Cornell Cooperative Extension | Cornell Vegetable Program

VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

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Portable Hand Washing Stations

Robert Hadad, Cornell Cooperative Extension, Cornell Vegetable Program

As with farm food safety, the COVID-19 situation has put a strong emphasis on hand washing. To keep farmers and farmworkers safe, there is a need for increased cleanliness.

Anyone who has attended our GAPs or PSA food safety training classes or has seen the CDC recommendations for hand washing knows these steps already.

1. Wet your hands with clean, running water (warm or cold), turn off the tap, and apply soap.
2. Lather your hands by rubbing them together with the soap. Lather the backs of your hands, between your fingers, and under your nails.
3. Scrub your hands for at least 20 seconds. Need a timer? Hum the "Happy Birthday" song from beginning to end twice.
4. Rinse your hands well under clean, running water.
5. Dry your hands using a clean towel or air dry them.

Besides having a well-stocked bathroom facility on the farm or break area, hand washing may be needed out in the field. This can be challenging if farm crews have to travel out to multiple fields in around town or county. The answer to this issue is having a decent portable hand washing station. We have been hearing that the portable toilet rental companies have rented out all their units and hand washing units are in short supply across the region. The answer is to build your own.

A portable hand washing station at a farmers market.
Photo by A. Chamberlain, University of Vermont

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About VegEdge

VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension partnership between Cornell University and CCE Associations in 14 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.

We're interested in your comments. Contact us at:
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Help us serve you better by telling us what you think. Email us at *cce-cvp@cornell.edu* or write to us at Cornell Vegetable Program, 480 North Main Street, Canandaigua, NY 14424.

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This next issue of VegEdge newsletter will be produced on June 24, 2020.

Welcome Taran Bauer to the Cornell Vegetable Program

My name is Taran Bauer. I am a sophomore at Cornell University pursuing a B.Sc. Degree in Biology. I will be working with Christy Hoepting and her team over the summer [through the Cornell Internship Program] on her numerous onion research projects. I am looking forward to this experience as an opportunity to further my skills as a scientist and communicator, and to learn from an excellent team about a topic that interests me. I seek someday to pursue a PhD, with the end goal of becoming a professor. I am from Penfield, NY and am a passionate Eagle Scout.

Taran Bauer, new summer intern for the Cornell Vegetable Program.

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Some operations have simply used a 5 gallon Igloo-type water container with spigot, a supply of paper towels, hand soap, and a trash bag for the paper towels. The water container is strapped to the back of a wagon or truck and the supplies are in a box. Real simple and cheap. An issue does occur about what to do with the gray water that would spill on the ground with this set-up. Gray water collection is a food safety concern.

The answer has come from a design created by Chris Callahan, Ag Engineer from UVM and his technician Andy Chamberlain. They have created two designs that provides for a hands-free water source, easy soap dispensing, a place for the paper towels, and collection of the gray water. One design would be great for set up near a roadside stand or market as well as a PYO operation. The other model would fit nicely to be set up near a harvest field wherever the crews go.

To build, the costs are approximately between $150-$190. As the pictures here shows, a foot pedal is stepped on to turn on the water spigot. The water falls and is collected in a slightly angled basin which then drains into a 5 gal pail. Soap is provided and paper towels are in a dispenser. A nearby trash can is for the used paper towels.

For information on the plans, cost sheet, schematics, and more, go to: https://blog.uvm.edu/cwcallah/2020/06/09/improving-handwashing-stations/

Portable hand washing station that includes a hands-free water source, soap dispenser, paper towel dispenser, 5-gallon bucket for gray water collection, and a nearby trash can. *Photo by Andy Chamberlain, UVM*

NY Sweet Corn Trap Network Report, 6/16/2020

Marion Zuefle, NYS IPM Program; from http://sweetcorn.nysipm.cornell.edu

Statewide, 23 sites reported this week with European corn borer (ECB)-E caught at four sites. ECB-Z was caught at three sites. Five sites reported corn earworm (CEW) with four of those sites high enough to be on a 4, 5 or 6 day spray interval. One site, Seneca Castle, caught 10 ECB hybrids. This is out of 5 sites that currently have hybrid traps set.

Based on the accumulated degree days (base 86/50), most sites are in the peak spring moth flight and entering the first generation treatment period (see table below).

True armyworm and ECB larvae were found at one site scouted this week. True armyworm damage looks very similar to FAW damage (photos online). Scouting of bare ground sweet corn should begin when the tassel starts to emerge. When scouting focus on the emerging tassel. Separate the leaves and look down into the tassel for any signs of feeding, frass or larvae. The threshold for ECB and FAW is 15% infested plants at tassel emergence.

European corn borer (bivoltine) development estimated using a modified base 50F degree day calculation

Development Stage	Accumulated Degree Days
First Generation	
First spring moths	374
First eggs	450
Peak spring moths	631
First generation treatment period	800-1000
Second Generation	
First summer moths	1400
First eggs	1450
First egg hatch	1550
Peak summer moths	1733
Second generation treatment period	1550-2100

I scouted a field in early tassel today that was just over the 15% threshold. Watch the How to Scout Fresh Market Sweet Corn video.

