



# VEGEEdge

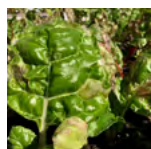
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Aster Leafhoppers Can Transmit Aster Yellows

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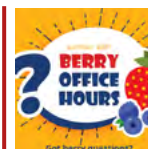
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## Aster Leafhoppers Can Transmit Aster Yellows

Julie Kikkert, Cornell Cooperative Extension, Cornell Vegetable Program

June is the time when we start hearing about leafhoppers in field and vegetable crops in New York. While there is always a lot of “buzz” about potato leafhoppers (*Empoasca fabae*), there is another species of concern *Macrostelus quadrilineatus*, known as aster leafhopper (ALH).

### WHAT'S THE CONCERN?

While these insects seem harmless to the eye, they may be infected with the phytoplasma (a bacterium like organism) that causes aster yellows disease. The disease has a large host range including numerous vegetables. The most damaging effects are often to carrots and lettuce. The foliage of infected plants is stunted and twisted and may turn yellow or red. In carrots, the taproots become bitter and appear “hairy” because of many small branch roots. Although aster yellows disease is usually not a major problem in New York, crop scouts should be aware of ALH and treat as needed. Processing carrot growers need to manage ALH on a regular basis. In Michigan, the University actually collects ALH regularly and tests them for the presence of the disease, to provide a risk assessment.



Aster leafhopper. Photo courtesy of Univ. of Minnesota



Hairy roots in carrot caused by aster yellows. Photo by J. Kikkert, CCE Cornell Vegetable Program



## 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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**The next issue of VegEdge newsletter will be produced on June 23, 2021.**



Stop and admire the simple beauty of a newly planted cabbage field. *Photo by J. Kikkert, CCE Cornell Vegetable Program*

## WHERE DOES IT COME FROM?

The organism that causes aster yellows disease overwinters in infected perennial and biennial host plants. The disease can also overwinter in infected adult leafhoppers in the south. In New York, the leafhoppers can overwinter in the egg stage in the leaf tissue of wheat, rye and other winter grains. As winter grains mature in late May/early June, ALH move to more favorable hosts, including vegetables. Populations of ALH also arrive on fronts from southern states. The leafhopper acquires the phytoplasma by feeding on infected plants and may carry and transmit it over great distances. Usually only a small percent of the ALH population is infected. However, an insect remains infected for life. There are several generations of ALH in New York.

## HOW DO I DETECT ASTER LEAFHOPPERS?

The adult is 3/16th inch long and pale green with six, black spots on the front of its head. Nymphs resemble adults, but are smaller and lack wings. The insect can be monitored with sweep nets or yellow sticky traps. Laboratory tests are the only way to know if an insect is infected with the aster yellows disease-causing organism.

## MANAGEMENT

- Eliminate susceptible overwintering host plants including weeds such as wild carrot, wild chicory, cinquefoil, daisies, dandelion, thistles, fleabane, milkweed, wild lettuce, sow-thistle, and plantain.
- Destroy infected crop plants as soon as they appear
- Lettuce and other valuable crops can be grown under row cover
- Reflective mulch may disorient leafhoppers
- Foliar insecticides: Processing carrot grower should apply a foliar insecticide at the first appearance of leafhoppers. Spray up to three applications at ten day intervals. For areas where yellows disease has been a problem, follow a seven day spray schedule and continue spraying through August or until leafhoppers can no longer be found. Because it takes a month for yellows symptoms to appear, sprays can be discontinued one month before harvest.



Purpling of carrot foliage from aster yellows infection. Photo by J. Kikkert, CCE Cornell Vegetable Program



Hairy roots in carrot caused by aster yellows. Photo by J. Kikkert, CCE Cornell Vegetable Program ●

# CROP Insights

*Observations from the Field and Research-Based Recommendations*

## BEETS

Continue to scout for cutworms. Weed scouting and management remain a priority at this time. - JK

## CARROTS

See the cover article on aster leafhoppers (ALH) and aster yellows. Processing carrot growers should monitor the population of ALH using yellow sticky cards or sweep nets. A foliar insecticide should be applied at the first appearance of ALH. Spray up to three applications at ten-day intervals. For areas where aster yellows has been a problem, follow a seven-day spray schedule and continue spraying until ALH can no longer be found in the field. Because it takes a month for yellows symptoms to develop, control measures for ALH can be discontinued one month before harvest. See page 172-173 of the 2021 Cornell Vegetable Guidelines for management and insecticide options. - JK

