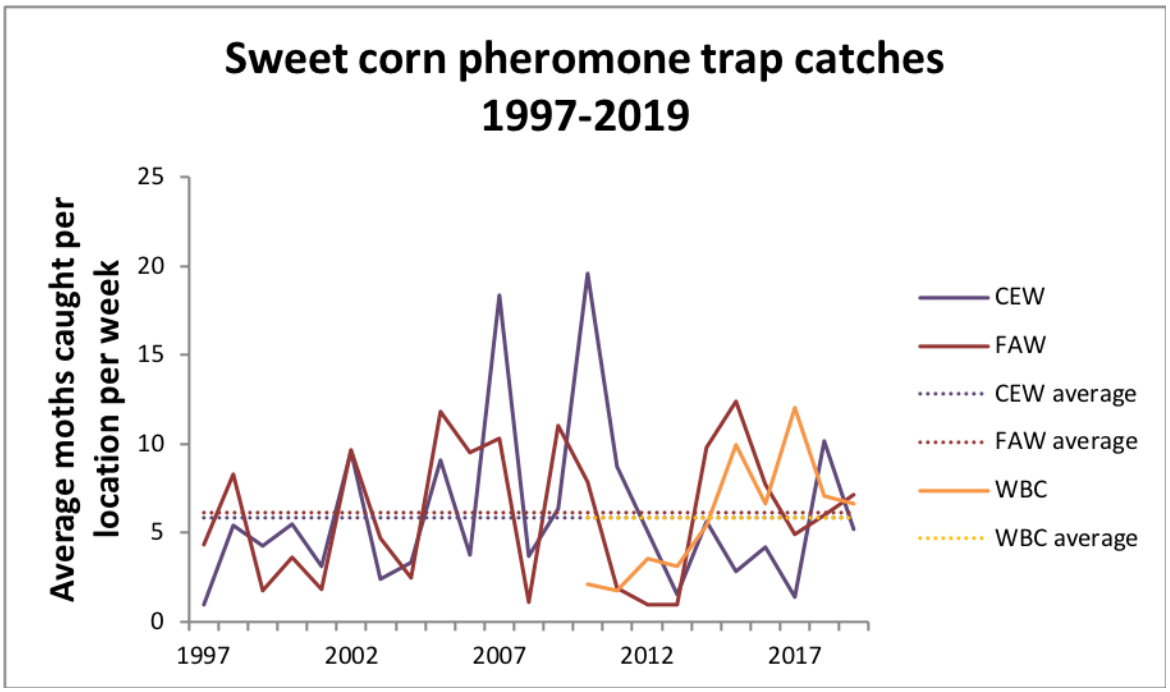

Figure 5. Average number of corn earworm (CEW), fall armyworm (FAW) and western bean cutworm (WBC) moths caught per trapping location per year from 1997-2019.

Table 1. Weekly average moths caught at each of the 38 sites in 2019.

Site	ECB-E	ECB-Z	CEW	FAW	WBC
Accord	0.3	0.1	2.5	2.1	0.0
Amsterdam	3.7	0.0	2.7	0.0	0.8
Attica	0.0	0.2	1.2	0.6	2.0
Avon	0.7	0.0	13.3	8.3	0.0
Baldwinsville	0.7	0.0	4.1	8.6	17.9
Batavia	0.0	0.1	1.8	0.2	2.2
Bellona	0.0	0.0	5.7	29.7	5.6
Carlton	0.4	0.1	0.1	9.3	5.4
Eagle Bridge	0.2	0.4	1.5	0.1	0.2
Eden	0.0	0.0	7.6	29.3	7.6
Farmington	0.5	0.0	0.5	0.3	0.5
Feura Bush	0.5	0.3	20.8	1.7	1.1
Florida	0.5	0.9	5.4	7.6	2.4

Site	ECB-E	ECB-Z	CEW	FAW	WBC
Geneva	2.5	0.6	0.8	2.7	4.6
Greenwich	0.2	0.0	6.3	1.5	3.8
Hurley	7.7	3.7	1.1	0.0	1.2
Kennedy	0.0	0.9	1.1	5.6	4.4
Kinderhook	0.2	0.5	19.9	4.7	5.0
King Ferry	0.0	0.0	25.7	40.8	2.1
Kirkville	0.0	4.0	0.0	0.3	6.0
LeRoy	0.6	3.0	48.0	112.8	1.6
Lyndonville	0.3	0.0	5.6	5.4	32.6
Oswego	0.0	0.0	0.8	10.4	15.6
Owego	0.5	0.3	0.3	0.0	0.3
Penn Yan	0.3	0.0	4.1	3.6	5.0
Peru	0.0	0.0	0.6	0.3	4.6
Plattsburgh	0.1	0.1	2.5	2.4	36.9
Plessis	0.0	0.4	0.9	0.1	14.5
Portville	4.0	0.1	3.9	1.3	2.1
Preble	0.0	0.0	0.0	0.4	12.6
Ransomville	0.4	0.1	7.5	7.7	2.7
Seneca Castle	13.9	0.8	0.3	1.1	0.9
Sherwood	0.3	0.0	29.0	36.0	3.3
South Colton	0.8	0.5	0.3	1.0	24.5
Stone Ridge	1.9	0.1	9.2	NA	NA
Tivoli	1.1	0.3	1.1	0.2	0.7
Unadilla	0.1	0.0	6.4	0.2	4.5
Williamson	0.0	0.0	0.0	0.0	0.8

Project Locations

Accord, Ulster Co.; Amsterdam, Fulton Co.; Attica, Wyoming Co.; Avon, Livingston Co.; Baldwinsville, Onondaga Co.; Batavia, Genesee Co.; Bellona, Yates Co.; Carlton, Orleans Co.; Eagle Bridge, Washington Co.; Eden, Erie Co.; Farmington, Ontario Co.; Feura Bush, Albany Co.; Florida, Orange Co.; Geneva, Ontario Co.; Greenwich, Washington Co.; Hurley, Ulster Co.; Kennedy, Chautauqua Co.; Kinderhook, Columbia Co.; King Ferry, Cayuga Co.; Kirkville, Madison Co.; LeRoy, Genesee Co.; Lyndonville, Orleans Co.; Oswego, Oswego Co.; Owego, Tioga Co.; Penn Yan, Yates Co.; Peru, Clinton Co.; Plattsburgh, Clinton Co.; Plessis, Jefferson Co.; Portville, Cattaraugus Co.; Preble, Cortland Co.; Ransomville, Niagara Co.; Seneca Castle, Ontario Co.; Sherwood, Cayuga Co.; South Colton, St. Lawrence Co.; Stone Ridge, Ulster Co.; Tivoli, Dutchess Co.; Unadilla, Delaware Co.; and Williamson, Wayne Co.

Samples of Resources Developed

Weekly blog posts from 5/28/19 to 9/24/19; totaling 18 posts were posted to the Sweet Corn Pheromone Trap Network Report blog found at: http://sweetcorn.nysipm.cornell.edu/. There are 113 subscribers to the blog and within the last year this blog has received 2,385 page views by 683 users.

The weekly blog posts are also included in the *VegEdge* newsletter which has 435 enrollees. Trap counts for eastern NY are presented in the *Weekly Veg update* which has 550 enrollees.