Cornell Cooperative Extension | Cornell Vegetable Program

VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

Volume 17 • Issue 15 • July 21, 2021

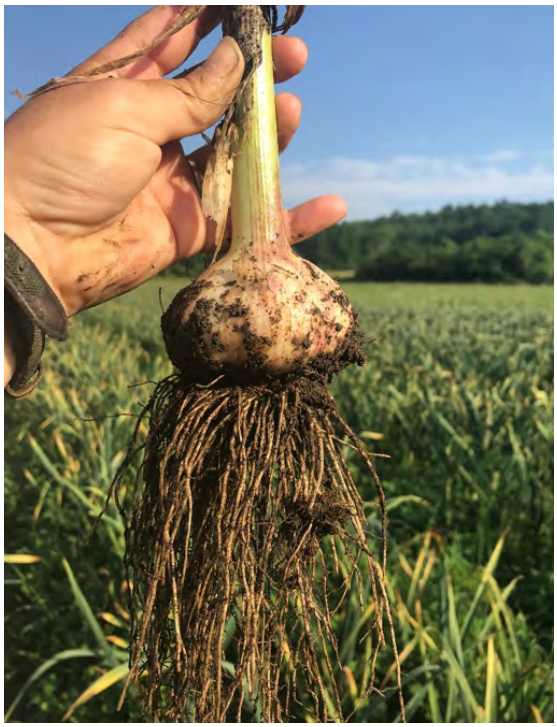
Harvesting Garlic from Muddy Fields

Crystal Stewart-Courtens, ENY Commercial Horticulture Program; edited by R. Hadad, CCE Cornell Vegetable Program

[Harvesting Garlic from Muddy Fields is a timely article written by our colleague, Crystal Stewart-Courtens, who really loves garlic. She has been out this week trying to pry garlic out of muddy fields. We needed this rain earlier in the growing season when the growing garlic was under a lot of drought stress. Having too much rain right at harvest is another hardship garlic growers have to face.

Besides just being a messy job and wanting to hurry up and get the bulbs up and out of the ground, patience and care still must be taken. Harvest injury, especially under wet conditions, can open up the bulbs to storage rots as well as opening up wounds for mites to feed. Take your time digging the bulbs up and getting them into bins or crates. Read below about what to look for and how to handle the mud once the bulbs are out of the ground. ed. R. Hadad, CVP]

I've been getting a lot of calls from growers in the last week wondering what to do about their very muddy garlic fields. Most of the garlic I've seen isn't yet approaching over-maturity, which is usually assessed by clove tips pushing outward from the scape to the point where you can clearly feel them. Many growers have been concerned that the wet weather will increase disease in the harvested crop, but we aren't particularly worried that this will happen. This wet period may cause the dying wrapper leaves to decompose faster, which is a bit alarming, but it should not affect the healthy wrapper leaves. As long as you still have four healthy wrappers or more, the garlic should make it through drying



Muddy garlic. *Photo by C. Stewart-Courtens*

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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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The next issue of VegEdge newsletter will be produced on July 28, 2021.

Accumulated Growing Degree Days, 7/19/21

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

Accumulated Growing Degree Days (AGDD)
Base 50°F: April 1 - July 19, 2021

Location**	2021	2020	2019
Albion	1419	1330	1146
Arkport	1135	1134	1073
Bergen	1294	1292	1111
Brocton	1317	1273	1147
Buffalo*	1396	1337	1139
Burt	1212	1229	1019
Ceres	1160	1091	1134
Elba	1229	1249	1069
Fairville	1240	1257	1054
Farmington	1285	1282	1086
Fulton*	1253	1291	1044
Geneva	1324	1317	1150
Hammondsport	1252	1257	1103
Hanover	1301	1272	1140
Lodi	1105	1335	1183
Niagara Falls*	1351	1292	1091
Penn Yan*	1398	1360	1205
Rochester*	1335	1330	1238
Sodus	1349	---	1031
South Bristol	1266	1258	1088
Varick	1404	1379	1219
Versailles	1257	1237	1135
Williamson	1223	1229	1011

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

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and cleaning intact. As a reminder, any garlic that looks bad at harvest should be discarded at harvest and not brought into storage. Garlic that was dying already will certainly die faster in this weather, so you may see isolated plants looking worse right now. In a way this is helpful, since they would have broken down slowly in storage.