## COLE CROPS

On the whole seem to be doing well. The temperature variability has been challenging for the earliest planted crops. Farms visited lately have done a good job avoiding (row cover) or treating for flea beetles. Though the white cabbage butterflies were out doing their annoying thing a few weeks ago, I've yet to see or receive reports of appreciable worm feeding. Swede midge has been emerging. Damage from larval feeding manifesting as distorted foliage and petioles is beginning to show on the new growth of infested plantings. - EB

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## EGGPLANT

Can I interest you in a dose of strange and intriguing? Here's a picture of a gypsy moth that was feeding on eggplants. Him and a couple hundred friends stripped bare half a dozen small hedgerow trees and, being in full "Very Hungry Caterpillar" mode, decided they needed more lunch. On their way to find new trees, they cut through the eggplants and began to snack as they went. Good news is gypsy moths don't particularly enjoy vegetables; this is an oddity of a case. Do take a good look at the photo though if you have blueberries - the gypsy moths are a destructive problem for the blueberry bushes. - EB



## GARLIC

Garlic scapes curling/cut them then keep well watered / to help the bulbs size. - EB

Thrips are also being found in high levels in garlic. Plants that are drying down prematurely should be scouted. Look within the deep leaf 'crease' by pressing upward, which will often expose a multitude of thrips. - JR

## LETTUCE AND GREENS

If you've had problems with aster yellows disease in the past, take note of the cover article on aster leaf hoppers because the time for concern is now through the end of the growing season. See pages 246-248 of the 2021 Cornell Vegetable Guidelines for specific management and insecticide options. - JK

Lettuce and greens plantings that established well have continued to progress nicely and look good on as they become marketable. Benefit to the dry weather is a lovely lack of slugs and disease issues. While there have been a few challenges with establishing direct sown crops, so far this seems to be a good season for spring greens. - EB

## ONIONS

The onion crop is growing well! It has gotten some rain and a reprieve from the heat this week, and it likes it! Majority of direct seeded acreage is at 4-leaf with youngest plantings at 2.5-3 leaf and oldest plantings at 6-leaf. Some of earliest planted early transplant varieties have greater than 1-inch bulbs with the rest of the transplanted crop ranging from 3-4 leaf to 8-leaf.

News this week is that Botrytis leaf blight (BLB) showed up over the past week, and was detected in all fields scouted. In some locations BLB leaf counts went from 0.0-0.5 to 3-5. The spray threshold is 1.0 BLB lesion per leaf. Based on last two years of field research, mancozeb 1-3 lb/A applied at first detection controlled BLB halo lesions significantly better than waiting until spray threshold to start spraying, at least initially (e.g. after two consecutive sprays). In Oswego 2020 trial, after 4 and 6 weekly fungicide sprays when BLB halo pressure increased to 14-15 BLB halos/leaf in the untreated, there were no longer any differences between at-first detection and at-threshold timings, but high rates of mancozeb 3 lb and Bravo 3 pt had significantly fewer BLB halos than mancozeb 1 lb and Bravo 1.5 pt. In this trial, FRAC 3 fungicide Inspire Super did not control BLB halos and FRAC 3 + 3 Quadris Top + Tilt was mediocre (middle-of-the-pack, better than nothing), FRAC 7 Scala did not control BLB. FRAC 7(4) fungicide Miravis Prime was one of the best treatments in the trial and FRAC 7(1) Luna Tranquility was generally as good as Bravo 3 pt and mancozeb 3 lb.

At this time, I am recommending mancozeb 1-3 lb for fields with below-threshold BLB, especially if Movento/Senstar is being co-applied for thrips, mancozeb 3 lb or Bravo 3 pt for fields at or above spray threshold, unless Movento/Senstar is being co-applied for thrips, in which case you should not co-apply these insecticides with Bravo. See last week's article for more info. Much more info on onion fungicide updates and recommendations next week!

We did not see much movement in onion thrips over the past week; thrips counts are holding or have dropped in fields treated with Movento/Senstar and are building very slowly in non-sprayed fields. No need to rush the first application of Movento/Senstar if thrips counts are less than 0.5 per leaf. See last week's article for more information. Saw first symptoms of bacterial bulb rot and IYSV in large transplants this week – early! Now that plants are 4-5 leaf, plants infected with onion smut are easier to spot, although with EverGol Prime treated seed, we certainly do not see smut like we used to! Growers are finishing up post-emergent applications of Buctril and Chateau, which have size limits of 5- and 6-leaf re-

**Table 1. Pre-emergent control of marsh yellowcress with Chateau and Prowl, 2019 onion herbicide trial results, Oswego (Hoepting).**