WNY Pheromone Trap Catches: June 16, 2020

Location	ECB-E	ECB-Z	ECB Hybrid	CEW	FAW	WBC	DD to Date
Batavia (Genesee)	0	0	NA	0	0	0	628
Bellona (Yates)	NA	NA	NA	NA	NA	NA	645
Brockport (Monroe)	0	0	NA	0	0	0	666
Eden (Erie)	0	0	NA	2	0	0	664
Farmington (Ontario)	0	0	0	0	0	0	667
Geneva (Ontario)	0	0	0	0	0	0	645
Hamlin (Monroe)	NA	NA	NA	NA	NA	NA	625
Kennedy (Chautauqua)	NA	NA	NA	NA	NA	NA	634
Leroy (Genesee)	0	11	NA	0	0	0	624
Lyndonville (Orleans)	0	0	NA	1	0	0	599
Oswego (Oswego)	1	0	NA	0	0	0	513
Panama (Chautauqua)	0	0	NA	0	0	0	564
Penn Yan (Yates)	0	0	0	0	0	0	619
Portville (Cattaraugus)	NA	NA	NA	NA	NA	NA	593
Ransomville (Niagara)	0	0	NA	0	0	0	653
Seneca Castle (Ontario)	28	6	10	0	0	0	612
Williamson (Wayne)	NA	NA	NA	NA	NA	NA	547

ECB: European Corn Borer; CEW: Corn Earworm; FAW: Fall Armyworm; WBC: Western Bean Cutworm; NA: not available; DD: Degree Day (mod. base 50F) accumulation

Average Corn Earworm Catch			Days Between Sprays
Per Day	Per Five Days	Per Week	
<0.2	<1.0	<1.4	No spray (for CEW)
0.2-0.5	1.0-2.5	1.4-3.5	6 days
0.5-1.0	2.5-5.0	3.5-7.0	5 days
1-13	5-65	7-91	4 days
over 13	over 65	over 91	3 days

Add one day to the recommended spray interval if daily maximum temperatures are less than 80F for the previous 2-3 days.

Evaluating Various Vegetable Crops for Dicamba Drift Sensitivity

Maggie Wasacz and Thierry Besancon, Weed Science Lab, Rutgers University

There has been a flurry of news, regulatory guidance, and industry updates in the last two weeks regarding certain product formulations of the herbicide dicamba. The story boils down to these important chemical registration and use changes:

- A federal court ordered that the registrations for three dicamba containing products be cancelled.
- The affected products are XtendiMax with vapor grip technology, Engenia, and FeXapan.
- The EPA is permitting growers to apply existing stocks of those products until July 31, 2020.
- The EPA has prohibited further sale of these products, as of June 8, 2020.

Dicamba is available in many herbicide products, including brand name, generic, and pre-mixed (two+ mode of action) options. The court ruling and regulatory changes do not affect the sale or use of any of these other dicamba products. In NY, dicamba is a common herbicide used in corn production and right-of-way vegetation management. It can also be sprayed on certain genetically engineered varieties of soybean. Vegetables are very sensitive to dicamba herbicide, see the article below. *– E. Buck, CCE Cornell Vegetable Program*

Dicamba is a WSSA group 4, synthetic auxin herbicide that has been used to control broadleaf weeds for over 50 years. With the development of genetically modified dicamba-tolerant crops, such as dicamba-tolerant soybeans, dicamba may be sprayed more frequently during the growing season. Additionally, dicamba is regularly applied in corn, for right-of-way applications, and in the early fall for control perennial weeds. These products can injure sensitive broadleaf plants through tank contamination, vaporization, and particle drift. Vaporization, also known as volatilization, occurs *after* application. Vaporization can happen when the herbicide evaporates from the target plant and these vapors travel off-target. Particle drift, on the other hand, refers to the herbicide being carried off-target by the wind *during* the application. Wind speed, particle droplet size, nozzle type, carrier volume, application method, and application speed will affect the extent of particle drift. If some of the dicamba product meant to be sprayed onto a soybean field moves off-target and lands on a nearby field planted with a sensitive crop, the results can be detrimental. This injury could potentially cause aesthetic damage as well as reduce yield. Potential for yield loss is influenced by amount of dicamba as well as when the injury occurs.

Figure 1. Non-tolerant soybean foliage when exposed to a sublethal rate of dicamba 2 weeks after treatment. Leaves are cupped with the bottom edges curved towards the top surface of the leaves.

Figure 2. Watermelon foliage when exposed to a sublethal rate of dicamba 2 weeks after treatment. Leaves are deeply lobed with a puckering, bubble-like texture.

Figure 3. Summer squash foliage when exposed to a sublethal rate of dicamba 2 weeks after treatment. Leaf edges are curved downward toward the ground.

PREVIOUS RESEARCH ON DICAMBA INJURY TO VEGETABLES

Small volumes of dicamba products can cause leaf cupping and deformation, plant twisting, and in extreme cases, plant death of sensitive crops. Since dicamba is not labelled for vegetable crops, research in this area describes fractions of the labelled rate of dicamba to represent drift rates. Moving forward, the phrase "labelled rate of dicamba" will refer to the maximum labelled rate for dicamba-tolerant soybean, 0.5 lb acid equivalent per acre. Previous studies on vegetable crops have shown that 1/50th of the labelled rate of dicamba can reduce tomato height and grape vine length by up to 50% six weeks after the drift event[1]. Pre-bloom application at 1/75th of the labelled rate on watermelon plants resulted in total yield reduction up to 20%.[2] Maturity of bell pepper sprayed at the 10-leaf stage with 1/50th of the dicamba labelled rate was delayed so that yield was reduced by 74% at first harvest, although, total yield was unaffected.[3] However, injury only appears on leaves that emerge after dicamba exposure. That being said, how do we know which crops we should be the most concerned with when applying dicamba?