The second common question is about washing garlic if harvesting in mud. This is the only time that I'd recommend washing, because you aren't drying then wetting then drying the garlic. Layers of mud dry slowly, which can lead to increased post-harvest diseases, and they can be very hard to clean off. Either washing or doing a quick rub down as the garlic does dry will help mitigate this issue. It is better to avoid harvesting from mud if possible, but of course that doesn't always work out.

Farm Unions and Collective Bargaining Resources

Richard Stup, Agricultural Workforce Specialist, Cornell Cooperative Extension

Farm employee unions were authorized in New York by legislative action beginning January 1, 2020. Following are a few helpful resources to assist employers and educators who may be affected by unions or collective bargaining.

Union Organizing and Collective Bargaining under New York's FLFLPA. A presentation prepared by Richard Stup in June 2021 to offer an overview of union-related topics for New York employers and their advisors.

An Initial Guide to Collective Bargaining Rights and Responsibilities Under the Farm Laborers' Fair Labor Practices Act. A document prepared in 2019 by John Wirenius, Chair of the NYS Public Employment Relations Board, the agency charged with administering and enforcing farm union law in New York.

Potential Unionization: What You Can and Cannot Say to Your Employees. A factsheet published by New York Farm Bureau and prepared by the law firm Bond Schoeneck & King. The factsheet provides a good summary of what employers can and cannot say, including details and examples.

Management of Cercospora Leaf Spot in Table Beet in 2021

Julie Kikkert, Cornell Cooperative Extension, Cornell Vegetable Program, and Sarah Pethybridge, Pratibha Sharma, and Daniel Heck, Cornell AgriTech, Geneva, NY

PRESENCE AND RISK

The latter part of the cropping season in 2021 is shaping up to be very conducive for foliar diseases. Firstly, conditions thus far have encouraged dense canopy growth making crops more susceptible to diseases. The continued rain and warm weather expected in the season is highly conducive for pathogen growth, infection and disease development. ***Therefore, it is time now to proactively consider Cercospora leaf spot (CLS) management in table beet.*** We are proactively monitoring selected table beet crops in western and central NY on a weekly basis. Our field scouting on July 20th turned up one field with significant numbers of fresh lesions that appeared to be CLS and some suspect lesions in a few other fields. We collected leaves to incubate in a humidity chamber to encourage spore development and observe with a microscope for definite confirmation. We are also monitoring the CLS decision support system https://dev.newa.cornell.edu/beet-cercospora-leaf-spot twice weekly. The CLS decision support system calculates the risk of infection based on temperature and relative humidity (Table 1).

In our studies, using this decision support system reduced the number of sprays applied throughout the season for CLS management without significantly reducing root yield or increasing disease severity. We continue to provide alerts on a twice weekly basis through email to table beet growers. Please email Julie Kikkert if you wish to be added to that list.

Table 1. Risk of Cercospora leaf spot (CLS) on table beet from July 14 to July 23 using a forecasting model. Risk classification of CLS is based on cumulative 2-days/risk, and the forecast is based on weather data from Network for Environmental and Weather Applications (NEWA) models.
Low risk: ≤3, Moderate: 4 to 6, and High Risk: >6

Location	Infection Values (2-day/risk)									
	Achieved							Forecast		
	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul	22-Jul	23-Jul
Albion	11	4	0	6	10	6	6	6	2	0
Bergen	6	4	2	5	7	4	5	5	2	0
Conesus Lake (S)	4	4	5	9	9	6	6	5	2	0
Elba	6	3	2	6	8	5	6	6	2	0
Geneva	7	6	2	6	8	3	2	4	3	0
Lyndonville	6	2	0	5	8	5	5	3	0	0
Medina	7	4	2	6	8	5	6	6	2	0
Sodus	7	5	2	5	9	7	6	5	2	0
Waterport	6	2	0	6	9	5	6	5	1	0

