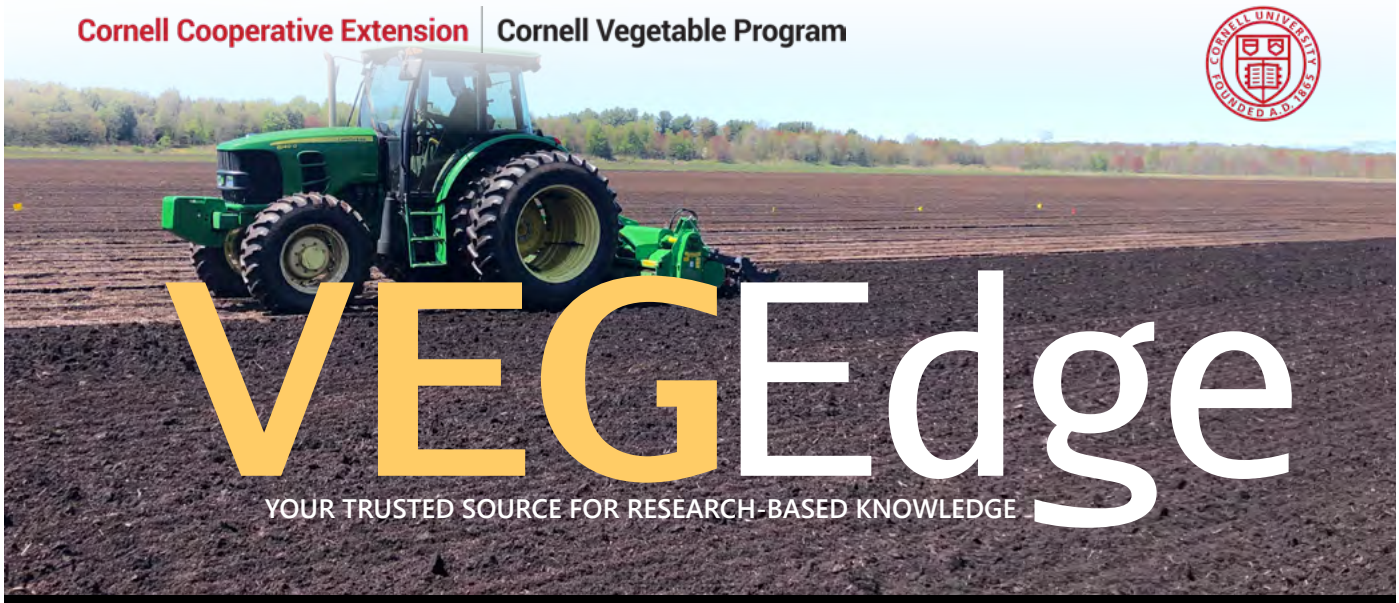
Cornell Cooperative Extension | Cornell Vegetable Program



VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

Volume 18 • Issue 6 • May 11, 2022

Get Your Irrigation System Up and Ready Ahead of the Rush

Robert Hadad, Cornell Cooperative Extension, Cornell Vegetable Program

It's best to be prepared and ready to go before the pressure of doing the task is upon you. I'm not sure who said that, but it rings true. Trying to work on all that's required of an irrigation system shouldn't be left till it is the 3rd day of an endless 90°F weather pattern.

Pump Maintenance

Where is the pump? Was the water drained out of it before winter set in? If not, you may want to check to see if there are any cracks. You want to make sure pumps are in working order. Change out the oil. Clean the spark plug. Clean out the intake pipes. Put in new thread tape to seal connections.

Irrigation Pipes and Drip Header Lines

Where are the irrigation pipes or the drip header lines? Probably off in the edge of the field. Best find them before a plow finds them for you. Check for damage. Check for rodent hotels. For drip headers, replace the snapped off valves before connecting to water supply. Set up headers and pipes to blow out. Check seals between sections for leaks.

Sand Filters

Find the sand filters. When was the last time they were cleaned out and sand replaced? Check connections from the pump and connections to the lay-flat or header line. Set the filter onto a sturdy stand.

