



A unique pest management situation is created this time of year in high tunnel winter

green plantings that can result in high pressure of pests. Plan now!

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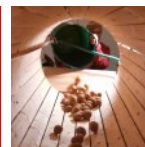
Growers that rely on Bt sweet corn in the latter half of the summer still saw considerable damage in their corn in 2018. Why is that? What is Bt sweet corn?

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Spotted lanternfly is an invasive insect under quarantine in PA and NJ. Here's what you need to know about the pest and moving goods from quarantined zones.

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Checklists have been developed for cleaning conveyor brush washers and root barrel washers. Helpful hints, supply lists, and critical cleaning points are identified.

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# VEGEEdge

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**Cornell Cooperative Extension**  
Cornell Vegetable Program

## Fall Pest Control in High Tunnels

*Judson Reid, CCE Cornell Vegetable Program*

The planting window for most high tunnel winter greens has passed (Sep 15-Oct 15); and the crop should now be established and growing inside. This creates a unique pest management situation: young, tender, slow growing greens, pest populations at high levels after a full season, and rapidly decreasing food sources for pests in the field as harvest and frost take over. The results can be high pressure of pests including aphids, slugs and cabbage worms in the tunnel. Plant growth is slow from now until spring, so there is no opportunity to replant if damage escalates. All this means that a plan to manage pests must be in place now.

Cabbage worms, and other 'worm' pests such as Armyworm, can be very damaging to high tunnel greens. Many of the Asian cultivars such as Mizuna, Tatsoi and Tokyo Bekana are in the cabbage family,



Young winter greens in Cattaraugus County high tunnel, 10/4/17. A plan to manage pests must be in place now to protect slow growing tender greens.  
Photo: J. Reid, CVP

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**VegEdge** newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension partnership between Cornell University and CCE Associations in 13 counties.

The newsletter is a service to our enrollees and is intended for educational purposes, strengthening the relationship between our enrollees, the Cornell Vegetable Program team, and Cornell University.

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*The next issue of VegEdge newsletter will be produced on November 29, 2018.*

preferred by these worms. We cannot prevent the flight of the moths that lay the eggs that become worms, as we need to ventilate the high tunnel, as well as greenhouses where transplants are grown. For these pests we must scout the crop, turning over leaves and looking down into the growing point. Sometimes we can spot feeding and droppings (frass) sooner than the worms themselves. Fortunately, there are effective, legal and safer spray options for these pests in tunnel greens. DiPel PRO DF is a biological formulation labeled for leafy greens in greenhouses settings and lists many worms as targets. A rate of 4 teaspoons per gallon of water (= 2lb/ac) can be applied with a 0 day PHI. As this is a biological product, the pests will ingest, metabolize and die sooner under warmer conditions. This indicates an early application in the crop cycle. We recommend DiPel as another organic spray for worms, SpinTor is specifically prohibited from inside applications.



Worm frass and feeding damage in tunnel greens. Photo: J. Reid, CVP



Cabbage worm in tunnel. Photo: E. Buck, CVP

Slugs and snails can also be very damaging to winter greens. Our experience is that a preventative application of iron phosphate, such as Sluggo, is worth the investment. The rate for this material is 1 lb/1000 sq ft with 0 day PHI. An early application is recommended as the pellets can become a crop contaminant once the canopy begins to close. Apply the material directly to the soil, or mulch.

Aphids are a more complex group to address, given the many species and their crop preferences. Weeds and crops surrounding the high tunnels influence which aphids may move into a high tunnel. Predators such as lady beetles have performed well in CVP trials in winter crops, particularly when row covers are used. The larvae of this beneficial is excellent at penetrating dense foliage and hunting aphids. Predatory wasp mixtures can control aphids well, but we do not recommend use now, as temperatures cool and daylength shortens. CVP research found that multiple applications with products that contain *Beauveria bassiana*, such as Botanigard or Mycotrol (Organic), controlled aphids in high tunnel greens. Since this is a contact material, higher pressure, mist sprays will help target aphids within the greens' canopy. Controlling weeds around a high tunnel will also decrease aphid movement inside.



Lady beetle larvae. Photo: J. Reid, CVP

Our conclusions here are:

- High tunnel greens are an attractive host for pests that are running out of food sources in the field.
- Greens grow too slow this time of year to tolerate damage.
- Effective controls are available and must be deployed now.
- Materials must be labeled for greenhouse application. ●

## Announcement – Office Hours Program

This winter, Elizabeth Buck will be holding office hours one day a month in Chautauqua, Cattaraugus, Niagara, and Orleans counties. These are days when growers can walk in to the county office with questions related to fresh market vegetable production for a face-to-face conversation. These are also great times to develop management plans for pests, diseases and weeds, talk about cultural control methods or rotations, discuss variety selection, and get help interpreting soil test results.