SCREENING VEGETABLES FOR DICAMBA SENSITIVITY

Greenhouse studies conducted at Rutgers University in 2019-2020 screened economically important vegetable crops from the mid-Atlantic region for sensitivity to sublethal doses of dicamba. These micro-rates of dicamba simulated varying levels of drift conditions in the field. To put the rates into perspective, the highest dose in this study was equivalent to about one drop of product per quart of water. The goals of this study are to develop recommendations that can help growers design their planting strategies around dicamba-treated fields as well as to use this data to help refine recommendations to maximize protection of sensitive crops.

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Figure 4. Cucumber foliage when exposed to a sublethal rate of dicamba 2 weeks after treatment. Leaf is cupped and the bottom edges of the leaf are curved upward towards the top leaf surface.

Figure 5. Eggplant foliage when exposed to a sublethal rate of dicamba 2 weeks after treatment. The undersides of affected leaves in both images are curled upward toward the top surfaces of the leaves.

Figure 6. Bell pepper foliage when exposed to a sublethal rate of dicamba 2 weeks after treatment. The leaves are cupped with a bubble-like texture on the top surface.

Figure 7. Tomato foliage when exposed to a sublethal rate of dicamba 2 weeks after treatment. Leaflets are curled, reduced in size, and deformed.

CROP-SPECIFIC REACTIONS TO SIMULATED DICAMBA DRIFT

Among the most tolerant crops from this study were basil, pumpkin, lettuce, and kale. These plants incurred the lowest amount of damage. The **moderately sensitive crops included watermelon, cucumber, and summer squash. Watermelon foliage exhibits injury differently than many of the other crops tested in the study.** Rather than leaf cupping, watermelon leaf texture appears shriveled and more deeply lobed with small bubbles on the top leaf surface (Figure 2). Summer squash and cucumber, however, show leaf cupping when injured. In **summer squash**, the top edges of the leaf curve downward towards the ground (Figure 3). The foliage of **cucumber** tends to curve the bottom edges upward toward the top surface of the leaf, although both directions of cupping were observed. (Figure 4).

The most sensitive crops in this study were the legume crops, including non-tolerant soybean, lima bean, and snap bean, as well as solanaceous crops, such as tomato, eggplant and pepper. These crops demonstrated severe injury. **Soybean** injury is characterized by the underside edges of the leaves curling upward toward the top surface of the leaves (Figure 1). **Lima bean and snap bean** have similar injury symptoms, both exhibiting injury in several ways. Higher rates caused some leaves to not emerge at all, while lower rates caused leaf cupping injury that caused the top edges of the leaves to curve downward towards the ground. Other symptoms included a bubble-like texture on the top sides of the leaves, as well as leaf crinkling.

For **eggplant and bell pepper**, injury was expressed as the undersides of the leaves curling upward toward the top surface (Figures 5 and 6). Additionally, leaf crinkling is seen in bell pepper foliage (Figure 6). Finally, **tomato plants** express dicamba injury with leaf twisting, cupping, stunting, and crinkling. At higher rates, these leaflets will be extremely stunted and deformed (Figure 7). Lower rates will show slight cupping, leaf crinkling and a change in leaf surface texture.

ON-GOING RESEARCH

This summer, Rutgers researchers will select a few of these crops to take yield in a field-based dicamba drift study that tests different drift rates and application timings. Although this study gives some preliminary information, more detailed studies are necessary to confirm these findings. However, in the meantime, this greenhouse work gives us a brief snapshot of which species to be most concerned with when working near dicamba treated fields and provides help with field identification of these injury symptoms.

This ongoing Rutgers University study was conducted by Maggie Wasacz, Thierry Besançon, and Baylee Carr. Other advisors of this project include Mark VanGessel of the University of Delaware and David Mayonado of Bayer CropScience. This research is funded by Bayer CropScience. *Maggie Wasacz can be contacted at mhw55@scarletmail.rutgers.edu*

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Bioinsecticides and Cultural Controls for Onion Thrips in Organic Onions

Lindsy Iglesias and Brian Nault, Cornell Entomology

Onion thrips is the major insect pest of onions in New York. Both adults and larvae feed on the onion foliage causing silver or white scarring on the leaf surface and, in very high infestations, can cause leaves to become completely white and papery. Thrips feeding reduces photosynthesis and can cause bulb yield losses up to 60%. Onion thrips also transmits important pathogens, such as *Iris yellow spot virus* (IYSV), and their feeding can exacerbate foliar pathogens like *Stemphylium vesicarium*, which causes Stemphylium leaf blight.

Adults emerge in late April and early May and colonize weeds and other host crops like small grains and alfalfa. The subsequent generations typically begin colonizing onion plantings in June and July. Onion thrips can reproduce asexually (without mating with males) and have several generations a year. When conditions are hot and dry, onion thrips infestations often increase rapidly. Onion thrips can be found in groups within the neck of onion plant; when populations are very high, they can be found along the length of the onion leaves.

CONVENTIONAL ONION THRIPS MANAGEMENT IN ONION

The most effective management strategy in conventional onion production relies on repeated insecticide applications using action thresholds (1 thrips larvae/leaf) and rotations of different modes of action (https://irac-online.org/modes-of-action/). Cornell researchers and Cooperative Extension educators have designed a season-long rotation program of conventional insecticides using action thresholds that can be found at https://cvp.cce.cornell.edu/submission.php?id=584.