Water Source Assessment

Scout around the surface water source you'll be pumping water from. Mow-

Two common types of farm irrigation pumps moving waters into vegetable fields either through overhead sprinklers or larger drip systems. *Photos from NCSU Extension*

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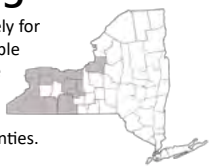
About VegEdge



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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The next issue of VegEdge newsletter will be produced on May 25, 2022.

Accumulated Growing Degree Days, 5/10/22

Emma van der Heide, CCE Cornell Vegetable Program

Accumulated Growing Degree Days (AGDD)
Base 50°F: April 1 - May 10, 2022

Location**	2022	2021	2020
Albion	71	82	27
Appleton	62	66	23
Arkport	55	98	14
Bergen	63	94	26
Brocton	95	127	34
Buffalo*	81	120	29
Ceres	62	118	17
Elba	61	87	20
Fairville	72	88	30
Farmington	75	96	30
Fulton*	75	93	35
Geneva	81	100	33
Hammondsport	81	105	28
Hanover	96	119	30
Jamestown	75	123	17
Lodi	114	109	33
Lyndonville	64	70	28
Niagara Falls*	86	78	18
Penn Yan*	80	113	33
Rochester*	77	95	31
Romulus	82	107	36
Sodus	78	97	29
Versailles	96	125	27
Waterport	50	48	28
Williamson	66	67	31

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

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ing down tall grass and weeds keep waterfowl from nesting (if on your property). Check for any floating carcasses, trash, or other potentially hazardous materials. Do waterfowl hang out in the pond during irrigation periods?

Assess the water source. Is it a pond that receives runoff from neighboring fields? What are the fields used for – livestock grazing? Do you draw water from a stream? What is upstream? What might be possible contamination that gets into the stream that you can easily figure out?

Water Quality Testing

If haven't done so already, it would be a good idea to start taking water quality samples for testing. Find the closest water testing lab near you (might be the county health department). Pick up sample bottles and instructions for taking the samples. READ the instructions. Most water samples need to get to the lab (kept cold) in a few hours from taking the sample. Ask for the water test that gives a number a quantitative generic E. coli test.

Take water samples in the spring and 2-3 times more during the season (especially if there are harvests spread out over the summer and into fall). READ the results of the tests. Compare each test to see if there is a pattern for the numbers of CFUs (colony forming units) or MPN (most probable number of units). A season's worth of tests will give you your baseline for water quality. If there is a large spike in the numbers between tests, check the water source and see if you can figure out the problem. Maybe migratory birds came in or something is dead in the water, or maybe a heavy rain-washed contamination from a neighbor's field into the water. Retake the test and see if the numbers have gone down.

For locations of water testing labs, check the Produce Safety Alliance website, your county health department, or the CVP team – Robert Hadad, rgh26@cornell.edu , 585-739-4065.

Conclusion

The moral of the story is be prepared before you get buried. Severe weather swings seem to be the new normal and can come on fast. Don't get caught short. If the forecast is for hot dry windy weather moving in, start irrigating beforehand. It takes a lot more water to make a difference if the soil has dried down than it does when the soil is damp. Keep up with watering (when it isn't a monsoon passing through) even during mild weather to be ahead of the game especially for soils that don't hold water well (growing and incorporating cover crops can help build up organic matter and water holding capacity). ●

Scout for Pests and Diseases in Strawberry Fields

Anya Osatuke, Cornell Cooperative Extension, Harvest New York

It is early May. Most strawberry beds have the mulch taken off of the plants, and new leaves are starting to grow. Now is a good time of year to scout for pests and diseases in strawberry fields.

Two spotted spider mites (*Teytanychus urticae*) are pests of strawberries, raspberries, blackberries, and many other crops, including vegetables. Two spotted spider mites overwinter as eggs. At this time of year, some mites are beginning to emerge from the eggs. Especially if you have had issues with mites in the past, now is a good time to grab a magnifying lens and scout for mites and eggs.