### Office Hour Dates for November:

Thursday, Nov. 8 – Jamestown, Chautauqua Co.

Monday, Nov. 19 – Lockport, Niagara Co.

Monday, Nov. 26 – Ellicottville, Cattaraugus Co.

Tuesday, Nov. 27 – Knowlesville, Orleans Co. ●

## Worms in Bt Sweet Corn

Marion Zuefle, NYS IPM Program, Cornell

This summer, sweet corn growers faced severe pressure from corn earworm (CEW). The NYS IPM Program has monitored sweet corn pests since 1994 and this year we saw one of the highest flights (based on trap catches) of CEW since monitoring began. Only in 2007 and 2010 were flights higher. This year also boasted the single highest trap catch ever recorded for one site: 341 CEW moths caught in a single week at one location.

Growers that rely on Bt sweet corn in the latter half of the summer still saw considerable damage in their corn, even if they thought it was protected by the Bt traits. Why is that, and what is Bt sweet corn?

Bt sweet corn has been modified to express, or produce in its tissues, one or more proteins from the bacterium, *Bacillus thuringiensis*. These proteins are toxic to certain insects, including several of the worm or larval pests that feed on sweet corn. When these larval pests feed on Bt sweet corn, the Bt proteins produced by the corn are ingested. The Bt proteins then bind to receptors in the mid-gut of larvae and cause pores to form, eventually leading to starvation and death of the larvae.

Bt sweet corn first became available in 1998. This was an Attribute [Syngenta] variety with a single Bt protein, Cry1Ab. This protein is very effective against European corn borer (ECB), but not that effective against CEW. As with other pesticides, development of resistance to Bt proteins is an issue.

When Attribute first became available, ear damage from CEW was below 10% but by 2016 damage increased to 84% of ears (Dively 2017). There are now additional Bt sweet corn types available that express additional Bt toxins, including Attribute II and Performance Series.

There are several possible reasons for increased damage in Bt corn this year. The first is that not all Bt varieties are the same. Some express different Bt proteins. When selecting Bt sweet corn it is important to know which Bt proteins the specific variety expresses and which of the worm pests will be affected by that protein. There are three general types of Bt corn available: Attribute® hybrids (expressing Cry1Ab toxin), Attribute® II hybrids (expressing Cry1Ab and Vip3A), both from Syngenta Seeds, and Performance Series™ hybrids (expressing the Cry1A.105 and Cry2Ab2 toxins) from Seminis Seeds. Each one is effective against different larval pests, or worms. Pest resistance occurs in several of these varieties. On the next page is a table of the different varieties of sweet corn in each of the three types, including the pests it controls as well as herbicide tolerance and disease resistance ratings.

From the table, it is evident that Bt technology is very effective against ECB, but under high pressure supplemental insecticides may still be necessary to control some of the other larval pests. Keep in mind that resistance to pyrethroids has been shown in CEW and that spray timing is critical for con-

trol. CEW lay their eggs on green silk. After eggs hatch, larvae enter the ear where they will be protected from sprays. It is therefore important to time sprays so that green silks are protected.

Another factor in Bt corn damage this year is the weather patterns and storm fronts that bring CEW north from their overwintering sites. There has also been an increase in the overwintering potential of CEW in NY. We have at least two known locations, one in Erie county and one in Onondaga county, that often have successfully overwintering CEW populations. Some studies have also found an effect of water stress on amount of damage, with high water stress increasing leaf injury in fall army worm (FAW) while low water stress increased ear damage by CEW (Brewer et al. 2014). In addition, and as already mentioned, CEW has developed resistance to some insecticides (pyrethroids) as well as field-evolved resistance to Bt corn.

Pest pressure varies throughout the season and location of the site, but it also can vary greatly among years. Flights can be monitored by visiting the [Sweet Corn Pheromone Trap Network](http://sweetcorn.nysipm.cornell.edu/) weekly blog posts (<http://sweetcorn.nysipm.cornell.edu/>). This blog provides trap counts for 40 locations throughout NY. If there is no site near your location, you can purchase traps yourself or contact your local CCE office or [mez4@cornell.edu](mailto:mez4@cornell.edu) to see if a site could be placed at your farm.

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Table 1. Descriptive characteristics of Bt sweet corn.