ORGANIC ONION THRIPS MANAGEMENT IN ONION

Chemical controls

Onion growers have fewer effective insecticides for managing onion thrips than conventional growers. In Cornell field trials in 2018 and 2019, we evaluated several OMRI-Listed bioinsecticides. Entrust (8 fl/oz) provided the best thrips control compared to Neemix 4.5 (16 fl oz), Azera (3.5 pt) and PFR-97 (2 lb) (Table 1). Marketable yield was also higher for onions treated with Entrust compared to all other bioinsecticides. Growers cannot rely exclusively on Entrust because of label restrictions limiting numbers of applications per season as well as a risk of insecticide resistance, so other products need to be considered for use in a sequence. In the same Cornell trials, the bioinsecticides were tank-mixed with three different adjuvants, NuFilm P (8 fl oz), M-Pede (2% v:v), and Trilogy (1% v:v), to see whether their performance could be improved to a level similar to that of Entrust. In both years, Entrust + M-Pede and Entrust + Trilogy provided the best control of onion thrips and both were better than Entrust + NuFilm P. In 2018, Neemix 4.5 + NuFilm P provided similar control to the best combinations. However, in 2019 when onion thrips densities were three times higher, none of the combinations could provide the same level of control as Entrust. None of the different adjuvants improved onion yield.

What are the best insecticides for organic onion thrips control? Entrust + Trilogy and Entrust + M-Pede provided excellent control of onion thrips (ratings on Table 1). M-Pede at 2% v:v caused severe phytotoxicity on the leaves, so 1.5% v:v is recommended (Fig. 1). Neemix 4.5 + NuFilm P provided moderate control and could be used in a sequence with Entrust. We are conducting additional trials looking at potential rotations of these products utilizing actions thresholds.

Another potential option, kaolin clay, is a particle film formulated with a spreader sticker that creates a powdery film on the leaf surface. The kaolin product Surround® WP has been shown to reduce rate of egg-laying, thrips feeding, and overall onion thrips densities in onions. Efficacy of kaolin clay is highly dependent on good leaf coverage and may require multiple applications, especially after rain.

Table 1. Onion thrips control and marketable yield using bioinsecticides alone or in combination with adjuvants, 2018 and 2019 trials, Geneva (Iglesias & Nault).

Treatment	Onion thrips larvae/leaf		Yield (tons/ha)		Rating[1]
	2018	2019	2018	2019	
Bioinsecticide					
Entrust	3.8b	3.8b	6.6a	6.8a	E
Neemix 4.5	4.8a	13.4a	5.6b	5.8ab	P
PFR-97	5.0a	14.9a	5.4b	4.9b	F
Azera	5.5a	12.3a	5.3b	5.5b	F
Bioinsecticide + Adjuvant					
Entrust + Trilogy	3.7ab	3.4d	18.5ab	6.5ab	E
Entrust + M-Pede	3.2b	2.7d	21.2a	6.4ab	E
Entrust + NuFilm	4.5ab	5.3c	20.3a	7.5a	VG
Neemix + Trilogy	5.2a	12.2b	17.4ab	5.3ab	P
Neemix + M-Pede	5.2a	13.9ab	17.6ab	6.0ab	P
Neemix + NuFilm	3.9ab	14.2ab	16.2ab	5.9ab	M
Azera + Trilogy	5.4a	11.5b	16.0b	5.1ab	F
Azera + M-Pede	5.6a	12.8ab	15.7b	5.4ab	F
Azera + NuFilm	5.6a	12.6ab	18.1ab	6.1ab	F
PFR 97 + Trilogy	5.4a	16.2a	17.9ab	5.2ab	F
PFR 97 + M-Pede	5.2a	13.9ab	14.8b	5.0ab	F
PFR 97 + NuFilm	4.4ab	14.6ab	16.3ab	4.6b	F
Untreated	5.2a	16.4a	17.7ab	5.1ab	F

[1] Ratings: E = Excellent, VG = Very good, M = Moderate, P = Poor, F = Fail

Cultural controls

Tolerant varieties. Non-chemical strategies must be considered alone or in combination with chemical controls. Thrips resistance has been shown in onion cultivars that have low accumulations of wax in the leaves ("semi-glossy" or "glossy") compared to onions with waxy leaves. Yet, the effectiveness of thrips-resistant onions in production is somewhat inconsistent. Cornell trials in organic onions evaluated two "semi-glossy", thrips-resistant cultivars (cv. 'Rossa di Milano' and

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Figure 1. M-Pede at 2% v:v caused severe phytotoxicity in Onion thrips control and marketable yield using bioinsecticides alone or in combination with adjuvants, 2018 and 2019 trials, Geneva (Iglesias & Nault).

B5336 x B5351) against a waxy, susceptible cultivar (cv. 'Bradley'). In both years, 'Rossa di Milano' had lower thrips densities than 'Bradley', whereas B5336 x B5351 had lower thrips densities than 'Bradley' in 2018 only. Although bacterial bulb rot was not different among the cultivars, some semi-glossy, thrips-resistant cultivars (cv. 'Avalon') have been shown to have higher rate of bulb rots as well as higher levels of Stemphylium leaf blight. Thrips-resistant onions will not be a silver-bullet for onion thrips control, but they can delay or reduce thrips densities enough that fewer insecticide applications are needed during the season for similar control.