Treatment	Marsh yellowcress Control	Pig weed (Control Rating) <sup>1</sup>	Lady's Thumb/ Smartweed (Control Rating)
<b>39 DAT<sup>2</sup> – Pre-emergent weed control</b>			
Chateau 1 oz	40%	E	Fail
Chateau 2 oz	80%	E	F-G
Chateau 3 oz	92%	E	E
Chateau 2 oz fb. <sup>3</sup> Chateau 1 oz 10 DAT	97%	E	E

1 **Rating:** E: Excellent; VG: Very good; G: Good; F: Fair; P: Poor; Fail

2 **DAT:** Days after treatment

3 **fb.** followed by

*continued on page 5*

spectively. We saw a bit more post-emergent herbicide injury this week, not sure why exactly, could be from herbicide applications getting wet (I sprayed Chateau prior to overnight rain and got more than the usual burn last week), the more humid conditions, or maybe the wax is thinner on some of these fields where the onions are growing so fast (in one of my trials onions went from 2.5 leaf to 4-eaf in a week)... Even if post-emergent weed control is good after first application of Chateau 2 oz, you may want to consider following up with Chateau 1 oz 7-10 days later for the stacked benefit of additional pre-emergent weed control, particularly for marsh yellowcress and Lady's thumb/smartweed (Table 1). Post applications of Chateau can also burn back yellow nutsedge. - CH

Spring and bunching onions are beginning to come to market. Seeing thrips activity pick up on fresh market plantings. Scouting is a wise investment of time since thrips can be hard to reign once their populations build. Gently tug the newest onion leaves apart and look for thrips deep in the base of the neck. Expect an influx if hay is cut or small grains are reaching maturity in a neighboring field. You want to maximize leaf count and health over the next couple weeks prior to bulbing - thrips don't help in that goal. - EB

### PEAS

Harvest of the 2021 processing pea crop began this week and will continue until the later part of July. Some fields have suffered from earlier hot and dry weather. The effects of poor root systems caused by compacted soils and/or root pathogens usually show up in June. Use a shovel to dig up plants that are stunted and yellow and look at the root systems. - JK

Thrips have been found in fresh market pea flowers. Although not a common pea pest in NY, other sources do note it can be associated with poor pod set. Peas that are grown close to ornamentals, such as gladiolus may be at higher risk. - JR

### POTATOES

Late blight severity values are still low for many parts the WNY region. See the table for more information on late blight forecasts for your area.

Colorado potato beetles (CPB) continue to lay eggs, and fields should be monitored for egg hatch in order to target small larvae with insecticides. Be sure to monitor fields where potatoes were planted in or nearby last year, or where CPB have been a problem in previous years. Potato leafhopper adults are showing up, but pesticide applications at planting should continue to control populations for a few weeks. - ML

Colorado potato beetle larvae are present at low population levels in scouted fields - pressure will vary across fields and across the region. 1st through 4th instar were found, with the majority in the 2nd or 3rd instar stage. These are best treated when small, 3rd instar and younger! - EB

### SNAP BEANS

A wedged bright green fiend / was seen field side this Monday / leaf hoppers return. - EB

Mexican Bean Beetles have caused skeletonizing of bean leaves in fresh market fields. These can resemble a larger yellow or orange lady beetle in adult form, but the larvae are unmistakable with black spikey hairs. Their feeding damage is unique in the number of 'window panes' they create when feeding on bean leaves. Often early plantings are the most susceptible and crop rotation is the best management tool. A population that has gotten out of hand can be managed with a single application of Assail (group 4A, 7 D PHI) or Sevin (group 1A 3 D PHI). Row cover will also work well to exclude adults in the spring. - JR

### SWEET CORN

Corn with silks now give / ears by the Fourth of July / but earworm moths fly. - EB

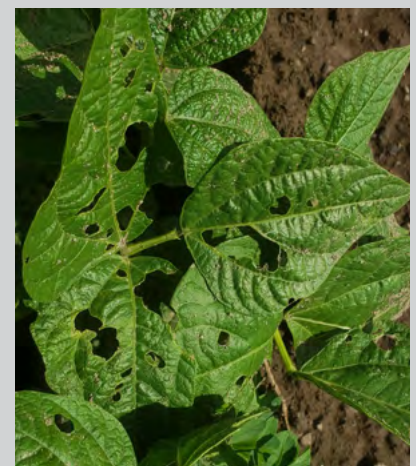
### TOMATOES

Most field plantings of tomatoes are growing rapidly, although fruit set is low in some fields due to the topsy-turvy weather of too cold then too hot causing flowers to drop. - JR