Company	Product	Variety	Type	Color	Days to Maturity	Insects Controlled						Disease Resistance				
						ECB	CEW	FAW	BCW	WBC	WCRW	SCLB	NCLB	Stw	Rust	MDMV
Seminis	Performance series	Anthem II	sh2	Bi-color	73	E	F-P	E	P		X					
	Bt Proteins:	Devotion II	sh2	White	80	E	F-P	E	P		X				IR	
	Cry1A.105, Cry2AB, Cry3Bb1	Obsession II	sh2	Bi-color	81-85	E	F-P	E	P		X		IR	IR	HR (Rp1-d)	
	Herbicide tolerance:	Pasion II	sh2	Yellow	81-85	E	F-P	E	P		X		IR	IR	HR (Rp1-d)	
	glyphosate	SV9010SA	sh2	Bi-color	81	E	F-P	E	P		X		IR	IR	HR (Rp1-d, Rp-g)	
		SV9012SD	sh2	Yellow	81-85	E	F-P	E	P		X				HR (Rp-g)	
		SV9014SB	Triple Sweet	Bi-color	76-80	E	F-P	E	P		X		IR		HR (Rp-g)	
		SV9813SC	sh2	White	76-80	E	F-P	E	P		X				HR (Rp1-d, Rp-g)	
Syngenta	Attribute	BC0528	Triple Sweet+	Bi-color	81	E	G-P	G	P							
	Bt Protein: Cry1Ab	BC0805	Triple Sweet	Bi-color	82	E	G-P	G	P							HR (Rp1-d)
	Herbicide tolerance:	BC0822	Triple Sweet	Bi-color	77	E	G-P	G	P			IR	IR	HR	IR (Rp1-d, g)	
	glufosinate	BSS0761	sh2	Bi-color	80	E	G-P	G	P							
		BSS0977	sh2	Bi-color	78	E	G-P	G	P				IR	IR	HR (Rp1-d)	
		BSS0982	sh2	Bi-color	80	E	G-P	G	P			IR			HR (Rp1-d)	IR
		GH0851	Triple Sweet	Yellow	80	E	G-P	G	P			HR			HR (Rp1-d)	
		GSS0966	sh2	Yellow	78	E	G-P	G	P				IR	IR	HR (Rp1-i)	
		WH0809	Triple Sweet	White	80	E	G-P	G	P			IR			HR (Rp1-g)	
		WSS0987	sh2	Bi-color	81	E	G-P	G	P			IR			HR (Rp1-d)	
Syngenta	Attribute II	Aspire	Triple Sweet	Yellow	80	E	E	E	VG	X		HR			HR (Rp1-d)	
	Bt Proteins: Cry1Ab, Vip3A	Milky Way	Triple Sweet	White	82	E	E	E	VG	X						
	Herbicide tolerance:	Protector	sh2	Yellow	79	E	E	E	VG	X		HR	HR	HR	HR (Rp1-d)	HR
	glyphosate and glufosinate	Remedy	Triple Sweet	Bi-color	82	E	E	E	VG	X						

ECB = European corn borer

CEW = Corn earworm

FAW = Fall armyworm

BCW = Black cutworm

WBC = Western bean cutworm

WCRW = Western corn rootworm

X = on label but no control rating available

HR = High Resistance, IR= Intermediate Resistance

NCLB = Northern corn leaf blight

SCLB = Southern corn leaf blight

Stw = Stewart's wilt disease

Rp genes = resistances to some races of common rust

MDMV = Maize dwarf mosaic virus

Insect Control rating: E= excellent, VG= very good, G= good, F=fair, and P= poor (from K. Flanders et al. 2010, CEW updated by Brian Nault 2018)

Sources:

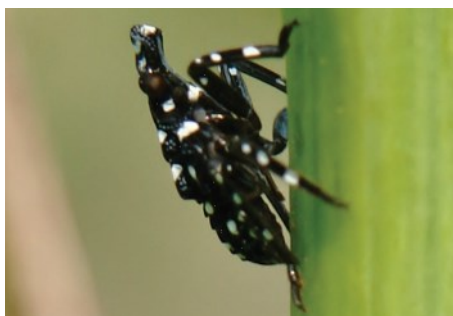
[http://www.syngenta-us.com/seeds/vegetables/assets/pdf/sweet\\_corn\\_crop\\_guide.pdf](http://www.syngenta-us.com/seeds/vegetables/assets/pdf/sweet_corn_crop_guide.pdf) and <http://www.seminis-us.com/products/performance-series-sweet-corn/>

# Spotted Lanternfly – What You Need to Know

Elizabeth Buck, CCE Cornell Vegetable Program

Spotted lanternfly is an invasive insect that is currently under quarantine in Pennsylvania and New Jersey. New York State has imposed a [border quarantine](#) that restricts the introduction of any plant parts (live or dead), outdoor goods, stone, and other outdoor use items originating in established quarantine zones of Pennsylvania and New Jersey. The goal is to prevent the introduction and establishment of spotted lanternfly populations in New York. Here's what you need to know about spotted lanternfly:

- 1) Spotted lanternfly is an invasive pest that poses a serious threat to orchard crops, maple production, forests, hops, grapes, and ornamentals. They feed on the trunks and branches of woody crops. The wounds they produce are small but often ooze sap. The sappy wounds attract molds and other insects. They swarm infested plants, which can lead to high sap losses.
- 2) Immature nymphs and adults are brightly colored and easy to recognize (see photos), but not always in easy-to-see locations. They may be at the base of plants or hidden under canopy shade.