Mites and eggs can be found on leaf undersides. Use a 10X – 15X magnifying lens to look for them; look for greenish-yellow, tick-like nymphs, and spherical white eggs. The scouting threshold for applying a miticide is 5 eggs and adults per strawberry leaflet. Predatory mites such as *Phytoseiulus persimilis*, *Neoseiulus californicus*, are a biological alternative to miticides.

The wet weather last summer has increased the risk of fungal diseases. Fungal crown rots such as *Phytophthora*, or red stele, and Verticillium wilt, can cause leaf dieback and eventual death of the planting. To identify crown diseases, uproot a strawberry plant from the ground and slice the crown in half with a sharp knife. Scrape the skin away from the roots. Healthy crowns and roots will be a uniform creamy beige color, with a pale white band of vascular tissue.

Winter injured crowns will have ombre brown discoloration within, but the band of white vascular tissue will remain intact. Fungal diseases will cause discolorations inside of the crown and vascular tissue: verticillium wilt has a blue-green tint, phytophthora will cause a dull reddish brown, and anthracnose crown rot will cause a bright red-brown marbling.

Once a disease has been identified, for more information on treatment options, consult an extension specialist or the Cornell Pest Management Guidelines for treatment recommendations.

Spider mite Description, Damage and Management | UC ANR:
https://www2.ipm.ucanr.edu/agriculture/strawberry/spider-mites/

Cornell Pest Management Guidelines 2022 | Cornell University:
https://www.cornellstore.com/books/cornell-cooperative-ext-pmep-guidelines

Survey of Strawberry Root Problems in New York State | New York Fruit Quarterly:
https://nyshs.org/wp-content/uploads/2019/03/McDermott-Pages-19-22-from-NYFQ-BOOK-Fall-2018-8-29-18-3.pdf ●

Internal Blossom End Rot on High Tunnel Tomatoes

Judson Reid, Cornell Cooperative Extension, Cornell Vegetable Program

Increasingly growers in our region plant tomatoes into heated spaces earlier and earlier each spring. With a price premium for early tomatoes, it certainly makes sense! However, managing the nutrient demands of the crop this time of year can be a bit tricky. In particular, colder soils may restrict root growth and nutrient uptake. This can lead to disorders such as Internal Blossom End Rot, which means unmarketable fruit and goodbye to high prices!

The market pays for early tomatoes, but only if there is quality! Avoid disorders like Blossom End Rot by planting in soils above 60F and avoiding excess nitrogen. *Photo by Judson Reid, CCE Cornell Vegetable Program*

How does this happen?

To speed early growth, farmers will front load bulk nitrogen sources such as alfalfa or soy meal into the soil, as well as inject soluble nitrogen through the drip system. Nitrogen as a nutrient is readily taken up in solution within the root zone. Calcium levels in most NY high tunnels soils are sufficient for healthy tomatoes, however that calcium is attached to soil particles. If root growth is restricted by cold soil temperatures, the crop is limited in its potential calcium uptake. Pairing cold soils with sunshine, warm canopy temperatures, excess nitrogen and today's vigorous commercial varieties, we create a localized calcium deficiency within the plant, specifically in the fruit itself. This creates a condition known as Internal Blossom End Rot, similar to the common Blossom End Rot we see with high temperatures and low moisture later in the season.

How do we prevent Internal Blossom End Rot?

- Avoid cold soils! Although tomatoes can survive in soil temperatures below 60°F, they won't thrive.
- If planting early, do not front load excess nitrogen. Keep applications to 50% or less of total N budget.
- Don't inject excess levels of soluble nitrogen. Consider pre-plant applications before injecting, and stay below 150 ppm N.

There may be a temptation to apply additional calcium, such as calcium nitrate during this period. We don't encourage this for soil grown tomatoes as calcium nitrate will raise soil pH and the persistent calcium leads to other problems. For container growing, calcium nitrate may be a good choice to help prevent Internal Blossom End Rot.