Late Blight Severity Values (SV) 6/16/21

Location	SV	Forecast 6/17-6/19	Location	SV	Forecast 6/17-6/19
Albion	3	0	Hammondsport	2	0
Arkport	9	0	Knowlesville	6	1
Baldwinsville	0	0	Lyndonville	5	1
Bergen	0	1	Medina	9	1
Buffalo	14	0	Niagara Falls	14	1
Burt	6	1	Penn Yan	12	0
Ceres	20	1	Rochester	12	1
Elba	5	1	Sodus	11	1
Fairville	6	1	Versailles	8	9
Farmington	9	1	Wellsville	32	1
Fulton	22	1	Williamson	6	0
Geneva	3	0			

Calculated using a May 26 crop emergence date, and May 15 volunteer emergence date



The feeding damage of Mexican Bean Beetle is known as 'skeletonized' for good reason. Photo by J. Reid, CVP



## How to 'Beet' Leafminers

Caitlin Tucker, Cornell Cooperative Extension, Cornell Vegetable Program

What's crawling inside of your Swiss chard? If you're growing beets, Swiss chard, or spinach and the leaves begin to look as though something is tunneling inside of them, then you're seeing tell-tale signs of the Beet or Spinach Leafminer. As adults, these leafminers are small grayish-black flies with light yellow markings. They emerge from the soil in late May / early June and begin seeking the perfect spot for the next generation to get started – beet, Swiss chard, or spinach leaves.

The white, cylindrical eggs are laid in clusters on the undersides of leaves (Fig. 2). Over the course of the next few weeks, the leafminer larvae hatch and burrow (or mine) their way in between the layers of a leaf and there they begin chowing down. Unless you're scouting your crops on a regular basis, the first sign of an infestation you may see are winding, opaque tunnels across the leaves. As the larvae mature, their appetites increase, and so does the damage. Extensive damage looks like large blotches of water soaked blisters that eventually turn brown (Fig. 1). Ultimately the photosynthetic area of the plant decreases, and a window of opportunity is opened up for diseases like Cercospora Leaf Spot, Phoma Leaf Spot, or Bacterial Leaf Spot. In as little as 1-2 weeks, the larvae are large enough to chew an exit out of the leaf and drop to the ground, continuing the life-cycle. It's typical to see 3-4 generations in a year.

For the most part, an infested plant can grow out of the damage, leaving only unappetizing looking leaves behind. For beet growers this may be acceptable, as infestations do not typically reduce yields. Ultimately it will depend on your markets. If you plan to sell your beets without their tops – no problem. But if you plan to grow spinach, Swiss chard, or sell your beets with their tops, the damaged foliage may be severe enough to reduce the marketability of the edible greens.



Figure 1. Large opaque blister-like feeding damage from Beet Leafminer larvae. Photo by C. Tucker, Cornell Vegetable Program



Figure 2. Clusters of white, cylindrical Beet Leafminer eggs on the underside of a chard leaf. Photo by C. Tucker, CCE CVP

### HOW TO BEET 'EM

**Prevent** – Frequent scouting is the best way to prevent a leafminer problem from becoming established. Scouting should begin when the flies begin emerging from the soil – late May, early June. Check the undersides of the leaves for the white, cylindrical egg masses and begin treatment as soon as you spot them.

**Crop Rotation** – Adult flies emerge from the soil where infested crops were previously located. So, if you know you have a history of spinach or beet leafminer, and have the space to allow for crop rotation, rotating away from spinach, swiss chard, or beets for 2-3 years can help break the cycle.

**Weed Management** - Unfortunately, these leafminers also have a back-up plan if they can't find those crops. They've also been known to lay eggs and feed on lamb's quarter, pigweed, plantain, and chickweed, so staying on top of your weed management is one further step you can take to beat them back.

**Exclude** – If you're able to rotate away, great! You should also consider protecting your crops with row cover. As their name implies, flies...fly. Until you've broken the cycle, there's a good chance they'll emerge in the Spring and find their way to your crops so exclude them from the get-go. Note: row cover will only help if placed over plants before the adults are active.

**Treatment** – Timing is critical if you choose to spray. Once the larvae have hatched and mined their way into the leaf, pesticide sprays cannot easily reach them. So, catch them early by scouting, and take care to cover the lower leaf surfaces.

