Cornell Cooperative Extension | Cornell Vegetable Program

VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

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Water Quality and Food Safety – Let's Dive In!

Caitlin Tucker, Cornell Cooperative Extension, Cornell Vegetable Program

I've got water on my mind, folks. It might have something to do with the recent downpours. While we wait for the waters to recede, I want to take some time to review water testing - specifically for food safety.

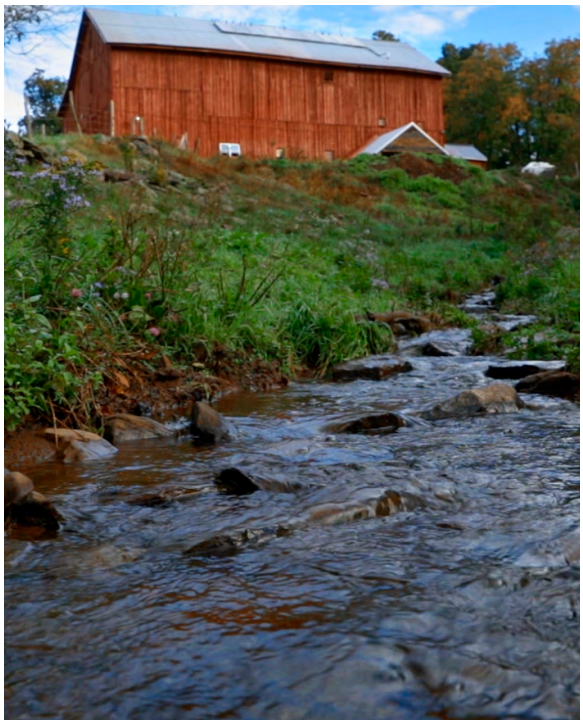
THE WHY

Water is an efficient way of contaminating large amounts of produce with pathogens like *Salmonella, E. coli, Shigella,* and *Cyclospora*, which cause foodborne illness. Ensuring that the water you use for crop production and post-harvest is free of pathogens and contaminants is not only a best practice, it is also a critical component of the Food Safety Modernization Act (FSMA) and third-party audit programs (GAPs, HGAPs, Primus, etc.).

WATER SOURCES AND WATER QUALITY

You may have access to numerous sources of water on your farm. They all vary in how relatively safe (or risky) they are to use.

- **Municipal (city) water** is relatively low-risk source. Though water treatments may differ across municipalities, most use a combination of filtration and disinfection to remove pathogens and contaminants.
- **Groundwater (well water)** carries a moderate risk in using for vegetable production and processing. Though rocks, sediment, and organic matter within the soil profile act as a natural filtration system, groundwater can become contaminated in many ways.



Surface water carries the most risk of contamination on your farm or upstream. *Photo by Jason Koski, Cornell*

continued on page 3

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:
CCE Cornell Vegetable Program
480 North Main Street, Canandaigua, NY 14224
Email: cce-cvp@cornell.edu
Web address: cvp.cce.cornell.edu

Contributing Writers
Elizabeth Buck
Robert Hadad
Christy Hoepting
Margie Lund
Julie Kikkert
Judson Reid

Publishing Specialist/Distribution/Sponsors
Angela Ochterski

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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.

Contents

The next issue of VegEdge newsletter will be produced on August 4, 2021.

Accumulated Growing Degree Days, 7/26/21

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

Accumulated Growing Degree Days (AGDD)
Base 50°F: April 1 - July 26, 2021

Location**	2021	2020	2019
Albion	1580	1498	1310
Arkport	1257	1291	1203
Bergen	1440	1463	1264
Brocton	1460	1440	1289
Buffalo*	1553	1522	1300
Burt	1354	1396	1170
Ceres	1285	1252	1268
Elba	1367	1407	1217
Fairville	1378	1421	1203
Farmington	1424	1447	1231
Fulton*	1390	1460	1192
Geneva	1465	1487	1303
Hammondsport	1383	1421	1242
Hanover	1445	1435	1281
Lodi	1207	1507	1333
Niagara Falls*	1505	1464	1251
Penn Yan*	1546	1532	1361
Rochester*	1483	1500	1398
Sodus	1496	1400	1177
South Bristol	1398	1418	1228
Varick	1540	1559	1374
Versailles	1390	1399	1269
Williamson	1360	1388	1163

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

continued from page 1

- **Surface water** is any body of water that is exposed to the environment – ponds, rivers, creeks, lakes, canals – and they carry the most risk for crop production. These bodies of water can become exposed to any number of contaminants that may originate on your farm or upstream.

HOW DOES WATER BECOME CONTAMINATED?

Municipal

I know, I just said municipal water was very safe to use. However, there's always a possibility that somewhere along the distribution system a crack or leak in the pipe could introduce contamination. Alternatively, there may be an issue with treatment at the plant. If the issue is under the municipality's control, they typically issue a boil-order as a precaution until the issue can be resolved. However, it is your responsibility to make sure the distribution system on your farm is in good, working condition.