The nitrogen level on this test shows above 6%, a key to the excess foliage that lead to the Blossom End Rot pictured. Even though calcium levels are acceptable in the foliage, there is a deficiency in the fruit. *Photo by Judson Reid, CCE Cornell Vegetable Program*

Curious About Cucurbits?

Check out The Current Cucurbit website to find some of the latest information and research regarding cucurbit diseases, insect pests, exclusion netting, and more! <https://www.cucurbit.plantpath.iastate.edu/>

You'll find helpful tips and tricks to apply when using exclusion netting and can watch a variety of short videos on interesting topics within the cucurbit world, plus a few interviews with growers. There's also a podcast series! Feel free to follow The Current Cucurbit on twitter as well @TCucurbit for project updates.

The focus of our three-state (Iowa, Kentucky, and New York), three-year (2020-2022) project is on finding better ways to manage diseases, insect pests, and weeds in organic systems, and getting that information to growers. Our funding comes from USDA's Organic Research and Extension Initiative (OREI).

Onion Updates and Killing of Barley Nurse Crop

Christy Hoepting, Cornell Cooperative Extension, Cornell Vegetable Program

Onion Updates, 5/11/22

Although chilly, it has been a relatively easy spring for planting the onion crop with not many days lost to rain and saturated soil conditions. Direct seeding is complete with the first leaf just starting to push in the earliest plantings, and majority of direct seeded crop starting to row to flag stage. Earliest transplants are in the 4-leaf stage. Transplanted onions have been a bit sluggish to take off in the chilly conditions. Stand in direct seeded onions is looking very good. The hot and dry conditions could result in burn-off, wind erosion and/or poor activation of pre-emergent herbicides.

Killing Barley Nurse Crop

Killing of barley nurse crop is typically timed between flag and 1-leaf stage. When barley gets too big, it can trap air between the rows and increase the chances of seedling burn-off, and the barley can compete for moisture and nutrients, and stunt the onions. Alternatively, killing off barley windbreaks too soon leaves the young onion seedlings vulnerable to wind damage, especially when conditions are dry. There is a higher risk of burn-off in onions that have been treated with "heavy" rates or tank mixes of pre-emergent herbicides prior to onion emergence, or when seed was planted deep (0.75-1"), because the onions can be weaker in these situations. Barley nurse cover crops will continue to provide crop protection for about 2 weeks after they are sprayed, but they will not use moisture or nutrients, and thus do not compete with the crop. Fusilade, Select EC/Max and Poast work best when barley is actively growing. If barley has been nipped by frost or wind, it will be stressed, and the barley-kill herbicide will work better after waiting a few days. Select EC kills the barley faster than the other two by 3-4 days.

2-Step Barley-Kill

Some growers apply barley-kill herbicides in 2-steps, the first (e.g. Select EC 10 fl oz) at loop-flag and the second (e.g. Fusilade 8 fl oz) 5-7 days later, often with Goal. With the 2-step barley-kill technique, there are two timings to incorporate applications of pre-emergent herbicides Prowl and/or Outlook. It is recommended to use different products for each barley-kill application. It is also not uncommon for growers to **add Goal 2XL 0.25-0.5 fl oz/A to barley-kill herbicide** to control tiny weed escapes in the cotyledon stage that are just beginning to break through the first pre-emergent herbicide application. Be aware that COC will heat up Goal 2XL considerably and will also kill the barley faster.

Tank-mixing Prowl EC with Fusilade

It is common for Prowl to be applied with barley-kill herbicide. Since Prowl EC contains petroleum distillates in its formulation, the amount of crop oil concentrates (COC) required when using Fusilade can be reduced according to the following recommendations by Roy Ellerbrock:

Rate of Prowl EC/A	Rate of COC with Fusilade
4 pt or more	None
Less than 4 pt	Half rate: 0.5% v/v (2 qt/100 gal)
No Prowl EC or Prowl H_2O	Full rate:1.0% v/v (4 qt/100 gal)

Vegetable Crops Susceptible to Seedcorn Maggot

Julie Kikkert, Cornell Cooperative Extension, Cornell Vegetable Program

Warm temperatures have been conducive to emergence and mating of the first generation of seedcorn maggot flies. Depending on the temperature, the resultant larvae can feed on seeds and seedlings of a variety of crops—**beans, beets, cruciferous crops, cucurbits, onions, peas, spinach, sweet corn**—for several weeks until they pupate and the next generation begins. Periods of cool, wet weather are conducive to maggot feeding and coupled with slow plant growth can cause significant crop damage.