The 2021 Cornell Commercial Vegetable Guidelines recommends Entrust SC (spinosad) as an organic option for beet crops or spinach. Conventional control options for spinach include Agri-Mek SC, Coragen, Trigard, and Radiant SC. Begin applications when spinach has two true leaves and repeat every seven days. Keep in mind that some products are labeled for Swiss chard, but not for spinach or beets! ●

## Upcoming Events

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

### 2021 Oswego County Onion Growers Twilight Meeting

June 24, 2021 (Thursday) | 4:00 - 7:00pm; dinner at 7:15pm

Sorbello muck, across the road from 75 Pollard Rd, Hannibal, NY 13074

It's going to be a Weed Control Extravaganza at this year's Oswego County Onion Growers Twilight Meeting! Bring weed samples for identification. 2.25 DEC recertification credits will be available (categories 1A, 10 and 23). CCA credits will also be available. This meeting is being organized by Oswego County Vegetable Growers and Improvement Association and CCE Cornell Vegetable Program. The [meeting agenda](#) can be found at [CVP.CCE.CORNELL.EDU](http://CVP.CCE.CORNELL.EDU). It's FREE thanks to the generous support of our sponsors!

Please remember to RSVP to Sam Allen ([samanthallen91@gmail.com](mailto:samanthallen91@gmail.com) or call 315-345-1592) **by this Friday if you want to stay for pulled pork dinner** after the meeting.

### Potato Production Meeting

July 1, 2021 (Thursday) | 4:00 - 6:00pm (free dinner follows at the Fresh Market Vegetable Production Meeting)  
1332 Milestrip Rd, Brant (Irving), NY

Meeting will cover organic and integrated management strategies. Topics include fertility, insect management, soil health, late blight prevention, and hand-on scouting skills practice. 1.0 DEC credit in 1a and 23.

Register online at [CVP.CCE.CORNELL.EDU/EVENTS.PHP](http://CVP.CCE.CORNELL.EDU/EVENTS.PHP) or by calling 716-652-5400 x176. Meeting is free to attend thanks to the generous sponsorship of Timac Agro / Laing-Gro. Pre-register by 5pm on June 28 to be included in head count for the post-meeting dinner.

### Fresh Market Vegetable Production Meeting

July 1, 2021 (Thursday) | 7:00 - 8:45pm (free dinner proceeds the educational event)

1418 Milestrip Rd, Brant (North Collins), NY

Organic and integrated pest management strategies will be covered. Topics include sweet corn scouting & laser scarecrow update, alternatives to Lorsban for cabbage maggot control, foliar sampling for improved fertility management, best practices for biopesticide use, and gauging soil biological activity. 1.25 DEC credit in 1a and 23.

Register online at [CVP.CCE.CORNELL.EDU/EVENTS.PHP](http://CVP.CCE.CORNELL.EDU/EVENTS.PHP) or by calling 716-652-5400 x176. Meeting is free to attend thanks to the generous sponsorship of Timac Agro / Laing-Gro. Pre-register by 5pm on June 28 to be included in head count for the pre-meeting dinner.

### Save the Date...Fresh Market Evening Field Meeting

July 28, 2021 (Wednesday)

Waterport (Orleans County)

### Save the Date...Fresh Market and Cabbage Evening Field Meeting

August 3, 2021 (Tuesday)

Newfane (Niagara County)

## On-Farm Rodent Management Survey

The New York State IPM Program helps people manage pests in ways that minimize environmental, health and economic risks. In addition to expertise in agricultural commodities, our program provides education about 'structural pests,' including rodents.

The purpose of this nine question survey is to collect information about current rodent management practices around farms to identify opportunities for outreach.

Take the survey at [https://cornell.ca1.qualtrics.com/jfe/form/SV\\_a5HcSjws6ref59Y](https://cornell.ca1.qualtrics.com/jfe/form/SV_a5HcSjws6ref59Y)

Thank you for your time! We greatly appreciate your input!



# Legionella in Water Systems

Robert Hadad, Cornell Cooperative Extension, Cornell Vegetable Program

When we hear about the bacteria Legionella, we think back to those disease outbreaks in convention centers, hotels, or cruise ships and Legionnaire's Disease. This disease causes respiratory issues that in vulnerable populations, can lead to hospitalization. Anyone can catch the disease but those over 50, past or current smokers, lung or heart disease, weakened immune systems, or other underlying illnesses are at a higher risk. Symptoms include fever, coughs, chills, and muscle aches. Difficulty breathing worsens for some patients especially these at risk groups.

## WHY DO WE CARE ABOUT LEGIONELLA ON THE FARM?

This bacterium comes from surface water sources and can contaminate soil. Contamination can be accidentally introduced into water storage tanks for outdoor irrigation set ups (often used when well water does not recharge fast enough and to build up supply, water is pumped into large storage tanks then pumped into fields).

Legionella can also get introduced into high tunnel and greenhouse irrigation systems such as overhead sprinkler or misting systems. The heat of the summer warms the water left in the piping, hoses, and nozzles where the bacteria multiply. People can get sick by breathing in the microdroplets when mist systems go off or even from spray aerosols when watering with a fine nozzle hose.