Groundwater

Well water can become contaminated if well caps are broken, if the well head is submerged under flood waters, or if the well casing is cracked or damaged. If wells or recharge areas were installed incorrectly and sit downhill from a septic system, lagoon, manure piles, etc., run-off from those areas could carry contaminants into the groundwater.

Surface Water

Surface water can become contaminated in many ways. Many of which may be hard to control. Migrating geese, livestock, or wind-blown manure from the neighbor spreading manure on a windy day. Let's not forget that we're all downstream from someone or something – a landfill, a dairy farm, a residential neighborhood, a golf course. Water run-off leaving someone else's property may drain into the very body of water that you plan to use for overhead irrigation. What kind of contaminants might it carry?

Flooding

According to the Food and Drug Administration, *"Flooding is the flowing or overflowing of a field with water outside a grower's control. Pooled water (e.g., after rainfall) that is not reasonably likely to cause contamination of the edible portions of fresh produce is not considered flooding."* With recent rain events your fields may be experiencing both pooling from heavy rains and flooding from surface waters if they're located near a creek, river, pond, etc. Flooding from surface water is a concern because flood waters may carry contaminants like sewage, dead animals, pathogens, raw manure, chemicals, heavy metals, etc. To determine whether produce can be safely harvested after being exposed to flood waters, you should consider the following:

- Has the field already been planted?
- Was the edible portion of the crop submerged?
- How soon will the crop be harvested?
- How long were flood waters present? How deep were they?

If you'd like more information on assessing whether crops exposed to flood waters can be harvested safely, consider reviewing the FDA's guidance: https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-evaluating-safety-flood-affected-food-crops-human-consumption

HOW DO YOU KNOW IF YOUR WATER IS SAFE TO USE?

Test it! Whether you're covered under FSMA or undergoing a third-party audit, regular testing of your water source(s) is the best way to know their quality and safety. In the next issue of VegEdge, I'll cover the different types of tests available to growers, testing frequencies, and tips to streamline your water sampling. Until then, everyone think dry thoughts!

Western Bean Cutworm Report: Trap Catch Numbers Jumped

Margie Lund, Cornell Cooperative Extension, Cornell Vegetable Program

Western Bean Cutworm (WBC) trap catch numbers jumped at most locations this week, putting all locations besides Penn Yan E and N above a cumulative 50 moths. Growers should scout adjacent corn fields when cumulative WBC have reached >50 moths per trap. Both the trap reports and scouting corn in fields near dry beans can help determine the risk. Numbers continue to be high this year compared to previous years, which indicates either earlier peak flight or overall higher pest pressure this year. Historically, peak flight for WBC is in the last week of July to early August. We will know next week if this is early peak flight. Dry bean pod scouting should begin 7 to 10 days after peak emergence, regardless of cumulative WBC trap catch, and especially where WBC has been found in bean pods/seeds in recent years.

In addition to the WBC traps listed in the "NY Sweet Corn Trap Network Report, 7/27/2021" on page 5, the following dry bean trap sites are being monitored this year.

Western bean cutworm (WBC) trap set date and WBC adult numbers by date for each dry bean trap location

Dry Bean Location	Trap Set	7/6/21	7/13/21	7/20/21	7/27/21	Cumulative WBC
Avoca Hill (Steuben Co.)	6/29/21	5	4	35	269	313
Avoca Valley (Steuben Co.)	6/29/21	1	1	17	97	115
Caledonia (Livingston Co.)	6/29/21	0	9	27	102	138
Pavilion (Genesee Co.)	6/29/21	0	0	22	87	110
Penfield (Monroe Co.)	6/29/21	0	1	74	124	208
Penn Yan E (Yates Co.)	6/30/21	0	1	8	18	27
Penn Yan N (Yates Co.)	6/30/21	0	2	0	12	14
Riga (Monroe Co.)	6/29/21	0	2	47	62	111
LeRoy (Genesee Co.)	6/29/21	1	15	62	86	164
Wyoming (Wyoming Co.)	6/29/21	0	3	25	90	118
Wayland (Steuben Co.)	6/29/21	6	5	21	277	309

Anthracnose in Vegetables

Teresa Rusinek, Cornell Cooperative Extension, Eastern NY Commercial Horticulture Program

Warm, moist conditions favor the development of Anthracnose on ripe fruiting vegetables such as pepper, tomato, eggplant, cucumber, melons, and pumpkin. Symptoms were found this past week on eggplant and cucumber. In cucurbits, leaf lesions begin as water-soaked spots that become yellow-tan and circular. Cucumber anthracnose can be managed by growing resistant varieties.