Accessed date: July 21, 2021; 6.00 AM

DISEASE SYMPTOM REMINDERS

CLS symptoms first appear as small, individual gray to black-colored lesions on the leaves, which rapidly grow together resulting in defoliation. In a red table beet cultivar (e.g. Ruby Queen and Merlin), a reddish-purple color surrounds the lesions. In yellow or white table beet cultivars, the lesions may by surrounded by a tan-brown ring. First symptoms are typically observed in older leaves, while younger leaves become infected as the disease progresses. The color and presence of structures produced by *C. beticola* called pseudostromata in the lesion distinguishes CLS from other leaf diseases. Pseudostromata are small (pin-head size), black, and numerous across the lesions (not in a circular pattern). On the pseudostromata, the spores of the fungus may be

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visible (Fig. 1). These may be observed with a hand lens in the field, but sometimes require incubation in a humid chamber and/or observation with a microscope. ***Please contact us if you are unsure of the cause of spots on table beet leaves.***

Figure 1. Cercospora leaf spot lesions on table beet with black pseudostromata within the lesion. The gray, needle-like structures on the lesion are the asexual spores produced from the pseudostromata. Observation of these structures within a lesion by a hand lens is the best method to distinguish CLS symptoms from those caused by other bacterial or fungal pathogens.
Photo: Noel Knight, previously Cornell

IN-SEASON MANAGEMENT OF CLS WITH FUNGICIDES

First, not all fields will need treatment with a fungicide. Make a decision whether or not to spray based on:

1. How close the field is to harvest;
2. If CLS has been found in the field, and
3. Risk for infection based on weather data and forecasts.

The CLS decision support manual is available at: https://live-cu-newa.pantheonsite.io/wp-content/uploads/more-info-cercospora-leaf-spot-of-table-beets-20201221.pdf

Fungicide Product

Resistance to FRAC group 11 fungicides (e.g. **Quadris**) is prevalent within the *C. beticola* population and use is hence ***discouraged*** for CLS control in table beet in New York.

Propiconazole (e.g. **Tilt**) is a FRAC group 3 fungicide that has been the workhorse over the past several years. There is some moderate level of resistance to Tilt within the *C. beticola* population. Tilt will likely continue to be a first-line product used in table beets this year but rotation with other products in different FRAC groups is strongly encouraged.

Miravis Prime was registered for the first time on table beets in 2020. It contains pydiflumetofen + fludioxonil (FRAC group 7 + 12). Miravis Prime has been the most efficacious product in our research trials for several years and should be considered for the high-risk situations such as this year. For resistance management, the second line products that are considered best for rotational purposes after a first spray of Tilt or Miravis Prime, include Merivon (FRAC group 7 + 11), Luna Tranquility (FRAC group 7 + 9) or Double Nickel (FRAC group BM02).

Organic Options

There are several efficacious products registered for the control of CLS in organic table beet production.

OMRI-listed copper formulations (FRAC group M01) provide moderate control of CLS when applied regularly throughout the season. However, copper accumulation in the soil and the potential for phytotoxicity when applied at high temperatures means other efficacious products are desirable. Double Nickel (Bacillus amyloliquefaciens strain D747) (FRAC group BM02), Stargus (Bacillus amyloliquefaciens strain F727) (FRAC group BM02) at the 2 Q/A rate, and LifeGard (Bacillus mycoides isolate J) (FRAC group BM02) have also provided moderate control in our trials. A tank mix of 2 qt/A Cueva (copper octanoate), and 1 qt/A Double Nickel LC resulted in significantly improved disease control in comparison to either product alone. We have not tested all rates and combinations of the various products within a single trial. Please contact us if you would like a copy of our trial data.