Silver reflective mulch. It is not uncommon for organic and small-scale growers to plant onions in raised beds with plastic mulch to control weeds and moderate soil conditions. Silver mulches are used in vegetable production to repel or delay infestation by insects such as aphids, whiteflies, and thrips. Cornell trials that evaluated silver and white-on-black plastic mulches against onion thrips saw a slight reduction in onion thrips on onions in silver mulch in one year only. The reduction in thrips densities in silver mulch did not affect marketable yield. Although thrips control by silver mulches may be inconsistent, they can reduce bacterial bulb rots and have shown to increase yield of larger bulbs and net yields compared to standard black plastic mulches.

Planting early. Onion thrips are most damaging when they feed during the early bulbing stage so protecting onions is crucial during this time. Planting onions as early as possible when thrips are low as well as planting early maturing cultivars, can reduce the time that onions are exposed to thrips. Onion plants are also larger later in the season when thrips populations are at their peak, so plants can withstand more injury without reducing yield. Early planting and early harvesting also reduces risk of disease.

Row covers. Row covers made of fine mesh can exclude onion thrips from feeding on onion plants. Apply row covers to thrips-free plants. Row covers can remain while the onion plants are young and most vulnerable to thrips damage, but should be removed as temperatures begin to rise to prevent overheating.

KEY FINDINGS

- Entrust + Trilogy and Entrust + M-Pede provided excellent onion thrips control. M-Pede should be applied at 1.5% v:v to minimize risk of phytotoxicity.
- Neemix 4.5 + NuFilm provided moderate control and could be used when thrips densities are low, saving Entrust for when densities are higher.
- Thrips-resistant onion cultivars are inconsistent in reducing thrips densities. 'Rossa di Milano' was best, B5336 x B5351 was inconsistent, 'Avalon' had lower thrips densities, but higher incidence of bacterial bulb rot and Stemphylium leaf blight.
- Silver reflective mulch was inconsistent against thrips densities, but can reduce bulb rots compared to black mulch.
- Plant early and plant early-maturing cultivars to reduce exposure to thrips and risk of disease.
- Apply fine mesh row covers while plants are young and most vulnerable to thrips damage.

Organic onion thrips management will require multiple tactics for successful control. All insecticides used in USDA Certified organic production must be approved by the Organic Materials Review Institute (OMRI). Search for approved products at https://www.omri.org/.

Scouting Tips for Onion Thrips in Onions

Christy Hoepting, Cornell Vegetable Program

To find the first thrips of the season, look deep into the leaf axils. Inspect 20 to 30 plants and count the total number of OT per plant and divide by the average number of leaves per plant to get the number of OT per leaf. Thrips feeding causes silvery streaking along the leaves. If you can already see thrips feeding damage that is also a good indication that it is time to spray. If there is a lot of feeding damage, than you likely missed a timely first spray.

Adult onion thrips are the first thrips of the season. They are tiny brown, sliver-like insects up to 2 mm in length. *Photo by C. Hoepting, CCE Cornell Vegetable Program*

Onion thrips nymphs are yellow and 0.5 to 1.2 mm in length. *Photo by Whitney Cranshaw, Colorado State University.*

Subtle streaking along leaves is an early indication of early onion thrips feedling. This plant has reached the spray threshold. *Photo by C. Hoepting, CCE CVP*

CROP INSIGHTS

GENERAL

The region is very dry and growers are irrigating crops where possible. - JK

Black cutworms are still very active in our region. Young seedlings of many vegetable crops are susceptible. This week's find was cutworms in one snap bean field, but not others nearby. Cut plants were found in the row. Digging just under the surface of the soil revealed the cutworm larva. Keep a keen eye out in all crops for missing plants, cut leaves, and dead plants laying in the row or next to the row. Economic treatment thresholds for black cutworms have been developed for the following crops (Univ. of Wisconsin): Snap bean= 2 larvae/row foot; Potatoes= 4 larvae/row foot; Sweet Corn= >5% of plants damaged; Leafy greens= <3% of the stand affected. Several pyrethroid products are labeled in New York for the control of cutworms. Please check the label for your specific crop. For organically grown crops, our current best thinking is that a mixture of azadirachtin and pyrethrin provides the best chance of control. - JK

BEETS

Cutworms are still a threat on young seedlings. Beets grown in tunnels may be ready for harvest, while field seeded crops are still very young, but in many cases have put on good growth in the past several weeks. Those recently seeded may be struggling to germinate in dry soils. Beets will sit in the ground waiting for the proper conditions to germinate, creating uneven stands with late emerging beets never making a crop. Fresh market growers should begin scouting for beet leaf miner eggs and early damage, which is seen as tunnels in the leaves. If you are selling beets with the greens or the greens by themselves, the treatment threshold is when 50% of the plants have eggs or early leaf mining damage. Entrust Sc (spinosaid) or other labeled product can be used for leaf miners. - JK

CARROTS

Early planted carrots are growing well at this point, but I have seen die-off of tender seedlings from damping off (remember the cold, wet period we went through early on), heat stress, wind damage, and herbicide injury. - JK