The following is an excerpt from a newsletter article written by Dr. Margaret McGrath from Long Island CCE, Suffolk Co.:

> Rain provides favorable conditions for splash dispersing the pathogen as well as for infection, and harvest delays due to rain increase opportunity for anthracnose to develop. Ripe and overripe fruit are especially susceptible but this pathogen can infect green tomato fruit with symptoms not developing until fruit begin to ripen. Spots on fruit initially are small, circular, and depressed. They can enlarge considerably over time with masses of pink to orange-colored spores developing. Eventually the entire fruit will rot. Fruit nearest to the ground are most likely to be affected. The fungus can also infect roots. To manage anthracnose do not grow these or other Solanaceous plants (especially potato) in the same area for 3 to 4 years, plant treated seed that was tested for the pathogen, cover the ground with black plastic mulch or other material to provide a barrier between the pathogen in the soil and fruit, trellis plants, use drip irrigation, apply fungicides, and pick fruit as soon as it is ripe. The pathogen can be seed-borne so managing volunteer tomato plants is important. Fungicide applications are recommended starting at first fruit set and are most important as the fruit ripens. Targeted fungicides labeled for anthracnose in these and other fruiting vegetables include Aprovia Top (FRAC code 3 + 7), Inspire Super (3 + 9), Mettle (3), Cabrio (11), Flint Extra (11), Quadris (11), Quadris Top (3+11), and Tanos (11+27). PHI is 3 days for Flint Extra, and Tanos; 0 days for others. As with all diseases, select targeted fungicides to use in alternation or combination based on their FRAC code so that products with different code numbers are applied together and in alternation. Label use restrictions state how many consecutive applications are permitted before a product with a different code must be used. Contact, protectant fungicides with chlorothalonil, mancozeb, and copper are also labeled.

Anthracnose lesions on eggplant fruit. *Photo by T. Rusinek, CCE*

Anthracnose on pepper fruit. *Photo by C. Stewart-Courtens, CCE*

Anthracnose lesions on cucumber fruit. *Photo by S. B. Scheufele*

Foliar symptoms of anthracnose on cucumber. *Photo by T. Rusinek, CCE*

Keeping Wash/Pack Equipment and Facilities Clean – Tool Resource

Robert Hadad, Cornell Cooperative Extension, Cornell Vegetable Program

Sanitizing and Cleaning Resources for Your Business (SCRUB) is a multi-state project (VT, NY, MI, and GA) made up of Extension and education specialists. The focus is to provide customized support for growers to improve cleaning and sanitizing wash/pack facilities and equipment on produce farms. The project works one on one helping produce farmers figure out improvements with their wash/pack food safety practices.

One big question we have heard from several farms concerns how to clean wash/pack equipment or facilities. What tools are available? Where do you find them? The answers to these questions can be found on a new resource, Cleaning Tools & Supplies for Produce Farms, found on the SCRUB website: go.uvm.edu/cleaningtools, part of The University of Vermont Extension Ag Engineering website created by Andy Chamberlain and Chris Callahan.

Whether cleaning off sorting tables, cleaning harvest bins, a brush washer or root barrel washer, scrubbing a 150gal stock tank or stainless steel sink, having good tools to get the job done is important. Having tools that last depends on how they are made.

continued on page 5

continued from page 4

Another aspect is how easy is it clean the cleaning tools. The website page covers many important topics.

Color coding of brushes might important if you have many workers responsible for different jobs. Keeping straight what tools are used for the right job is critical. You don't want brushes used in the bathroom to be used on a food contact surface. Setting up a wash/pack facility where tools are easily stored yet available at the location of need plus being distinguishable from other tools makes workers more efficient.

Here is an excerpt from the site:

> Farms of various sizes all have tools and equipment that need to be cleaned and sanitized. This equipment varies in how well it has been designed to be cleaned; its level of hygienic design. Some items require lots of effort and specific tools to clean adequately while others are straight-forward. What's the best brush to clean totes? Is spending money on an expensive squeegee to get water off the floor worth it? This blog post will highlight some of the things to look for in cleaning tools and supplies for use on the farm.
>
> The first question to ask yourself is "Does it need to be cleaned? And, if so, how frequently?" Not everything needs to be kept sparkling clean, and not everything should be cleaned with soap and water. There are various easy ways to achieve "clean" based on the item's intended purpose. Starting with a visual inspection you can ask yourself some of the following questions:

- Is it a food contact surface?
  - *Critical* to clean, regularly
- Is it adjacent to food contact surfaces?
  - *Very important* to clean, regularly
- Is it contributing to a dirty environment?
  - Should be cleaned routinely

Check out the website for other resources as well including SOPs, wall and ceiling materials, and floor drains. ●

NY Sweet Corn Trap Network Report, 7/27/2021

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

Statewide, 29 sites reported this week. European corn borer (ECB)- E was caught at 7 sites with a high of 35 at the Accord site (Ulster County). ECB-Z was caught at 5 sites. The hybrid ECB was caught at three of the five sites trapping for it: Bellona (1), Hurley (11) and Penn Yan (1). Corn earworm was caught at 14 sites with 10 sites high enough to be on 4, 5 or 6 day spray schedule (see table). Fall armyworm (FAW) numbers continue to increase with 15 sites reporting trap catches. Western bean cutworm (WBC) numbers are also increasing with 28 sites reporting trap catches. Based on degree day accumulation, we are at about 40% flight completion at most sites for WBC using the NEWA WBC Flight Emergence Lookup Table. Peak flight usually occurs the first week of August.