MORE INFORMATION

For more information see the recently updated CLS factsheet at https://blogs.cornell.edu/cornellvegetables/pest-management/disease-factsheets/cercospora-leaf-spot-of-table-beet/

Crop Insurance Claim Guidelines Available

Cornell Cooperative Extension, Cornell Vegetable Program

If you experience crop loss and have crop insurance, it is important to initiate a claim quickly. Call your crop insurance agent and follow up in writing (keep a copy for your records). Your crop insurance company will arrange for a loss adjuster to inspect your crop. It is your responsibility to **call your crop insurance agent immediately and initiate this process**. Most policies state that you should **notify your agent within 72 hours of discovery of crop damage**.

Please contact Elizabeth Buck (585-406-3419, emb273@cornell.edu) or Julie Kikkert (585-313-8160, jrk2@cornell.edu) for a copy of the guidelines. More information on crop insurance can be found at https://www.rma.usda.gov/

Control of Botrytis or Gray Mold in Raspberries During Harvest

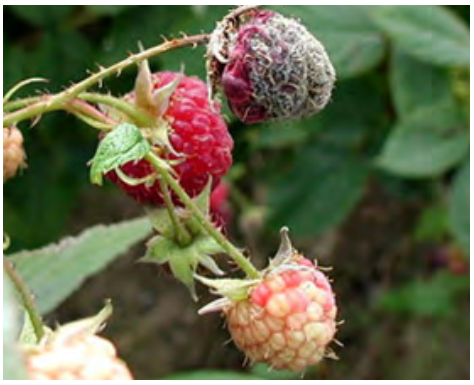
Anya Osatuke, Cornell Cooperative Extension, Harvest NY

Botrytis can spread from rotted berries to healthy berries. Touching healthy berries after touching rotted berries will spread the disease; the healthy berries will rot within 48 hours.

Another way the fungus spreads to healthy berries is through contact with soil or direct contact with infected berries. This is especially true in humid and rainy weather.

Here are some ways to prevent the spread of botrytis during the summer:

- Harvest rotted berries separately from marketable berries to prevent spread of botrytis.
- Pick all unmarketable berries into a "rot" bucket that you will not use for harvesting healthy berries.
- Dispose of rotted berries far away from your planting, so wind cannot carry the spores to infect flowers in the spring.
- Plan to spray for botrytis next spring if you saw a lot of it in your fields this summer.



Botrytis (gray mold) on rasberries. *Photo from Cornell Berry Diagnostic Tool*

Here are some tips in case you know that you have a fair amount of botrytis in your planting, but cannot dedicate the labor to selectively remove the unmarketable berries:

- Encourage pickers not to touch moldy berries when picking, especially for quarts that will be sold fresh.
- Freeze or process your berries soon after picking.
- Encourage customers to refrigerate berries promptly.

The way berries are handled and grown is the most important factor in preventing spread of botrytis.

Fungicides may be applied to raspberries during summer as well.

Switch 62.5 WDG, Rorval Brand 4 Flowable, and Elevate 50 WDG both have a 0-day pre-harvest interval. Reserve applications of these sprays for very wet, rainy periods.

NY Sweet Corn Trap Network Report, 7/20/2021

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

Statewide, 32 sites reported this week. European corn borer (ECB)- E was caught at 8 sites and ECB-Z was caught at 5 sites. The hybrid ECB was caught at the Seneca Castle, Bellona and Hurley site this week. Corn earworm was caught at 18 sites with only 16 sites high enough to be on 4, 5 or 6 day spray schedule (see table). Fall armyworm (FAW) was caught at nine sites this week and Western bean cutworm (WBC) numbers are still increasing with 24 sites reporting trap catches and with a high of 73 at the Plattsburgh site. Based on degree day accumulation we are still at only at 10% flight completion at most sites for WBC.

To determine the estimated WBC flight completion of the sweet corn sites, use the degree days in the NEWA Western bean cutworm flight emergence lookup table. Degree days were calculated using a base 38°F but not the upper threshold of 75°F. The degree days are therefore overestimated a bit.