## PREVENTION AND MANAGEMENT

Recently there have been confirmed reports of on-farm contamination of water systems and illness developing. Though rare, this is still something to be aware of and get ahead of the problem. The solution is prevention. By doing periodic cleaning and sanitizing of holding tanks, hoses, and irrigation lines, the risk can be greatly reduced. At the same time, other bacterial problems often heard of like E. coli, Salmonella, and Listeria among others will also be managed. So, there are co-benefits when it comes to cleaning and sanitizing.

Some management steps for reducing risk include periodic seasonal cleaning and sanitizing water tanks. Tanks should be scrubbed down with a coarse brush. There are long-handled brushes called tank brushes made to do this kind of job. Use detergent and elbow grease to do a thorough job inside the tanks. Since cleaning will also go after other types of bacterial problems as mentioned about follow this up with spray of sanitizer following label directions.

For irrigation lines, run sanitizer through an injector. Hot water is another method of killing bacteria. To kill Legionella, water temperature must be above 140°F and exposure for more than 2 minutes. If irrigation lines are long, the temperature must be higher to maintain that degree of heat reaching the end of the line. Nozzles need to be cleaned as well. Some growers replace their mister nozzles seasonally anyway especially if the water is hard to avoid clogs. It is also a good idea to clean up inside the tunnel or greenhouse. Remove anything lying around where water can collect. These can become incubators for bacteria. Stay safe and be well. ●

# Optimizing Herbicide Performance During Droughty Conditions

Jed Colquhoun, Professor and Extension Specialist, IPM Program Director, Univ. of Wisconsin-Madison, Department of Horticulture; originally published in the UW Vegetable Crop Update, No. 10 – June 13, 2021

Many non-irrigated areas of the Upper Midwest are becoming significantly droughty as our weather prematurely enters the dog days of summer. There are several agricultural impacts of these hot and dry conditions, including on weed growth and management. While we can't make it rain, we can use awareness of how drought affects weeds to adjust plans in a way that optimizes management. Here, we offer a very short summary of weed growth and herbicide performance in a drought and a few tips on how to adjust plans in these conditions.

## WEED GROWTH IN A DROUGHT

Annual weeds are biologically conditioned to germinate and emerge when weather conditions favor survival and reproduction. There are many factors that affect seed dormancy, such as soil temperature, seed age, seed coat mechanical breakdown and soil moisture. Weed seed that is close to the soil surface is most affected by drought and we often see fewer weed seeds break dormancy and germinate in these conditions. And, some weeds that do germinate will die before establishment because of inadequate moisture to support growth.

That's the good news. Unfortunately, there are two negative aspects of weed biology during a drought that affect successful management. First, in the absence of annual small-seeded weeds that germinate from near the soil surface, the weed spectrum shifts to those that are often harder to control: perennials regrowing from deep and established root systems such as yellow nutsedge and Canada thistle and large-seeded weed species that can germinate and emerge from deeper in the soil where moisture may be more available. Second, emerged weeds become "hardened off" and more difficult to control during a drought. In particular, they will put on a thicker, waxier cuticle on leaf surfaces to protect from water loss.

## HERBICIDE PERFORMANCE DURING A DROUGHT AND WHAT WE CAN DO TO OPTIMIZE IT

There are two common misconceptions that we need to first address: soil residual herbicides don't prevent weed seed germination and stressed weeds are actually harder to control than healthy, actively growing weeds. In a very general sense, herbicides

*continued on page 9*



act by blocking an active biological process required for normal weed growth, and so that target biological process needs to be happening for the herbicide to work.

For soil residual herbicides that are applied prior to weed germination and emergence (pre-emergent herbicides), the herbicide needs to be near the weed seed in the soil as it germinates and the seed needs to break dormancy. In many cases we rely on soil moisture from moderate rainfall to incorporate pre-emergent herbicides into the target weed germination zone. If this doesn't happen weed seed can germinate and emerge rapidly through herbicide sitting on the soil surface. When rainfall is scarce or sporadic, it's worth watching the forecast even more carefully to try to time crop planting and/or pre-emergent herbicide application to the best chance of adequate soil moisture as outlined on the herbicide label. Editorial note: this is obviously easier said than done. I have a beet trial where I planted just before an 80% chance of showers that never happened and has sat with herbicide on the powder dry soil surface for two weeks now. When it does finally rain, I don't expect much out of the pre-emergent herbicide and have started planning for a more aggressive post-emergent program. This is a time when scouting is more important than ever so that post-emergent control options can be considered and timed relative to unanticipated changes in the weed spectrum.