It is recommended that all fields that are in the whorl or early tassel stage be scouted for WBC egg masses with a 4% threshold for processing sweet corn and a 1% threshold for fresh market sweet corn. WBC will usually lay eggs on the upper side of the top 1-3 leaves of pre-tassel corn, close to the leaf base. After tasseling has finished WBC seek out younger corn or dry beans. To scout for egg masses check the top 3 leaves of 10 corn plants in 10 locations throughout the field. The eggs are easy to observe if you view the leaf while holding it towards the sun. The egg mass will appear as a distinct shadow. It takes between 5-7 days for eggs to hatch. It is critical that sprays are timed before the larvae have a chance to enter the ear. The egg mass will become purple in color approximately 24 hours before egg hatch.

WNY Pheromone Trap Catches: July 27, 2021

Location	ECB-E	ECB-Z	ECB Hybrid	CEW	FAW	WBC	DD to Date
Batavia (Genesee)	0	0	NA	0	0	23	2783
Bellona (Yates)	3	0	1	0	13	22	2770
Brockport (Monroe)	0	2	NA	1	0	7	2837
Collins (Erie)	0	0	NA	6	0	3	2665
Eden (Erie)	0	0	NA	7	0	22	2772
Geneva (Ontario)	0	0	0	0	0	16	2762
Hamlin (Monroe)	NA	NA	NA	NA	NA	NA	2751
Leroy (Genesee)	0	0	NA	1	4	2	2746
Lyndonville (Orleans)	0	0	NA	0	0	17	2689
Oswego (Oswego)	0	0	NA	1	0	37	2503
Panama (Chautauqua)	0	2	NA	0	2	66	2482
Penn Yan (Yates)	0	0	1	0	18	14	2681
Portville (Cattaraugus)	1	0	NA	1	10	3	2434
Ransomville (Niagara)	NA	NA	NA	NA	NA	NA	2781
Seneca Castle (Ontario)	0	0	0	0	0	2	2711
Williamson (Wayne)	0	0	NA	2	2	159	2568

ECB: European Corn Borer; CEW: Corn Earworm; FAW: Fall Armyworm; WBC: Western Bean Cutworm; NA: not available; DD: Degree Day based on accumulation starting March 1 (base 38) for WBC emergence

Average Corn Earworm Catch			
Per Day	Per Five Days	Per Week	Days Between Sprays
<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. ●

CROP Insights

Observations from the Field and Research-Based Recommendations

BEETS

Bacterial leaf spot (BLS), Cercospora leaf spot (CLS), and Phoma leaf spot (PLS) are all present in local fields at various levels and together can result in reduced foliar health and possible defoliation. To further complicate disease identification, rain and soil splash have also produced a lot of spots on beet leaves. The wet weather was very conducive to PLS, which is much more prevalent this season than in most years. So far, we are mostly seeing the larger target spot lesions of PLS on older/lower leaves, but it is something to keep an eye on in your fields. For more information see the newly revised PLS fact sheet at https://www.vegetables.cornell.edu/pest-management/disease-factsheets/phoma-leaf-spot-and-root-rot-of-table-beet/. The primary target for foliar fungicides on table beet is Cercospora leaf spot (CLS). The good news is that most products that are efficacious for CLS are also efficacious for PLS. - JK

COLE CROPS

With the wet weather there is occasional incidence of bacterial soft rot in broccoli. There is little to be done once this disease becomes noticeable in broccoli heads. Instead, concentrate on protecting younger plantings with copper. Wet ground has also delayed the late plantings on many farms.

CUCUMBERS

Downy is present throughout WNY and has been confirmed in Erie, Niagara, Orleans, Genesee, Wyoming, and Cattaraugus counties. The entire region should be considered at risk. - EB

DRY BEANS

Mexican bean beetle (MBB) adults are starting to defoliate dry beans. If left unchecked, MBB can quickly defoliate large portions of fields. A pesticide application is recommended when 1-1.5 larvae are found per plant, or 30% defoliation during bloom and 15% defoliation during pod-set and podfill is observed. Recent wet weather increases the likelihood of white mold development in beans. An initial application of Omega 500F is recommended followed by a second application of Endura 70 WDG. The first application should be made at the early bloom stage. Wet weather has also led to low nodule formation on roots in many areas. Saturated soils inhibit bacteria from forming nodules, but as soils dry out with more sunny days plants may start to form more nodules. Fields that show very low to no nodule formation and are experiencing large amounts of yellowing of leaves may benefit from an additional nitrogen application. - ML

ONIONS

Bacterial rot is abundant in fresh market sweets and some pungent onion plantings. Stemphyllium is chasing. Try to finish your onions as fast as possible if you have rot present. - EB

What a difference a week makes! The crop is recovering nicely from last week's 3-5 inches of rain. Tipburn has now set in as bulbing is in full swing. Many plantings of direct seeded onions have also begun to lodge and the end of the spray season is in sight! Amazingly, all leaf diseases are well under control across the region with Botrytis leaf blight (BLB) halo lesions disappearing and BLB necrotic spots increasing. There have been no reports of downy mildew. Foliar symptoms of bacterial diseases are on the upswing across the region in small- and large-scale production – see article on rot race on page 8. - CH