A young nymph is black with white spots (top). An older nymph is red with black legs and edges and white spots (bottom).  
Photos: itchydogimages



Adult as it would appear during its awkward flight. Photo: Lawrence Barringer, Pennsylvania Department of Agriculture, [bugwood.org](#)



Adult at rest. Measurements are approximately 1" long by ½" wide.  
Photo: Lawrence Barringer, Pennsylvania Department of Agriculture, [bugwood.org](#)

- 3) Egg masses are laid on any smooth outdoor surface, and they are not so conspicuous. This is a major concern as egg masses laid on pallets, firewood, stone, vehicles, outdoor furniture, produce or produce boxes, etc could very easily be transported into the state. Unhatched egg masses are grayish and waxy, while hatched ones are brown. They can blend in well with bark (see photo).



Waxy, gray-brown egg masses camouflaged on bark.  
Photo: Kenneth R. Law, USDA APHIS PPQ, [bugwood.org](#)

- 4) Adults and nymphs walk and jump. Adults can fly short distances and have an awkward flight pattern.
- 5) Spotted lanternfly is an extremely good hitch hiker, at all life stages. A handful of hitchhiker spotted lanternfly adults were detected in various parts of the state this year. One hitchhiker from the quarantine zone in Pennsylvania was found in Penn Yan, close to the vulnerable wine grape industry.
- 6) If you see a spotted lanternfly, please report it to Ag & Markets or the DEC. Try to capture any adults or nymphs. When taking pictures of suspected spotted lantern fly, turn on the location feature of your phone on so the photo will be geotagged.
- 7) DEC and Ag & Markets have a protective zone in NY that currently runs along the border from Chemung county to NYC where they are surveying for spotted lanternfly.
- 8) The DEC and Ag & Markets are actively looking for spotted lanternfly and egg masses throughout the state. For Ag & Markets, the division of plant industry horticultural inspectors are tasked with keeping an eye out for spotted lanternfly. They and their DEC counterparts can make spot checks at likely points of introduction.

[Covered goods](#) moved into New York from quarantine zones established in Pennsylvania and New Jersey (see maps) require paperwork. Any plant part (seeds, marketable produce, transplants, etc), pallet, outdoor use item, firewood, stone, or vehicle entering the state from a quarantine zone must be accompanied by a certificate of inspection stating that the load is free of spotted lanternfly. Certificates of inspection are issued by the authorities in the quarantine zone, such as Pennsylvania Dept. of Agriculture. The certificate of inspection is only required for the initial removal from the quarantine zone to its first out-of-quarantine zone destination.

*continued on next page*



Quarantine zones in PA (above) and NJ (left)

The same requirements are in place outdoor use items like tractors, plastic mulch, and shipping pallets or boxes. Vehicle drivers are expected to walk their vehicles to inspect for egg masses that may have been laid while they awaited loading, and to check the interior of the vehicle for nymphs and adults. Inspect the load after arrival for the presence of egg masses. Pallets may be particularly important to inspect as egg masses will blend in well and can be on any of the hard-to-see surfaces.

#### Buying produce from the quarantine zone

Each load of produce must have a certificate of inspection. If loads are picked up from multiple sources, you may need to ask each source for a copy of their paperwork. If a load is brought to you from the quarantine zone, retain the certificate of inspection that the driver used to bring the produce out of the quarantine zone. Inspect the produce and its shipping/packing materials for egg masses and hitch hiking adults/nymphs.

#### Selling produce/goods into the quarantine zone

You are free to market goods into the quarantine zone. However, trucks returning from the quarantine zone may be required to obtain an inspection certificate.

#### Obtaining re-sale items originating in the quarantine zone but purchased outside of it

Let's say you pick up a load of plastic mulch from a dealer in Erie, PA who bought it from a warehouse in Lancaster, PA. Lancaster is in the quarantine zone. The dealer in Erie is responsible for obtaining and retaining a certificate of inspection to move the plastic mulch out of the quarantine zone. The dealer in Erie is also responsible for inspecting the load upon arrival for spotted lanternfly. Because the good is already out of the quarantine zone, you as the secondary buyer do not need to do anything extra.