CUCURBITS

Cucumber beetles are out in force in some areas. If exclusion is not being practices, there are several products in the Cornell Veg Guidelines that can help. Even with applying insecticides, the beetles still have to feed on the leaves for the products to be effective. This feeding can still pass bacterial wilt to cucumbers and melons. Admire Pro Systemic protectant can be used as a drench or run through irrigation lines. This product will offer management for several weeks usually long enough for the first generation to pass. Surround, a kaolin clay product can also be used to cover the foliage creating a barrier of sorts that reduces the feeding of the beetles. The clay can be mixed with water and sprayed on but requires continued agitation so it doesn't settle out. Also, if your sprayer has a fine mesh filter, remove it for better application. - RH

GARLIC

Irrigation might be a good idea to help increase bulb size. Despite earlier rains, soils are drying out and the forecast is for sunny and hot weather for about a week. Fusarium has been a problem in some plantings. Feeding damage from onion maggots and other insects have injured the roots/bulbs opening up a wound for fusarium to enter. - RH

LETTUCE AND GREENS

Lettuce has been having issues mainly due to heat stress. Low calcium availability due to insufficient water causes yellowing/bronzing of the leaf edges. This problem is similar to blossom end rot in peppers and tomatoes. The photo shows a closeup of the yellowing of the leaf edges. In a few days to a week, the yellowing will turn brown as the tissue dies back.

Yellowing leaf edges from calcium deficiency.

Bottom rot (caused by Rhizoctonia) is another problem that shows up close to harvest when the weather has had wet periods then heat. The stem area near the soil surface begins to rot by the bacteria causing the leaves to wilt. If you have ground where this has been a problem in the past, several products listed in the Guidelines can be used applied earlier on. Endura 70 WDG, Luna Sensation, Quadris F, and Rovral 4F are all listed. Long rotations out of lettuce or planting on raised beds can help reduce the problem. - RH

ONIONS

Earliest transplants have 7-9 leaves and 1" bulbs and earliest direct seeded onions have 4-5 leaves with majority of direct seeded crop in 3-4 leaf stage. Some growers are side-dressing nitrogen and irrigating to get the foliage as big and healthy as possible before bulbing begins. During bulbing (early bulb swell until tops down) the crop will take up 70% of its total nitrogen requirements. Last week at 2-leaf stage was the first "safe" stage of onion to go "heavy" with post-emergent herbicides in problematic fields. I put "safe" and "heavy" in quotes because it is somewhat of an oxymoron. None-the-less, it has been my pleasure to see the "dead bodies" this week. Generally, crop tolerance to these "heavy" post-emergent herbicides has been pretty good. When it is hot, dry and windy, onions are more tolerant to post-emergent herbicide injury. Unfortunately, so are the weeds.

With few exceptions, there was not much movement of Botrytis leaf blight (BLB) or onion thrips (OT) this past week, which generally remain below spray thresholds. Any fields that have exceeded the 1.0 BLB halo lesion/outer 3 leaf/plant spray threshold and have a minimum of three leaves should get their first Bravo fungicide application this week. Upland growers should begin scouting for onion thrips as there have been reports of them starting to build. First insecticide application of Movento is recommended at early bulb swell or 0.6 to 1.0 onion thrips/leaf, whichever comes first (side-bar). See article on organic options for managing onion thrips in onion, page 6. Although not too much of an issue just yet, in cases where last application of Chateau and first application of Movento bunch up (e.g. at 5-6 leaf stage), follow Chateau (± Prowl H2O) with Movento 3-5 days later to avoid detrimental interaction (= burn the leaves off of the onions) between

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Chateau and the penetrating surfactant that is used with Movento. Onion smut and onion maggot are starting to show up. The next couple of weeks would be a good time for growers with EverGol Prime-treated seed who experimented with "no drench" (= no mancozeb/Ridomil/Lorsban in-furrow) in sections to see if it made any difference with respect to stand or most importantly, onion smut. - CH

PEAS

The earliest processing pea fields are nearing harvest, however, heat and drought are not favorable for the crop at this time. Fields are being irrigated where possible. Stress on the plants will bring out any underlying soil compaction or root rot issues present in a field. If you are seeing yellow patches or dying plants, use a shovel to dig up the plants and examine the root system. - JK

PEPPERS

Watch for bacterial diseases. Use new stakes (in tomatoes too) to avoid transferring bacterial diseases from an infected crop this year to a clean crop currently in the field. Flag outbreaks to facilitate control efforts such as working diseased sections only when foliage is dry.

POTATOES

Colorado potato beetles (CPB) are starting to find their way into field edges where potatoes are planted adjacent to last year's potato fields. CPB generally walk from their overwintering spots to new fields, so they will first appear in field edges in nearby fields before making their way into the field center. Insecticides applied at planting should continue to protect against the earliest beetles in the field. If you are noticing CPB in you field edges, you may want to consider checking your field weekly. Cold overnight temperatures this week have led to frost and cold air damage to some potatoes in the region. Affected plants should outgrow any damage over the next few weeks.

Six sites have reached or come close to 18 severity values (SV) this week – Buffalo, Ceres, Niagara Falls, Penn Yan, Rochester, and Wellsville. The SVs at all other stations are still low. However, all stations have reached a P-day value within 230-280. A SV ≥ 18 indicates the threshold for late blight risk, while a P-day value ≥ 300 indicates the threshold for early blight risk. The first fungicide application should occur in fields with plants larger than six inches tall as soon as possible after either of these values have accumulated in your area. Weather data used to calculate SVs comes from weather stations located in each site, and can be accessed for each station at http://newa.cornell.edu/index.php?page=all-weather-data. On a national level, late blight has been confirmed on tomato in Florida, and potato in Florida and Alabama. No late blight has yet to be reported in NYS. –ML and JG

This leaf is showing early frost damage symptoms, having developed a brown burn across the leaf surface. Parts of the damaged leaf are starting to turn black.