Harvest began for earliest plantings of early-maturing transplants in Elba last week (see cover photo), which means that onion thrips are on the move. Recent insecticide spray programs have generally included Minecto Pro (= Agri-Mek + Exirel) or Exirel. It is recommended (and often specified on the label) to apply not more than two consecutive weekly applications per active ingredient (a.i.) before rotating to a different a.i. to minimize exposure of multiple thrips populations (assume a thrips generation is 2 weeks) to same a.i. in order to veer off thrips from developing resistance to insecticides. If you sprayed Agri-Mek twice or Agri-Mek and then Minecto Pro, then you need to rotate away from Agri-Mek and Minecto Pro, and may use Exirel or Radiant. If you used two applications of Minecto Pro, then you need to rotate away from Minecto Pro, Agri-Mek and Exirel, and next in sequence would be Radiant 8-10 fl oz. After two applications of Radiant, Exirel may be used again. The maximum allowable rate of Exirel per crop per season is 61.5 fl oz, which is equivalent to 3 high rate (=20.5 fl oz) applications. Minecto Pro 10 fl oz is equivalent to 13.5 fl oz of Exirel, so if you used two applications of Minecto Pro 10 fl oz, then you have 34 fl oz of Exirel left (= 1 app of 20.5 fl oz + 1 app of 13.5 fl oz) that could be used after Radiant, if needed. Similarly, if you used only one application of Minecto Pro 10 fl oz, then you have 48 fl oz of Exirel left (= 2 x 20.5 fl oz). See diagram for insecticide use to control onion thrips in onion. - CH

PEPPERS

Bacterial disease (spot) is common in several counties and is aggressive under these conditions. Keep after it with copper + mancozeb, stay out of the field when the foliage is wet, move into infected fields/areas after the rest of your clean peppers, and hope for drier weather. Varietal tolerance is available for next year.

continued on page 7

continued from page 6

POTATOES

Continue to be proactive on disease control with regular preventative fungicide sprays. While we have had more sunny days in the past week, we want to make sure any diseases spread by recent storms do not have the chance to develop in your potatoes. - ML

Hopper burn is showing on more susceptible varieties, and some spotty losses to bacterial decay of stems. - EB

Simcast forecasting indicates that Ceres, Elba, Farmington, Fulton, Medina, Niagara Falls, Rochester, Sodus, and Wellsville have surpassed the 30 blight units (BU) needed to trigger a spray for late blight. Albion, Brant, Fairville, Geneva, Hammondsport, Knowlesville, Lyndonville, and Penn Yan are expected to surpass 30 BU by the end of the week. The chart assumes use of a susceptible potato variety, Reba, and an application of chlorothanlonil on July 21. For locations that are not close to a weather station, forecast information should only be used as a general indication of how favorable weather has been for late blight. Forecast BUs are subject to changes as the weather forecast changes, so check forecasting tools regularly to see if disease forecasts have changed. Still no reports of late blight on a national level. - ML

Late Blight Risk Chart, 7/28/21

Location	Blight Units 7/21-7/27[1]	Blight Units 7/28-7/30[2]	Location	Blight Units 7/21-7/27	Blight Units 7/28-7/30
Albion	10	20	Geneva	12	21
Arkport	0	21	Hammondsport	11	21
Baldwinsville	0	14	Knowlesville	26	20
Bergen	0	19	Lyndonville	26	21
Brant	10	21	Medina	33	21
Buffalo	24	5	Niagara Falls	31	20
Burt	19	5	Penn Yan	22	19
Ceres	37	21	Rochester	40	20
Elba	32	21	Sodus	38	21
Fairville	14	21	Versailles	0	14
Farmington	34	21	Wellsville	40	21
Fulton	43	20	Williamson	0	18

Calculated using a May 26 crop emergence date, last fungicide application July 21, cultivar Reba

1 Past week Simcast Blight Units (BU)
2 Three-day predicted Simcast Blight Units (BU)

SNAP BEANS

White mold (WM) and gray mold (GM) are what we usually worry about in snap beans. However, snap beans are also susceptible to Phytophthora blight caused by *P. capsici*, the same pathogen that affects cucurbits and solanaceous crops. *P. capsici* is a soil borne pathogen that is especially infective during rain splash and wet soils. Snap bean varieties vary in susceptibility and a number of years ago we were seeing it mainly in fresh market varieties. However, in processing fields if you think your white mold control isn't working, you could be dealing with Phytophthora blight instead. Look for dying leaves and foliage especially in wet spots or where heavy downpours occurred. When Phytopthora blight infects the pods, they become whitish and shriveled. WM, GM and Phytophthora blight often occur in the same field. Please contact one of our team members if you need assistance with identification. Avoid planting snap beans in infested soils. For more information and photos, see the Cornell fact sheets at https://www.vegetables.cornell.edu/pest-management/disease-factsheets/phytophthora-blight/ - JK

TOMATOES

Spot/speck abounds. See Pepper for suggestions.