These restrictions are being put in place out of a very real risk of spotted lanternfly introduction to NY. Our grape and wine industry, maple producers, and stone fruit orchards in the Finger Lakes and Hudson Valley are vulnerable because they are close to the quarantine zones and have a lot of visitors and goods enter from the quarantine zones. These measures are in place to help protect these industries and the woodlots and forests across the state. ●

#### Buying farm supplies

Vegetable farm suppliers located in the quarantine zones should have certificates available to send with any goods you order from them. It is the responsibility of the person transporting or acquiring the good to ensure a copy of the certificate of inspection accompanies the load out of the quarantine zone. Tell your suppliers you require a certificate of inspection to complete your transaction.

## Increasing Irrigation Access/Water Availability & Reliability: Erie Canal and Streams Flowing North from the Canal

Elizabeth Buck, CCE Cornell Vegetable Program

A proposal for enhancing irrigation from the canal was a finalist in the NYS Canal Corporation's recent Reimagine the Canals Competition (<http://www.canals.ny.gov/reimagine/irrigation.html>). The proposal was submitted by the SUNY College of Environmental Science and Forestry, Cornell Cooperative Extension, and C&S Engineers. At the request of the Canal Corporation, a follow-up study is being conducted to 1) **identify farms with an interest in new or additional canal irrigation infrastructure** and 2) to understand the potential economic benefits of this new infrastructure to farms and the regional economy.

If your farm has an interest in adding new infrastructure that allows irrigation via the canal (either **directly from the canal or from streams fed by the canal**), we would be interested to **hear from you**. Please contact Steve Shaw from the SUNY College of Environmental Science and Forestry (607-435-9848 or [sbshaw@esf.edu](mailto:sbshaw@esf.edu)).

Feedback is sought from growers backing the canal in Erie, Niagara, Orle-

ans, and western Monroe Counties **and from growers with current/potential irrigation access to the following streams:**

**Niagara:** Eighteenmile and some branches thereof, Johnson, and Jeddo Creeks.

**Orleans:** Beardsley, Fish, Jeddo, Johnson, Marsh (central/eastern Orleans County), Otter, East branch Sandy, and Sandy Creeks.

**Monroe:** Buttonwood, Larkin, Round Pond, and Sandy Creeks (no tributaries). Brockport, Moorman, Northrup, Otis, Salmon, and West Fork Creeks and their tributaries. ●

# Survey of Vegetable Growers and Other Farmers in New York Reveals Costs and Benefits of Soil Health Practices

Cedric Mason and David Wolfe, Horticulture Section, School of Integrative Plant Science, Cornell

The condition of a farm's soil has a vital impact on crop production and the environment. Healthy agricultural soil holds adequate nutrients, absorbs heavy rainfall, and stores water. But in many annual production systems these functions are compromised by tillage, which diminishes soil organic matter and creates compaction, ultimately restricting crop growth while increasing susceptibility to drought, erosion, and nutrient losses. Healthy soils containing substantial levels of organic matter and beneficial pore space can be developed over time by reducing tillage and using cover crops. But to put in place, both strategies require significant investments of time and resources, while the benefits may vary with context and can require some years to take effect.

To help clarify exactly what costs and benefits farmers in New York experience when using these soil health-enhancing practices, we conducted a statewide survey during the winter of 2017-18. Over 180 farmers from 46 NY counties provided information about the crops they grow, and how using reduced tillage and cover crops have impacted their farm business. Here we will first discuss results for a subset of those surveyed who indicated that they used reduced tillage or cover crops primarily to support vegetable production. The most frequent expenses and benefits reported by these vegetable growers are summarized in Table 1.

The two most commonly reported benefits by vegetable growers for both reduced tillage and cover crops were less erosion or sedimentation repairs, and greater yields. The third highest ranking among potential benefits of reduced tillage was less labor, fuel, or equipment, and the third highest ranking benefit of cover crops was lower fertilizer inputs. On the cost side of the ledger, the top three ranking factors for reduced tillage were: specialized tillage equipment, increased labor, and greater herbicide-related costs. The

**Table 1. Common costs and benefits of reduced tillage and cover crops ranked by prevalence among New York vegetable growers.** The percent of vegetable growers reporting each cost or benefit is given in parentheses; n = 13 for reduced tillage and n = 19 for cover crops.