FAW numbers also increased this week. At sites where CEW are being caught in high enough numbers to determine the spray schedule, those applications will be sufficient to take care of other worm pests that are present. Where CEW are not determining the spray schedule, scout to be sure that FAW and other pests are not above threshold. Photos: Fall armyworm egg mass; FAW larva with an inverted 'Y' on the head capsule; FAW feeding damage.

WNY Pheromone Trap Catches: July 20, 2021

Location	ECB-E	ECB-Z	ECB Hybrid	CEW	FAW	WBC	DD to Date
Batavia (Genesee)	0	0	NA	0	0	9	2566
Bellona (Yates)	0	0	1	0	10	NA	2549
Brockport (Monroe)	0	0	NA	1	0	0	2610
Collins (Erie)	1	0	NA	4	0	1	2456
Eden (Erie)	0	0	NA	5	0	12	2554
Geneva (Ontario)	0	1	5	4	0	5	2538
Hamlin (Monroe)	NA	NA	NA	NA	NA	NA	2525
Leroy (Genesee)	0	0	NA	12	0	5	2530
Lyndonville (Orleans)	0	0	NA	0	0	0	2465
Oswego (Oswego)	0	0	NA	0	0	24	2302
Panama (Chautauqua)	2	0	NA	1	2	17	2280
Penn Yan (Yates)	0	1	0	3	1	9	2466
Portville (Cattaraugus)	0	0	NA	0	14	7	2240
Ransomville (Niagara)	0	0	NA	0	0	5	2552
Seneca Castle (Ontario)	0	0	0	0	0	0	2489
Williamson (Wayne)	1	0	NA	4	2	24	2350

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			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.

Pesticides for Onion Bulb Rot – Do They Work? Featuring 2020 Field Trial Results

Christy Hoepting, Cornell Cooperative Extension, Cornell Vegetable Program

THREE FIELD TRIALS TO EVALUATE EFFICACY OF PESTICIDES FOR BACTERIAL BULB ROT

One of the sub-objectives of the national 'Stop the Rot' project is to determine the effectiveness of foliar applications of pesticides including bactericides (e.g. copper products, FRAC M01), plant defense activators (FRAC P01, P06), sanitizers and antibiotics (FRAC BM02) for control of bacterial bulb rot. Here, we summarize the results of four small-plot field trials that were conducted in 2020 in New York, Georgia and Washington, representing very different onion production systems in the Northeast, Southwest and Northwest, respectively. In all cases, 5-6 weekly pesticide applications were made beginning at first leaf senescence until approximately 50% lodging – see below on critical timing of bactericides.

GENERALLY, PESTICIDES DID NOT WORK WELL TO REDUCE BULB ROT

- Of the 37 different treatments evaluated in Table 1, only 7 (= 19%) resulted in a significant reduction in bacterial bulb rot compared to the non-treated control.
    - In this trial in Georgia with high disease pressure (76% rot in the non-treated control), % control of effective products ranged from 60 to 88%, which means that actual incidence of bulb rot was 30% to 9% (still a lot).
- None of the other 30 treatments reduced bulb rot significantly, and only 7 (=23%) numerically reduced bulb rot by more than 30%.
    - In a couple of treatments, bulb rot was numerically higher than in the non-treated control.
- It is unknown why efficacy was so good in Georgia and not in New York or Washington trials (I wish I knew why!).
- **Generally, the most effective products tested were the copper sulfate bactericides MasterCop and Cuprofix Ultra 40 Disperss, and Mankocide (copper hydroxide + mancozeb).**
- In Washington, all of the copper bactericides tested resulted in phytotoxicity when applied with adjuvant and exposed to 100°F temperatures.