Labor Research! What's Happening in Your Farm?

An important research project is gearing up to understand what is happening with New York farm labor during this time of great change in markets, regulations and technology. Strong participation from farm employers and employees is important!

Farm employers who operate fruit, vegetable, and greenhouse/nursery operations should watch their U.S. mail for a pre-notification letter in the coming weeks, followed a few days later by a survey packet. This survey packet will contain an employer survey plus six copies of an employee survey (3 in English, 3 in Spanish). We are asking farm employers to complete the employer survey to give us hard numbers about your farm's labor situation and the changes from 2019 to today. Employers will distribute the employee surveys to members of their team to complete and share current employee perspectives about the farm and employee management. All surveys will remain anonymous and only group data with no identifying information will ever be reported. (The dairy part of this research will start a few weeks after the fruit, vegetable, and greenhouse portion.)

Objectives of this research are to:

1. Identify what human resource management practices are most effective at achieving high performance and labor efficiency.
2. Describe NY farm employee hours, compensation, quality of work life and satisfaction with working conditions/relations.
3. Describe how labor markets and regulations are affecting labor usage, enterprise selection, and business plans for NY farms.
4. Identify what labor-saving technologies farms are adopting and how they best fit in an overall human resource management strategy.

Watch your mail for the letter and survey packet. For more information about this research project, visit the Cornell Agricultural Workforce Development website at agworkforce.cals.cornell.edu

The Rot Race: Harvest Practices to Avoid Bacterial Bulb Rot in Onion

Christy Hoepting, Cornell Cooperative Extension, Cornell Vegetable Program

ROT LIKES IT HOT AND WET

In general, hot temperatures and moist conditions favor bacterial diseases. Therefore, wet summers and irrigated onions tend to have higher incidence of bacterial bulb rot than dry summers and non-irrigated onions, and onions grown on black plastic tend to have more bulb rot than onions grown on reflective silver plastic. Generally, red varieties tend to be more susceptible to bulb rot than yellow varieties, while sweet onions tend to be the most susceptible of all.

SPOT THE ROT

Most of the bacterial diseases that cause bulb rot in onion infect the inner green leaf/leaves of an onion plant and then move down through the neck and into the corresponding scale. Sometimes this is referred to as "center rot" or "ring rot" (Fig. 1). Most easily recognizable foliar symptoms of bacterial disease are when one or two middle-aged leaves collapse with a bleached or "greasy" appearance (Fig. 2). Very early symptoms are subtle white lesions (Fig. 2 left), but eventually, the whole plant will collapse (Fig. 3). Symptoms typically first start to appear during bulbing and gradually increase until harvest.

Figure 1. Bacterial bulb rot of onion. *Photo by C. Hoepting, CCE CVP*

For tips on identifying bacterial bulb rot of onion, see our diagnostic video on the Cornell Vegetable Program's YouTube channel

https://www.youtube.com/user/ccecvp

How to Diagnose Onion Bacterial Bulb Rot

NOT ALL PLANTS WITH FOLIAR SYMPTOMS OF BACTERIAL DISEASE RESULT IN BULB ROT

As harvest approaches, location of bacterial disease within infected onion plants ranges from being: 1) just in the leaf, to 2) in the leaf/leaves and the neck (Fig. 4), to 3) in the leaf/leaves, neck and bulb. But, not all onion plants with foliar symptoms of bacterial disease will result in bulb rot. For example, in my 2019 onion variety rot research trial, artificial inoculation (inner onion leaves were pricked with a toothpick dipped in high concentration of pure bacteria solution) resulted in greater than 90% foliar symptoms of bacterial disease (1 to 4 inner leaves dead), but only 2 to 50% of those plants had bulb rot at harvest, which varied by variety. In this study, it appeared that plants that were artificially infected after they had stopped putting on new leaves resulted in less bulb rot.

Figure 2. Early foliar symptoms of bacterial disease in onion with first sign of rot (left) and then a single (middle) and multiple (right) inner middle-aged leaves that are yellow or white and collapsing. In the early stages, bacterial infection may not yet be in the bulb. *Photos by C. Hoepting, Cornell Cooperative Extension*

THE ROT RACE

Bacterial diseases are thought to infect and spread in green leaf tissue, while infection and movement is halted in necrotic or dry tissue. **The race becomes getting the neck tissue to dry down fast enough to stop the bacterial infection before it gets into the bulb.** Once bacterial rot is in the bulb, there is nothing that can be done to reverse it.