		Benefits of reduced tillage	Costs of reduced tillage	Benefits of cover crops	Costs of cover crops
Rank among vegetable growers	1	Less erosion or sedimentation repairs (69.2%)	Specialized tillage equipment (46.2%)	Less erosion or sedimentation repair (78.9%)	Cover crop seed costs (89.5%)
	2	Greater yields (69.2%)	Increased labor (38.5%)	Greater yields of cash crops (78.9%)	Planting or rolling equipment (52.6%)
	3	Less labor, fuel, or equipment (53.8%)	Greater herbicide-related costs (23.1%)	Lower fertilizer inputs (57.9%)	Cover crop termination costs (47.4%)
	4	Lower fertilizer inputs (38.5%)	Specialized planting equipment (15.4%)	Less labor, fuel, or equipment (31.6%)	Greater nitrogen requirements (10.5%)
	5	Easier or faster harvest (30.8%)	Lower yields (15.4%)	Lower herbicide inputs (26.3%)	Additional research, scouting, or labor (5.3%)
	6	Less irrigation (30.8%)	Other costs: Silage tarps (7.7%)	Less irrigation (21.1%)	Lower yields of cash crops (5.3%)
	7	Avoided drainage investments (15.4%)	NA	Source of animal forage (use/sale) (10.5%)	NA
	8	Lower insecticide inputs (7.7%)	NA	Easier or faster harvest (10.5%)	NA
	9	Access to cost-share programs (0%)	NA	Avoided drainage investments (10.5%)	NA
	10	NA	NA	Lower insecticide inputs (5.3%)	NA
	11	NA	NA	Other effect on income: wheat sales (5.3%)	NA
	12	NA	NA	Access to cost share programs or incentives (0.0%)	NA

top three expenses for cover crops included seed costs, planting or rolling equipment, and cover crop termination costs. Note that costs and benefits reported in Table 1 go beyond revenue associated with yield, to include increases or decreases in annual input costs, as well as capital investment costs (e.g., new equipment) or avoided costs (e.g., drainage system installation).

When data from all cropping systems were combined and analyzed, some unique aspects of vegetable cropping systems were revealed. For example, for vegetable cropping systems more than 69% of respondents reported increased yields as a benefit from reduced tillage or cover crops (Table 1), but with data from all cropping systems combined, only about 50% of respondents reported this benefit (data not shown). Another interesting contrast was that labor expenses ranked in the top three as both a savings (54%) and as an additional cost (39%) among vegetable growers using reduced tillage (Table 1). However, when data for all cropping systems were combined (data not shown), 74% reported savings on labor while an increase in labor was only reported by 13% of respondents, suggesting that labor could increase in vegetable systems initiating reduced tillage. A particularly interesting contrast was that none of the vegetable growers using reduced tillage or cover crops reported accessing cost share programs (e.g., NRCS, CSP, CRP) for their practices (Table 1), but when data from all cropping systems was combined (data not shown) about 16% of growers included this among benefits. This suggests that vegetable growers may be either unaware of these programs, or that the programs

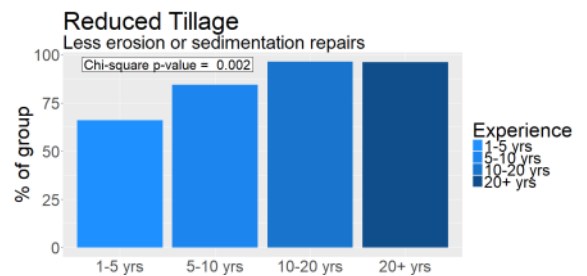
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are not available or designed for vegetable production systems. Our study results highlight the differences that exist between cropping systems, and show that any decision to implement a specific soil health practice should be made on a case-by-case basis, carefully evaluating both the positive and the negative impacts that could occur following a shift in management practice.

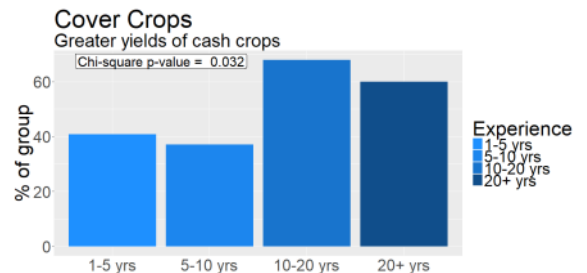
Figures 1 through 3 illustrate some important aspects of adoption of soil health practices that are common to all cropping systems and are based on analysis of the entire data set. We asked farmers how long they had been using reduced tillage and cover crops, and found that overall there was an association between the length of time a farmer had been using those practices and what benefits they saw; farmers that had been using reduced tillage and cover crops the longest saw greater benefits. One such benefit is less erosion. While about 66% of farmers who had used reduced tillage for less than 5 years reported this benefit, after 10 years that number had risen to almost 100% (Fig 1). Similarly, among farmers who used cover crops, greater yield of cash crops was more frequently associated with long-term cover crop use (Fig 2).