CONTROL OF BULB ROT WITH COPPER BACTERICIDE INCONSISTENT IN NEW YORK ONION VARIETY TRIAL

I included a copper bactericide element to my 2020 onion variety trial where each plot (onion variety) was divided into protected and not protected. On the protected side of the plot, I sprayed copper bactericide Badge 1-2 pt/A for five consecutive weeks beginning at early tip burn stage until approximately 50% lodging. I had one entire trial that relied on natural bacterial infection, and another entire trial that I artificially inoculated with *Pantoea ananatis* and *P. agglomerans* at early lodging after 2-3 applications of Badge (= 2-3 apps before and 1-2 apps after artificial inoculation). Here is a summary of the inconsistent effects of copper bactericide on bulb rot:

- Protection with copper bactericide Badge was not significant in either trial.
- Application of copper bactericide reduced bulb rot in 7 out of 14 (= 50%) varieties in naturally infected trial, and in 5 out of 14 (= 36%) varieties in the artificially inoculated trial, by an average of 34.5% (range: 8 to 58%).
- Bulb rot was higher in plots treated with copper bactericide Badge compared to non-treated counterparts in 50% and 36% of varieties in naturally infected and artificially inoculated trials, respectively, by an average of 34% (range: 10-80%).
- Effect of copper bactericide on bulb rot was opposite between trials (e.g. copper resulted in higher rot in one trial and less rot in the other) for nine (64%) of the varieties.

BULBING IS CRITICAL TIMING FOR COPPER BACTERICIDE (IN GEORGIA)

In a trial conducted in Georgia by Dr. Bhabesh Dutta in 2017 and 2018, he found that application of **copper bactericide was only effective at reducing bacterial bulb rot caused by *Pantoea* spp. when it was applied at bulb initiation and during bulbing.**

- Three consecutive applications starting at bulb initiation (= early bulb swell) and two consecutive applications starting during bulbing (= 1 inch bulbs) of Kocide 3000 1.5 lb/A resulted in approximately 63% reduction in Center rot caused by *Panteoa* species of bacterial rot from ~40% bulb rot in the non-treated control to ~15% in the Kocide treatments.
- Three consecutive applications of Kocide starting at first leaf senescence (= 7-leaf stage) did not reduce bulb rot compared to the non-treated control.
- Eight applications of Kocide throughout the growing season did not reduce bulb rot beyond two/three applications of Kocide starting at bulb initiation or during bulbing.

It is unknown whether this critical timing for copper bactericide also holds true for *Burkholderia cepacia* (= Sour Skin), which is thought to be the most common bacterial pathogen of muck-grown onions in New York. But, **since the effectiveness of copper bactericides to control bulb rot is hit and miss (more miss), perhaps it would be more economical to experiment only during the critical timing during bulbing.**

FOLIAR SYMPTOMS OF BACTERIAL DISEASE NOT GOOD PREDICTOR OF BULB ROT

Once plants become infected with bacterial disease, the pathogen has to make its way through the neck and into the bulb. Furthermore, not all infected plants show leaf symptoms. So, incidence of foliar symptoms is not always an accurate predictor of bulb rot.

- In New York trials, incidence of foliar symptoms in non-treated controls were 2 and 2.6-times higher than the total amount of bulb rot. This means that the bacteri-

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al infection did not make its way through the neck and into the bulb 50-60% of the time.
    - Interestingly, in the New York trials, only 20-30% of the total bulb rot was detected by squeezing bulbs prior to storage, with the majority of bulb rot showing up after 3 months in storage. This indicates opportunity to reduce losses from bulb rot by selling crop out of field instead of out of storage.
- In Washington trial, foliar symptoms of bacterial disease were only 44% of the total amount of bulb rot and underestimated incidence of bulb rot, perhaps because not all bulb rot begins with foliar symptoms.
- In Georgia trial, foliar symptoms of bacterial disease was only 14% more than total bulb rot. However, in the best pesticide treatments in this trial, bulb rot was 80% less than the foliar symptoms (data not shown), which **suggests that pesticide application prevented spread of bacterial disease through neck and into bulb.**

Table 1. Results summary from 2020 'Stop the Rot' bactericide trials conducted in New York, Washington, and Georgia for control of bacterial bulb rot in onion.