- One strategy that many small-scale fresh market growers use is to **pull the onions early** (e.g. with less than 50% lodging and more than 50% green leaves), **and save them from rot by essentially cutting of the bacterial infections when they are topped.** This strategy may result in new bacterial infections and reduced yield.
    - Yield increases 25 to 33% after lodging as the contents of the leaves are translocated into the bulbs (big tops = big bulbs). However, the longer that the plant is growing, the more time that the bacterial infection has to reach the bulb. Smaller-sized healthy bulbs are more valuable than big rotten bulbs.
    - Be aware that **new bacterial infections may occur when onions are topped when the necks are green**. Clippers may become contaminated with bacteria when topping infected plants that can then infect the green neck tissue of healthy plants, especially when the neck is cut very close to the bulb.
    - Also, new bacterial infections could be introduced when soil contaminated with bacteria comes in contact with fresh cut green neck tissue. **Until the neck tissue is completely dry, onions**

continued on page 9

continued from page 8

should be topped to leave a 3-4 inch neck (Fig. 5). Incidence of bulb rot may increase dramatically when onions with green neck tissue are topped at the bulb.

- **Quick drying may help to win the rot race** (e.g. dry neck tissue down before bacterial infection reaches the bulb), **which requires removing the onions from the field and subjecting them to good air circulation while avoiding temperatures greater than 85°F** (temps greater than this may result in black mold when green onions are heated up). Growers have many different set ups to accomplish this (Fig. 6). To avoid dealing with massive amounts of green leaves during this process, perhaps some of the leaves could be removed in the field, leaving 8-10 inches of leaves/neck (we have had good luck using this strategy with garlic).

Figure 3. Whole onion plant collapsed from bacterial disease. Once this stage is reached, the rot has already entered into the bulb. *Photo by C. Hoepting, Cornell Cooperative Extension*

Figure 4. Bacterial infection of onion making its way down the neck (yellow arrows), but has not yet entered into the bulb. Quick drying may save this bulb from rot. *Photo by C. Hoepting, CCE*

Figure 5.Onions should only be topped when neck tissue is completely dry (back row). When onions are topped when neck tissue is green (front row), disease pathogens may enter and later infect the bulb. Disease pathogens do not infect or spread in dry neck tissue. The longer the neck, the more time it will take for bacterial disease to spread through the neck into the bulb. As the neck dries, bacterial disease will be halted. *Photo by C. Hoepting, Cornell Cooperative Extension*

Figure 6. Onions drying in a high tunnel covered with shade cloth. Onions were pulled and placed with their leaves intact in on benches in a single layer with a lot of air circulation. Ideally, temperatures should not exceed 85°F. *Photo by C. Hoepting, Cornell Cooperative Extension, Cornell Vegetable Program*

Bacterial Diseases of Beans

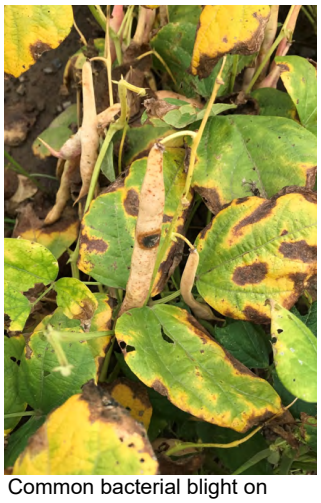
Julie Kikkert, Cornell Cooperative Extension, Cornell Vegetable Program

Symptoms of bacterial disease could be popping up over the next week or so. Heavy rains are very favorable for the development and spread of bacteria. Severe disease outbreaks typically occur seven to ten days after a period of humid, rainy weather. High winds and hail cause wounds which enable pathogens to enter and infect the tissue. Three different pathogens may be involved (see table). Each may cause lesions (spots) on leaves, stems or pods.

Common Name	Bacterial Brown Spot	Halo Blight	Common Bacterial Blight
Scientific Name	*Pseudomonas syringae pv. syringae*	*Pseudomonas syringae pv. phaseolica*	*Xanthomonas campestris pv. phaseoli* or *X. axonopodis pv. phaseoli*
Common Hosts	Snap bean, dry bean, lima bean, pea	Snap bean, dry bean, lima bean, soybean	Snap bean, dry bean, cowpea, soybean
Environment Favoring	High humidity; Moderate temps with daily highs less than 86 F	High humidity; Moderate temps with daily highs less than 77 F	Warm temps with daily highs greater than 86 F
Age of Infected Leaves	Infect young leaves	Infect young leaves	Middle-aged to older leaves

MANAGEMENT

- Application of copper at the first sign of infection may help reduce the spread. However, these diseases may be impossible to control in wet weather.
- Resistant varieties where available
- High quality, certified seed (can be seed-borne)
- Crop rotation, with beans planted once every fourth year
- Avoid working in fields when they are wet



Common bacterial blight on dry beans in NY. *Photo by J. Kikkert, CCE*

FOR MORE INFORMATION AND PHOTOS

https://www.vegetables.cornell.edu/pest-management/disease-factsheets/bacterial-diseases-of-beans/

Respirator Fit Testing Clinics in Ontario County in September

The New York Center for Agricultural Medicine and Health (NYCAMH) and HealthWorks is pleased to provide respirator fit testing clinics in the Finger Lakes region. All attendees must wear a mask or face covering while attending the clinic.