We also wanted to know if farmers in New York State are improving their resilience to severe weather events by using soil health practices. Rainfall patterns in the region could change in the future, and we hypothesized that enhanced soil health provides protection against flooding and erosion from especially heavy downpours, due to the presence of stable aggregates and the soil's increased capacity to absorb water. That same healthy soil may also help a farmer during times of drought by storing water in the soil profile and making it available for crop growth. Both reduced tillage and cover crops were found to help farmers cope with extreme weather events, with over 60% reporting resilience benefits (Fig. 3).

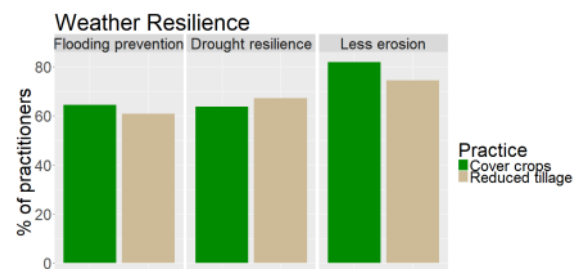
This study was conducted by New York Soil Health, and funded by NYS Dept. of Ag & Markets and Cornell University College of Agriculture and Life Sciences (CALS). To learn more about soil health in New York, visit [newyorksoilhealth.org](http://newyorksoilhealth.org).



**Figure 1.** Reducing tillage helps protect against erosion, especially when used for more than 10 years.



**Figure 2.** The use of cover crops can result in greater yields of cash crops, but this benefit is most common when the practice is in place for 10 years or more.



**Figure 3.** Over 60% of farmers surveyed confirmed that reduced tillage and cover crops help protect against extreme weather events.

## PathStone Corporation is Accepting Applications for their 2019 On-Farm Housing Grant

This program is a matching grant of up to \$2000 to repair and upgrade existing farm labor housing. Examples of eligible repairs include, but are not limited to: bathrooms, plumbing, laundry facilities, recreation rooms, upgrading kitchens and appliances, heating, floors, walls, windows, ceilings, doors and other major structural components. Special consideration will be given to projects that positively impact the quality of life for farmworkers during off work hours. Farm Owners must agree to provide \$1 for every \$1 provided by PathStone Corporation. This grant is **available in Monroe, Wayne, Ontario, Orleans and Genesee counties.**

If interested, or if you have questions, please contact Susan Lerch at 585-546-3700 x3020 for an application. The application deadline is currently March 1, 2019 and the work will need to be completed by May 15, 2019.

Please help us spread the word as we want to assist as many farms as possible! 🍅

The [Cornell Farmworker Program](http://cornellfarmworkerprogram.org) is dedicated to improving the living and working conditions of farmworkers and their families. They also seek recognition for farmworker's contributions to society and their acceptance and full participation in local communities.

For more information, contact Mary Jo Dudley, Cornell Farmworker Program Director, at 607-254-5194 or email [farmworkers@cornell.edu](mailto:farmworkers@cornell.edu)



## Upcoming Events

*view all Cornell Vegetable Program upcoming events at [CVP.CCE.CORNELL.EDU](http://CVP.CCE.CORNELL.EDU)*

### Plenary Session – Canadian Weed Science Society Annual Meeting

November 21, 2018 | 8:30 AM - 5:00 PM

Marriott on the Falls, Niagara Falls, ON Canada

CCAs, researchers, agronomists, and growers interested in cutting edge and emerging weed management techniques have a rare opportunity to learn from an expert line-up of weed scientists – right in our backyard! Talks are anticipated to be at a somewhat academic/advanced grower level. Lunch and coffee breaks included. Passports or enhanced drivers licenses required to enter Canada.

Topics covered will include:

- Optimizing sprayer efficiency
- Advances in mechanical weed control
- Current and future imaging and data collection tools
- Hyperspectral technologies for assessing seed germination & herbicide resistance
- Understanding plant interactions

6.5 CCA CEUs available, various categories. Cost: \$CAD 150 (~\$115 US). More information and registration available at <https://weedsociety.ca/meeting-home/>. There is an option to attend for just the Wednesday plenary on the second registration page.

### Processing Snap Bean Advisory Meeting

December 4, 2018 | 10:00 AM - 1:00 PM

CCE Ontario Co, 480 N Main St, Canandaigua, NY 14424



All are invited to discuss processing snap bean production in New York. Hear reports of 2018 snap bean projects funded by the association. Special report on the application of remote sensing for white mold management by RIT researchers. Hear ideas and concerns from fellow growers and industry members. Your input is needed to set future research priorities. This meeting is free and includes a complimentary lunch. 1.75 DEC recertification credits (1a, 10, 23) offered. Contact Julie Kikkert at 585-313-8160 for more information.