Trial Specifications		New York Naturally Infected (Hoepting)	New York Artificially Inoculated[1] (Hoepting)	Washington Naturally Infected & Artificially Inoculated[2] Combined (du Toit)	Georgia Naturally Infected (Dutta)
Total No. weekly pesticide applications[3]		6	6	5	6
Spray volume		40 gpa	40 gpa	30 gpa	40 gpa
Spray pressure		31-33 psi	31-33 psi	25 psi	75-80 psi
Nozzle type		8005 VS flat fan	8005 VS flat fan	Air induction O2	TX-18 hollow cone
Adjuvant		None	None	R-11 0.25% v/v	None
Trial conditions		Not irrigated	Not irrigated	Irrigated daily; Hot	Wet growing season
% Foliar Bacterial Symptoms in Non-Treated Control		58%	43%	17.6%	87.5%
% Total Bacterial Bulb Rot in Non-treated Control		**21.7%**	**22.5%**	**39.7%**	**74.8%**
Product and Rate/A	**Active ingredient**	**% Control**			
Copper bactericides:					
Kocide 3000 1.5 lb	Copper hydroxide (46.1%) (30% Cu metallic eq.)	4% - NS[4]	20% - NS	15% - NS PHYTO[5] – 7%	60% - sign.[6]
Champ 1.5 lb	Copper hydroxide (37.5%) (24.4% Cu metallic eq.)	--	--	--	76% - sign.
NuCop	Copper hydroxide (76.7%) (50% Cu metallic eq.)	--	--	--	75% - sign.
Mankocide 2.5 lb	Copper hydroxide (46.1%) + mancozeb (15%)	30% - NS	47% - NS	13% - NS PHYTO – 17%	88% - sign.
Badge SC 2.75 pt	Copper oxychloride (16.81%) + copper hydroxide (15.36%) (20% Cu metallic eq.)	14% - NS	22% - NS	20% - NS PHYTO – 33%	--
Cuprofix Ultra 40 Dis-perss DF 2.5 lb	Basic copper sulfate (71.1%) (40% Cu metallic eq.)	20% - NS	44% - NS	36% - NS PHYTO – 9%	--
MasterCop 1 pt	Copper sulfate pentahydrate (21.46%) (5% Cu metallic eq.)	55% - NS	37% - NS	--	84% - sign.
Nordox 2.5 lb	Cuprous oxide (83.9%) (75% Cu metallic eq.)	19% - NS	7% - NS	--	77% - sign.
Sanitizer:					
Oxidate 2.0 0.5% v/v	Hydrogen dioxide (27.1%) + peroxyacetic acid (2%)	+ 9% - NS	34% - NS	21% - NS	--
Oxidate 5.0 0.25% v/v	Hydrogen dioxide (27.1%) + peroxyacetic acid (5%)	--	--	--	26% - NS PHYTO
Plant Defense Activators:					
Lifegard WG 4.5 oz/100 gal	Bacillus mycoides isolate J	19% - NS	25% - NS	0% - NS	64% - sign.
Actigard 0.5 oz	Acibenzolar-S-methyl (50%)	35% - NS	11% - NS	--	23% - NS
Antibiotic:					
Harbour 200 ppm	Streptomycin sulfate (22.4%)	11% - NS	19% - NS	--	--
Combination:					
Kocide 3000 1.5 lb weekly + Lifegard WG 4.5 oz/100 gal bi-weekly	Copper hydroxide (46.1%) Bacillus mycoides isolate J	+ 3% - NS	17% - NS	--	--

1 New York trial artificially inoculated with 10^6 cfu/ml each of *Pantoea ananatis* and *P. agglomerans*, 3 days after 4th spray and 7 days after the 5th spray.
2 Washington trial artificially inoculated with 10^8 cfu/ml each of *Pantoea agglomerans* and *Burkholderia gladioli* pv. *allicola* at 5% and 50% lodging.
3 Sprays generally started at first sign of leaf senescence and continued weekly until approximately 50% lodging.
4 **NS**: Not significantly different than the non-treated control.
5 **PHYTO**: Phytotoxicity observed.
6 **Sign.**: Significantly less bacterial bulb rot than the non-treated control.