If the droughty conditions persist during the remainder of the growing season and beyond, we'll need to consider another consequence: the risk for extended soil residual carryover. In short, the vast majority of herbicides rely on soil microbes for break-down and these microbes aren't very active in dry soils. But, let's cross that bridge if and when we get to it in a follow-up article – just be aware of what might be planted next as you think about your herbicide choices and rotational restrictions.

For post-emergent herbicides, as always be very careful to follow the details of the label to optimize performance. Be sure to use the correct adjuvant to help the herbicide penetrate drought-protected leaf surfaces, follow the weed growth stages carefully, and consider adjusting the rate within the labeled ranges with a more challenging target in mind. ●

## NY Sweet Corn Trap Network Report, 6/15/2021

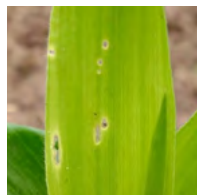
Marion Zuefle, NYS IPM Program; from <http://sweetcorn.nysipm.cornell.edu>

Statewide, 21 sites reporting this week. Four sites caught European corn borer (ECB)-E. Five sites caught ECB-Z. Three of the four sites with ECB hybrid traps caught hybrids. Corn earworm was caught at 10 sites with 8 sites high enough to be on a 4, 5 or 6 day spray schedule (see table). Still no fall armyworm (FAW) or western bean cutworm (WBC) caught this season.

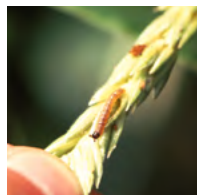
I found ECB larvae in a whorl stage field that I scouted this week. For tassel emergence corn the threshold is 15% infested plants. As the tassels begin to emerge larvae will leave the tassel and move down the plant looking for protected places to feed. Insecticide applications need to be timed to kill larvae before they bore into a new feeding location where they will be protected from sprays. For information on how to scout both tassel emerging and silking corn, please see the video: [How to Scout Fresh Market Sweet Corn](#).



ECB egg mass on underside of leaf.



ECB feeding damage on leaf.



ECB larva on tassel.

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

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

### WNY Pheromone Trap Catches: June 15, 2021

Location	ECB-E	ECB-Z	ECB Hybrid	CEW	FAW	WBC	DD to Date
Batavia (Genesee)	0	0	NA	0	0	0	707
Bellona (Yates)	NA	NA	NA	NA	NA	NA	683
Brockport (Monroe)	NA	NA	NA	NA	NA	NA	711
Collins (Erie)	NA	NA	NA	NA	NA	NA	666
Eden (Erie)	0	0	NA	6	0	0	697
Geneva (Ontario)	NA	2	4	0	0	0	682
Hamlin (Monroe)	NA	NA	NA	NA	NA	NA	663
Leroy (Genesee)	NA	NA	NA	NA	NA	NA	691
Lyndonville (Orleans)	0	1	NA	1	0	0	644
Oswego (Oswego)	0	0	NA	0	0	0	564
Panama (Chautauqua)	NA	NA	NA	NA	NA	NA	629
Penn Yan (Yates)	0	10	0	0	0	NA	658
Portville (Cattaraugus)	NA	NA	NA	NA	NA	NA	632
Ransomville (Niagara)	3	0	NA	2	0	0	708
Seneca Castle (Ontario)	3	0	5	0	0	0	661
Williamson (Wayne)	NA	NA	NA	NA	NA	NA	579

ECB: European Corn Borer; CEW: Corn Earworm; FAW: Fall Armyworm; WBC: Western Bean Cutworm; NA: not available; DD: Degree Day (base 86/50) April 1st accumulation [Climate Smart Farming](#)

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. ●

## Do Vegetables Need Extra Boron?

Steve Reiners, Professor/Chair in Horticulture, Cornell University, Cornell AgriTech

Vegetable growers seem to have a lot of interest in using boron (B) fertilizers. Boron is an essential plant nutrient, which means plants cannot complete their life cycle unless boron is present in the soil. But unlike essential nutrients like nitrogen, phosphorus and potassium that are needed in large amounts (>100 pounds/A for N and K, and >50 pounds/A for P), only small amounts of boron are needed, in the range of 1-3 pounds of B/A.

Even that amount varies by crop. Some crops truly benefit from boron additions and others not so much. For crops like beans and peas, excess boron can cause toxicity. Table 1 provides details on likely vegetable crop responses to boron.