Scout Fields for Damage

Areas of poor emergence or growth may indicate seedcorn maggot injury. Dig up 5 to 10 seedlings or transplants in a suspect area. Infested seeds and stems are often hollowed out. Seeds may be killed and fail to germinate. Infested seedlings are often weak and die. They may have damaged cotyledons or lack a growing point. Onion plants infested early may not emerge, whereas, later damage to pre-bulbing plants may cause misshapen bulbs from which the foliage tends to grow from the side of the bulb. Finding the maggots in association with the damaged tissue is the best evidence. Full grown seedcorn maggot larvae are yellow-white, tough skinned, legless, about ¼ inch long. They have wedge-shaped heads and two black hooks for feeding.

Attack is most severe when cool, moist spring conditions slow seed germination and growth of young plants. Seedcorn maggot adults emerge from overwintering pupae. Mated females fly close to the ground in search of suitable egg laying spots – preferably near decaying organic material or germinating seed to provide a food source for the newly hatched larvae. Eggs hatch 2-3 days after being laid, and the **maggots feed on and burrow into the seed and stems**. Maggots develop through larval stages for 2 – 3 weeks depending on the temperature. **If damaged plants aren't killed outright, the injury provides wounds for plant pathogens to attack, causing root and stem rots to develop**.

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Prevention

Prevention is the key to control, because there are no effective rescue treatments. Here is a list of steps you can take:

- Encourage fast germination by planting high quality seeds in a well prepared seedbed at the minimum depth consistent with soil moisture.
- Handle seeds carefully since cracked seed coats can provide entry points for maggots.
- Using transplants may reduce your risk, but maggots can tunnel in stems of young plants, especially if growth is delayed by cold weather after planting.
- Avoid planting in low, wet areas.
- Incorporate crop residues/cover crops 2 to 3 weeks prior to planting.
- Avoid manure applications right before planting as this attracts egg-laying adults.
- Time early plantings to avoid periods of peak adult emergence and/or plant after the first generation maggots have pupated (typically mid-June) as this generation is often most damaging. Degree day models and other methods for estimating fly emergence are described in the reference from the University of Wisconsin below.
- Row covers may prevent egg laying and subsequent plant damage, but will not protect crops where pupae are already in the soil.
- Use insecticide and fungicide treated seed to protect seeds/seedlings –see the Cornell Vegetable Guidelines for individual crops.
- In-furrow or planter-box insecticide treatments are available in some crops.

MORE INFORMATION can be found at
Seedcorn Maggot | Wisconsin Vegetable Entomology

Azadirachtin for Aphid Management in High Tunnels or Vegetable Transplants

Elizabeth Buck, Cornell Cooperative Extension, Cornell Vegetable Program

One of the most common calls this spring has been aphid management in high tunnels or vegetable transplants. Azadirachtin is one tool for those settings. I'm going to do my best to walk through how it works, really focusing on what it does to aphids. For those of you who just want to know if your azadirachtin applications are working, skip to the end of the article and you'll find a short check list.

Aza-di-what?

Azadirachtin is the primary active ingredient in neem oil. It is widely used as an insect management tool in organic and other soft-approach production systems. Azadirachtin is sold as component within horticultural neem materials, as a purified product, and in pre-mixes with other organic insecticides.

Feeding Reduction

Some insects are highly sensitive and can detect very small concentrations of azadirachtin. In these insects, the presence of azadirachtin makes food unappealing and causes physiological changes in how the insects perceive their food. This leads to a quick reduction in feeding and, for some insects, an avoidance of the treated crops.