This plant is showing moderate frost damage, with the leaves on the top and outside of the plant developing symptoms. Leaves have turned from brown to black in color and have wilted.

Late Blight Severity Values* 6/16/2020

Location	Total	Forecast 6/17 - 6/19	Location	Total	Forecast 6/17 - 6/19
Albion	1	0	Hammondsport	6	1
Arkport	4	1	Knowlesville	8	0
Baldwinsville	1	0	Lyndonville	4	1
Bergen	0	0	Medina	10	0
Buffalo	28	0	Niagara Falls	28	0
Burt	3	0	Penn Yan	21	0
Ceres	16	1	Rochester	19	0
Elba	0	0	Sodus	10	0
Fairville	1	0	Versailles	10	0
Farmington	6	0	Wellsville	27	1
Fulton	13	0	Williamson	2	0
Geneva	3	0			

* Severity value accumulations start 5/20/2020

SNAP BEANS

Processing growers are getting the crop planted and putting on early herbicide sprays. Make sure you are scouting for cutworms (see general section) and other early season problems as the crop emerges.

SWEET CORN

The earliest processing fields have put on good growth with the warm temperatures. Dry soils have younger plants searching for water, which will make the roots grow deeper if they have germinated and started growing. Hopefully, we will see some of the forecasted rain early next week. Continue to be on the lookout for cutworms and true armyworms. - JK

Earliest fresh market sweet corn is in tassel. Keep an eye on the trap count catches (see page 3) and/or scout weekly as many plantings are in susceptible stages for European Corn Borer damage. - EB

TOMATOES

No major pests or diseases to report on field tomatoes yet. Some Colorado Potato Beetle egg masses have been found. Remember that planting tomatoes after potatoes is the best way to develop an infestation. Small levels may be tolerated before an insecticide is used. An important point for organic growers using Bt products: it is time to spray if when 5% of plants have egg masses, and 30% of these have hatched. Entrust (Group 5) is another organic option. Conventional materials can be applied when there is an average 1 adult or larvae per plant or 20% defoliation. Radiant (Group 5) and Assail (Group 4A) are both non-restricted. -JR

As some parts of the region go into another week without rain, the earliest planted field tomatoes may be setting fruit. Dry soils, wind, heat and rapid plant growth while setting fruit can lead to Blossom End Rot. This dry rot is caused by insufficient water to transport calcium to the far end of the tomato fruit. Check under plastic mulch to monitor soil moisture and irrigate regularly. Most New York vegetable soils have sufficient calcium, but all can benefit from irrigation. Demand is high for local tomatoes right now, so be sure to maximize yield by eliminating Blossom End Rot. Water is the cheapest input in vegetable farming and the most important. - JR

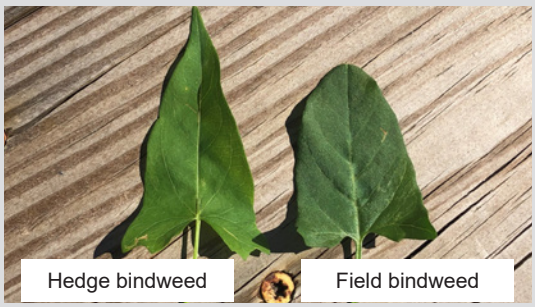
Excess compost applications can lead to nutrient restrictions in field tomatoes. Compost piles that are particularly high in woody materials can have elevated pH and calcium levels. In high doses this can interfere with the uptake of several micro-nutrients. Just as we apply fertilizers with known analyses, composts should be tested for nutrients too, and applied at appropriate rates. Parts of Ontario and Yates counties have soils with high native calcium levels already, so high levels of compost with fine woody material are not advised. -JR

Identifying Bindweeds: A Quick ID Guide for Three Common Species

Lynn Sosnoskie, Assistant Professor of Weed Ecology and Management, Cornell

The name "bindweed" is often used as a catch-all term that encompasses several different weedy plant species. This can include the annual morningglories (*Ipomoea spp.*) and the perennial field (*Convolvulus arvensis*) and hedge (*Calystegia sepium*) bindweeds. It also may include a species that is not even a bindweed at all. i.e. wild buckwheat (*Fallopia convolvulus*), which is occasionally referred to as black bindweed. The specific bindweed species present at your site may impact the type and timing of weed management strategies you will want to employ because of differential sensitivity to herbicides or regrowth potential following physical control measures. Below is a guide to help you distinguish between three commonly encountered "bindweeds" present in New York.