**Table 1. Vegetable response to applied boron and recommended application rates.**

High Boron Requirement 3 lbs./A	Medium Boron Requirement 2 lbs./A	Low Boron Requirement 1 lb./A	No Boron Requirement 0 lbs./A
Beets Broccoli Cabbage Cauliflower Celery Kale Rutabaga Spinach Swiss chard Turnip	Asparagus Carrots Cucurbits Eggplants Leeks Onions Parsnips Potatoes (white) Radishes Sweet corn Tomatoes	Potatoes (sweet) Peppers	Beans Peas (all)

### CONDITIONS LIKELY TO CAUSE BORON DEFICIENCY

Very sandy soils, low in organic matter and alkaline soils with a pH above 7 can be the most problematic. But droughty conditions or soils very high in calcium can also cause deficiencies. Like calcium, boron is absorbed by plant roots and moves through the transpiration stream. If you are an organic crucifer grower and maintain a soil pH above 7.2 to control club root, a boron deficiency is likely.

### TYPICAL BORON DEFICIENCY SYMPTOMS

It depends on the plant. Growing points can dieback, which can be a very common symptom in beets. Also in beets, roots can develop internal black rings. In crucifer crops, typical deficiency symptoms include cracked or corky stems. Broccoli and cauliflower stems are hollow and brown internally.

### APPLICATION OF BORON

Crucifer crops, beets and celery are the most likely crops to respond to boron applications. Applications to crops with a medium and low requirement are less likely to result in noticeable differences. A few years ago, there was some discussion that boron could improve yields and quality of tomatoes, but additional research has not shown that to be the case.

Boron can be applied as a broadcast application with other fertilizers in the spring or as a foliar application later in the spring. **Remember to adjust your boron application based on the material being used.** The rates suggested above are actual pounds of boron per acre. If you want to add 1 pound of actual boron per acre and you are using Borax that contains 11% B, you will need about 9 pounds of Borax ( $1 \div 0.11 = 9.09$ ). If using Solubor at 20% B, you would need only 5 pounds of Solubor ( $1 \div 0.2 = 5$ ).


Those of you that have heard me talk at grower meetings the last 25 years know I'm not a big proponent of foliar nutrient applications. But boron can be effective when applied in this manner. It is especially helpful on a high pH soil that may tie up boron and make it unavailable through root uptake. If using



A boron deficient broccoli with corky scarring on the stem. Photo by Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org

foliar applications, rates should be reduced significantly to reduce toxicities, with rates of only 0.1 to 0.3 pounds per acre of actual boron applied. Best to apply in at least 30 gallons of water per acre. Another advantage of the lower rate with foliar applications is less likelihood of a boron toxicity if beans or peas are in rotation.

If using a foliar application, apply either early in the morning or in the evening when humidity is high, and leaves will stay wetter. Do not apply when plants are drought stressed. Apply when temperatures are below 80F. Optimum temperature for foliar application is 72F. Spray when winds are calm to avoid drift and use smaller droplet size to maximize uptake. ●



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and distributions of major  
diseases and insects by filling  
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developed by  
University of Kentucky.

Thank you!



summer 2021

# BERRY OFFICE HOURS

**Got berry questions?**

Join Extension Berry Specialists [Laura McDermott](#) and [Anya Osatuke](#) each week for virtual office hours!

**Thursdays**  
**12:30 - 1:30pm EDT**

Join the [Zoom meeting](#); Meeting ID: 980 3216 0743;  
Passcode: 353671

Call in to: 646-876-9923 or 646-518-9805

## Growing Degree Days (GDDs)

Julie Kikkert and Emma van der Heide, CCE Cornell Vegetable Program

Accumulated Growing Degree Days (AGDD)  
Base 50°F: April 1 - June 14, 2021

Location**	2021	2020	2019
Albion	620	479	410
Arkport	526	412	393
Bergen	581	479	411
Brocton	628	499	441
Buffalo*	652	473	395
Burt	516	436	337
Ceres	532	407	462
Elba	556	459	382
Fairville	566	465	376
Farmington	595	487	394
Fulton*	563	474	369
Geneva	615	496	425
Hammondsport	578	478	410
Hanover	603	494	438
Lodi	562	518	455
Niagara Falls*	603	466	364
Penn Yan*	647	507	461
Rochester*	612	494	479
Sodus	635	454	370
South Bristol	598	477	410
Varick	667	536	475
Versailles	583	489	446
Williamson	537	451	346

\* Airport stations

\*\* For other locations: <http://nwa.cornell.edu>

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# Cornell Cooperative Extension Cornell Vegetable Program

480 North Main Street  
Canandaigua, NY 14424



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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**Cornell Cooperative Extension  
Cornell Vegetable Program**

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