### Processing Vegetable Crops Advisory Meeting

December 12, 2018

9:30 AM - 12:30 PM – sweet corn and pea

1:15 - 3:00 PM – lima bean, table beet and carrot

First United Methodist Church, 8221 Lewiston Rd (Rte 63), Batavia, NY 14020



A roundtable meeting will be held for each crop. Hear ideas and concerns from fellow growers and industry members. Reports of the 2018 funded projects will be given. Your input is needed to set future research priorities. This meeting is free and includes a complimentary lunch. DEC credits offered but vary depending on which session you attend. Contact Julie Kikkert at 585-313-8160 for more information.

### WNY Soil Health Alliance – Soil Health Workshop & Annual Meeting

December 19, 2018 | 8:30 AM - 3:00 PM

Quality Inn & Suites, 8250 Park Rd, Batavia, NY



Kris Nichols will be presenting information on Regenerative Farming practices and Hands-on tools for assessing Soil Health. John Wallace will be presenting Penn State research on Weed Management and Soil Health practices. For more information contact: Dennis Kirby at 585-589-5959. DEC & CCA credits pending.

### 2019 Empire State Producers EXPO

January 15-17, 2019 | 1.25 hr sessions throughout each day

SRC Arena & Events Center, Onondaga Community College, 4585 West Seneca Turnpike, Syracuse, NY 13215



The 2019 Empire State Producers Expo combines the major fruit, flower and vegetable associations of New York State in order to provide a comprehensive trade show and educational conference for New York producers, as well as the surrounding states and Eastern Canada. Session topics include commodity specific programs in berries, cole crops, cut flowers, tree fruit, sweet corn, tomato, onions, root crops, vine crops, and emerging markets (hard cider and hemp); and multidisciplinary programs in weed management, precision ag, soil health, biopesticides, ag labor, forecasting and climate tools for agriculture, marketing, bird management, high tunnels, and floriculture crops in greenhouse production. DEC pesticide recertification credits and Certified Crop Advisor (CCA) credits will be offered during the appropriate educational sessions. The complete Expo program will be available on the [NYS Vegetable Growers Association website](http://NYSVegetableGrowersAssociation.org) as the event draws closer.

## Cleaning Produce Wash Equipment: Conveyor Brush Washer and Root Barrel Washer Checklists Developed

Months of research was conducted on a wash line comprised of a conveyor, brush washer, and absorber combination, as well as a root barrel washer, to determine how best to clean equipment that wasn't made to be easily taken apart and cleaned. Through the tracking of vegetable matter and debris dispersed through the equipment during use and rinsing, the hard-to-reach places were identified.

Different tools were used to aid in the cleaning. Some of the tools were custom-made to fit the needs. These were simply put together from easy to find supplies. We are sure that other enterprising individuals will be able to come up with additional tools that will make cleaning the equipment more effectively. The goal is to do what it takes to get rid of the food source (vegetable matter and debris) that can feed the disease causing bacteria can live on and multiply.

Various techniques for reaching and cleaning these locations took place. The techniques for reaching an acceptable level of cleaning had to be effective in a reasonable amount of time. Inspection was based on visual criteria only and further investigation on the microbial level still is required. To the best of our efforts, areas of critical cleaning are identified as well as all other necessary sections for cleaning are listed on these sheets.

Find the new cleaning checklists at:

[Conveyor Washing System](https://rvpadmin.cce.cornell.edu/uploads/doc_705.pdf)

<[https://rvpadmin.cce.cornell.edu/uploads/doc\\_705.pdf](https://rvpadmin.cce.cornell.edu/uploads/doc_705.pdf)>

[Root Barrel Washer](https://rvpadmin.cce.cornell.edu/uploads/doc_706.pdf)

<[https://rvpadmin.cce.cornell.edu/uploads/doc\\_706.pdf](https://rvpadmin.cce.cornell.edu/uploads/doc_706.pdf)>

To request a print copy of the checklists to be mailed to you, contact Angela Parr at 585-394-3977 x426.

A regular cleaning schedule is necessary to keep equipment from having vegetative matter and debris from becoming caked on. Rinsing and some scrubbing at the end of each day's use is recommended. At the end of the season or during a down time during the season is a good time to more thoroughly go through the equipment for a heavier cleaning. Drying off the equipment after each rinse/clean period is also recommended to aid in the reduction of moisture from harboring bacteria.

In the near future, other cleaning sheets will be made available so check on our website for further updates. ●



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# Cornell Cooperative Extension Cornell Vegetable Program

480 North Main Street  
Canandaigua, NY 14424



VegEdge is the award-winning newsletter produced by the Cornell Vegetable Program. It provides readers with information on upcoming meetings, pesticide updates, pest management strategies, cultural practices, marketing ideas and research results from Cornell and Cornell Cooperative Extension. VegEdge is produced every few weeks, with frequency increasing leading up to and during the growing season.



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Cornell Cooperative Extension  
Cornell Vegetable Program

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