Common name	Field bindweed	Hedge Bindweed	Wild buckwheat (Black bindweed)
Latin name:	*Convolvulus arvensis*	*Calystegia sepium*	*Fallopia convolvulus*
Plant family:	*Convolvulaceae* Morningglory family	*Convolvulaceae* Morningglory family	*Polygonaceae* Knotweed family
Life cycle:	Perennial	Perennial	Annual
Reproduction:	Root fragments and seed	Root fragments and seed	Seed
Leaves:	Leaves are alternate and arrow-shaped and rounded at the apex. The leaf base is relatively flat with lobes that point away from the stem. Field bindweed leaves are approximately 1 to 2.5 inches in length. Leaves can be hairless to hairy.	Leaves are alternate and triangular with sharply pointed apices. The leaf base is deeply lobed, especially compared to field bindweed. Leaves, which are smooth, can be up to 5 inches in length.	Leaves are alternate, almost heart-shaped and pointed at the apex. The leaf base has deep and rounded to pointed lobes. At the base of each leaf, a cylindrical, membranous sheath (ocrea) surrounds the stem. Leaves are can be up to 3.5 inches long.
Roots:	Deep (reaching tens of feet into the soil profile) vertical roots; extensive lateral roots in the top 1 to 2 feet of soil. Root pieces as small as 1inch in size can regenerate.	Extensive, but shallow, rhizomatous root system. Root fragments as small as 1 inch in size are capable of regrowth.	Fibrous root system. Regeneration does not occur from roots.
Flowers and seed:	White to pink, solitary trumpet-shaped flowers that emerge from leaf axils. Usually 1 to 2 inches in size. Small leafy, bracts are located approximately 1 inch below the base of each flower. Seed are brown to black, wedge-shaped, and persistent in the soil (decades).	White, trumpet shaped flowers that are mostly greater than 2 inches in length. Bracts are large, leafy and cover the base of the flower. Seed are brown to black, egg-shaped and persistent in the soil (decades).	Individual flowers are small and inconspicuous (less than 0.5 inches in length). There are no petals, only sepals that are white to pink to green in color. Flowers are held in small clusters in leaf axils or at the end of stems. Seed are 3-angled and short-lived.



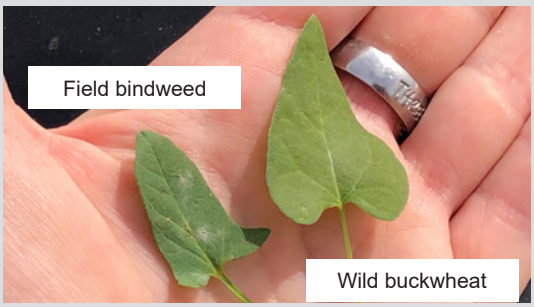


Figure 1. Leaves. Hedge bindweed leaves have pointed tips and deep-lobed bases.

Field bindweed has a rounded tip and flattened base.

Wild buckwheat has heart-shaped leaves with pointed tips.

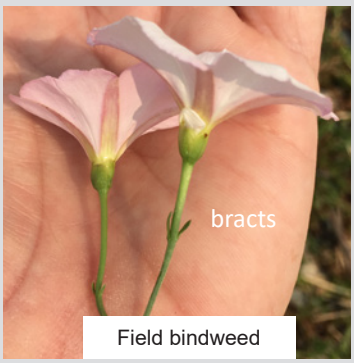


Figure 2. Flowers. Hedge bindweed flowers are trumpet-shaped, white, with bracts at base.

Field bindweed flowers are trumpet-shaped, white/pink with bracts below.

Wild buckwheat flowers lack petals, are white/pink/green and are held in racemes.

A Bindweed Indentification Guide has been developed. For an e-copy, email Lynn Sosnoskie at lms438@cornell.edu.

Weather Charts

John Gibbons, CCE Cornell Vegetable Program

WEEKLY WEATHER SUMMARY: 6/09/20 - 6/15/2020

	Rainfall (inch)		Temperature (°F)	
Location**	Week	Month June	Max	Min
Albion	0.48	0.65	92	41
Arkport	0.00	0.06	89	36
Bergen	0.16	0.47	93	36
Brocton	0.40	0.41	90	45
Buffalo*	0.76	2.39	90	42
Burt	0.34	0.44	92	40
Ceres	0.11	0.78	90	31
Elba	0.46	0.76	93	39
Fairville	0.50	0.62	91	36
Farmington	0.26	0.57	92	36
Fulton*	0.08	0.46	90	40
Geneva	0.02	0.26	90	41
Hammondsport	0.00	0.47	89	39
Hanover	0.47	0.49	93	37
Lodi	0.00	0.47	90	42
Niagara Falls*	0.39	1.38	89	44
Penn Yan*	0.00	0.30	90	40
Rochester*	0.10	0.56	93	41
Sodus	0.25	0.27	91	35
South Bristol	0.00	0.45	88	40
Varick	0.05	0.41	90	43
Versailles	0.48	0.54	92	39
Williamson	0.31	0.44	93	38

ACCUMULATED GROWING DEGREE DAYS (AGDD) BASE 50°F: APRIL 1 - JUNE 15, 2020

Location**	2020	2019	2018
Albion	470	426	660
Arkport	419	407	536
Bergen	483	428	619
Brocton	508	454	NA
Buffalo*	482	411	710
Burt	443	352	554
Ceres	417	470	593
Elba	464	397	646
Fairville	470	392	594
Farmington	492	410	622
Fulton*	484	386	600
Geneva	505	440	641
Hammondsport	484	423	613
Hanover	503	455	661
Lodi	521	471	670
Niagara Falls*	475	378	741
Penn Yan*	514	477	682
Rochester*	501	496	720
Sodus	459	385	584
South Bristol	484	425	635
Varick	546	490	679
Versailles	499	459	649
Williamson	456	362	565

*Airport stations
** For other locations: http://newa.cornell.edu

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VegEdge is the highly regarded 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 University 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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