Aphids are not particularly well-equipped to detect azadirachtin in their feeding environment. The main effects of azadirachtin on aphids occur after they ingest the material. In aphids, the reduction in feeding is a result of physical breakdown of the digestive tract. This process takes more time than chemical-deterrence derived antifeeding responses in highly sensitive insects. Active feeding in aphids will fall after a day or two.

Feeding reduction is absolutely a benefit but it is not the main mechanism of control in aphids. Less feeding means less resources sucked from your plants. The risk of virus transmission can be reduced for certain aphid-vectored viruses if the aphids are disinclined to feed. As a bonus, reducing feeding reduces honeydew (aphid droppings) which can reduce unsightly sooty mold and reduce aphid farming by ants.

Reproductive Reduction

Anyone who has dealt with an aphid infestation knows that they multiply faster than rabbits. Female aphids exposed to azadirachtin reproduce much more slowly. Even better, the offspring they do produce are less likely to survive. Reproductive inhibition is a more impactful control mechanism in aphids.

Growth Inhibition

The growth effects are easiest to observe and play a large role in managing an aphid outbreak with azadirachtin. Once consumed, azadirachtin wreaks havoc on the hormones that control molting. Molting is the process that aphids and many other insects use to grow. Remember how insects have those crunchy exoskeletons? In order to grow, they literally have to crawl out of their skin. How charming.

Anyway, azadirachtin screws up the entire hormonal process and causes the insects to be incapable of molting. If they don't molt, they don't grow. And if they can't molt and grow, they die. Objective achieved. Somewhat slowly, but dead is dead.

When aphids molt they leave behind their cast skins. These are the small white … I don't know…flakes?... that you'll see on the foliage near an aphid infestation. While you won't find a cast skin for every time an aphid molts, they are relatively easy to find when you have a healthy and too-large-for-comfort aphid population.

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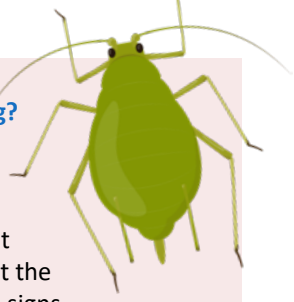
And for Good Measure

Azadirachtin has other physiological effects on insects. One that I find useful is that azadirachtin can cause impede muscle function. This can make insects a bit slow or unresponsive to stimuli that would normally cause a fleeing response.

Aphids aren't really known for running away, they pretty much tap into a tasty vein and stay put. But, if you gently poke your fingernail against the back end of aphids on the edge of a colony, you can often convince a few that it is time to find a better spot. The bigger aphids seem more willing to go than the small ones. You can try this with the healthy aphids before treating with azadirachtin to get a sense for how willing they are to move and what how fast they'll scurry.



How do I know my azadirachtin is working?

Azadirachtin is not a fast-acting product. You won't have the immediate satisfaction of seeing a bunch of dead aphids, or any other insect pest for that matter. But you don't have to take it on faith alone that the material is having an effect. Here are some signs to look for after several days:

Aphids Aren't Growing and Reproducing

1. Mark a couple leaves with aphid colonies throughout the infested area. I like to use bits of colored masking tape of a swipe of a sharpie.
2. Before spraying, take a picture of the aphids and get your finger or a pen tip the picture so you have a size reference.
3. Check back 5-7 days later.
4. You should see some large aphid adults and a disproportionately high number of smaller stages, relative to the before treatment picture. You won't see many cast skins at all, and the colony probably hasn't expanded in area very much.

Aphids Look and Act Unhealthy

1. The aphids might be off-colored compared to before treatment. Green aphids may start developing a yellowish tinge. Small aphids tend to show this response.
2. See if the response to disturbance has changed, if they can't move away as well as before.
3. Reduced aphid dispersion through the production area. This can be a slow down in how far or fast the infestation is spreading.

Reduced Feeding

Feeding is hard to gauge in aphids. If the infestation is severe enough to be generating honeydew, you can look for a reduction in the rate of new honeydew deposition. ●

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