September 23, 2021 (Thursday)
September 24, 2021 (Friday)
CCE Ontario County, 480 North Main St, Canandaigua, NY 14424

During the clinics, NYCAMH will provide medical evaluations; respirator fit tests; and WPS compliant trainings on how to properly inspect, put on, take off, fit, seal check, use, clean, maintain, and store respirators. If a worker wears more than one style of respirator, including filtering facepieces, they must be fit tested for each one. Please keep in mind while determining who will come to the clinic that a clean-shaven face is a necessity for masks to be effective and for fit testing to be possible.

Clinic appointments are **one hour long**, and **groups of 4 workers** can be seen at a time. Medical evaluations, fit tests, and trainings are available in both **English and Spanish**. If you are unable to attend the clinic in your area you may schedule an appointment at another clinic location.

To schedule an appointment, please call the NYCAMH office at 607-547-7014 #7 between **August 2 and September 30**, Monday - Friday, 8:00am - 4:30pm. Ask to speak with the farm respirator clinic scheduler.

When calling to schedule an appointment please have the following information available:

- Total number of people attending from your farm
- Name of each person being scheduled
- Language spoken by each attendee
- Make and model of each respirator to be tested

Photo from NYCAHM

Upcoming Events

Events are listed at CVP.CCE.CORNELL.EDU

Niagara Region Summer Vegetable Meeting

August 3, 2021 (Tuesday) | 6:00 - 8:15pm
Corner of Hess Rd and Drake Settlement in Appleton, NY

Sign-in at 5:45pm for 1.5 DEC credits *(categories 1a, 10, 23).* Field meeting featuring weed and disease control. Chris Smart, our plant pathologist, will be discussing control of bacterial diseases in tomato, alternaria in brassicas, and other current/hot topics in disease. Weed Scientist Lynn Sosnoskie will introduce new pigweed species that are appearing in our region and give updates on herbicide resistance and new mechanical weed control techniques. Smaller topics include soil health.

FREE! Pre-register by 12pm on 8/3 to Elizabeth Buck at 585-406-3419.

Meeting sponsored by Timac Agro.

Chipping Potato Growers Twilight Meeting

August 5, 2021 (Thursday) | 5:00pm
Mahany Farms, 10043 NY-36, Dansville, NY 14437

Join us for a fun, potato-centered twilight meeting at Mahany Farms! Come hear about updates from this year's chipping potato variety trial, and learn more about disease forecasting and management. Stick around after the talks to enjoy a steak dinner, courtesy of Mahany Farms, and network with fellow growers, event speakers, and Cornell Cooperative Extension staff. This event is free to attend, and no pre-registration is required. For more information, contact Margie Lund at 607-377-9109.

Food Safety Modernization Act (FSMA) Training

August 11, 2021 (Wednesday) | 9:00am - 4:00pm
Seneca Produce Auction, 2295 Yerkes Rd, Romulus, NY

Do you fall under the FSMA food safety regulations? If so, you are REQUIRED to come to a FSMA training. Topics will include: Introduction to Produce Safety; Worker Health, Hygiene, and Training; Soil Amendments; Wildlife, Domesticated Animals, & Land Use; Agricultural Water (Part I: Production Water; Part II: Postharvest Water); Postharvest Handling and Sanitation; How to Develop a Farm Food Safety Plan

REGISTRATION: Registration required by August 1, 2021. Contact CCE Seneca County at 315-539-9251. Be prepared to provide the name(s) of those attending, mailing address, and phone number (if available).

COST: $100.00* for the manual and certificate. (Keep reading...) *Cost will be covered by scholarships from the Produce Safety Alliance: ***Total cost to grower = $0***

QUESTIONS? Contact Judy Wright at 315-539-9251 ext 109

Cornell Cooperative Extension
Cornell Vegetable Program

480 North Main Street
Canandaigua, NY 14424

VEGEdge
YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

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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.

Contact Us

VEGETABLE SPECIALISTS

Elizabeth Buck | 585-406-3419 cell | emb273@cornell.edu
fresh market vegetables, weed management, soil health

Robert Hadad | 585-739-4065 cell | rgh26@cornell.edu
farm food safety, organic, business & marketing, fresh market vegetables

Christy Hoepting | 585-721-6953 cell | cah59@cornell.edu
onions, cabbage, broccoli, garlic, pesticide management

Julie Kikkert, Team Leader | 585-313-8160 cell | jrk2@cornell.edu
processing crops (table beets, carrots, peas, snap beans, sweet corn)

Margie Lund | 607-377-9109 cell | mel296@cornell.edu
potatoes, dry beans, and post-harvest handling and storage

Judson Reid | 585-313-8912 cell | jer11@cornell.edu
greenhouses/high tunnels, small farming operations, fresh market vegs

PROGRAM ASSISTANTS

Sarah Caldwell | sv483@cornell.edu

Angela Ochterski | aep63@cornell.edu

Caitlin Tucker | 573-544-4783, cv275@cornell.edu

Emma van der Heide | ev247@cornell.edu

ADMINISTRATION

Peter Landre | ptl2@cornell.edu

Steve Reiners | sr43@cornell.edu

Cornell Cooperative Extension
Cornell Vegetable Program

For more information about our program, email cce-cvp@cornell.edu or visit CVP.CCE.CORNELL.EDU