CROP Insights

Observations from the Field and Research-Based Recommendations

GENERAL

The continuing wet weather pattern is keeping the region under a high risk for diseases. Under these very favorable conditions, catching the problems quickly and correctly identifying them will go a long way in improving overall control.

Weeds have gotten out of hand, pushed along by the rains and protected from removal by wet ground. Mechanical controls include hand pulling, mowing, and cultivation. When cultivating, expect weeds to resist the cultivator due to their large, tough stems and well developed root systems. Increase cultivator aggression by adjusting tooth angle to be more vertical, using heavy shanks, increasing vibration (action), increasing speed. You can cultivate slightly deeper, but doing so will turn up more weed seeds for future germination. Sharpening your cultivator teeth makes for a good rainy day activity and can greatly improve efficacy. Herbicides work best on small weeds and many have outgrown the size capacity of common labels. Please check your labels carefully for restrictions on timing of POST applications. The past few years has seen some expanded options for SHIELDED row-middle applications with strong herbicides in vegetables. This can be an effective option, though with any shielded sprayer expect there to be a small amount of drift and associated contact damage on the crop. -EB

BEETS

Bacterial leaf spot (BLS) is prevalent in many but not all fields, sometimes at very high levels. In fields that we scouted yesterday, suspect Cercospora lesions (CLS) were found and taken back to the laboratory for confirmation. See the general article on CLS management for 2021, page 3. Phoma leaf spot (PLS) was detected in 2 conventional and one organic field. PLS is most typically found in organic fields because the seed has not been treated with fungicides. The pathogen *Phoma betae* can be seedborne and seed companies test and discard or treat seed lots to reduce transmission (be aware if you are producing your own seed). In one Cornell research trial 2 years ago, Double Nickel fungicide was an effective organic treatment for PLS. These trials are being repeated this season to obtain more robust data on organic options. - JK

CARROTS

The risk of leaf spot disease is high. See last week's Crop Insights in VegEdge for more information. - JK

COLE CROPS

Slugs are returning as a problem. Alternaria has been spotted in some limited geographies, and receiving sporadic reports of head rots in broccoli. Flea beetles are their usual annoying selves. - EB

CUCUMBERS

Downy mildew has been confirmed in Niagara, Erie, and Orleans (and is probable in Wyoming) since Monday afternoon. The disease has been present for at least a week in some localities and has been sporulating. Rapid spread is expected. Refer to prior issues for control recommendations: Vol. 17, Iss. 14, 7/14/21 and Vol. 17, Iss. 12, 6/30/21.

DRY BEANS

Leafhopper nymphs are starting to show up in some dry beans. The presence of nymphs will indicate when the Cruiser application is no longer working, so be sure to scout fields to check if nymphs are present. If a Cruiser application was applied, a second insecticide treatment likely won't be needed until after the bloom stage. 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. - ML

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	Cumulative WBC
Avoca Hill (Steuben Co.)	6/29/21	5	4	35	44
Avoca Valley (Steuben Co.)	6/29/21	1	1	17	18
Caledonia (Livingston Co.)	6/29/21	0	9	27	36
Pavilion (Genesee Co.)	6/29/21	0	0	22	23
Penfield (Monroe Co.)	6/29/21	0	1	74	84
Penn Yan E (Yates Co.)	6/30/21	0	1	8	9
Penn Yan N (Yates Co.)	6/30/21	0	2	0	2
Riga (Monroe Co.)	6/29/21	0	2	47	49
LeRoy (Genesee Co.)	6/29/21	1	15	62	78
Wyoming (Wyoming Co.)	6/29/21	0	3	25	28
Wayland (Steuben Co.)	6/29/21	6	5	21	32

Western Bean Cutworm (WBC) traps were set up adjacent to dry bean fields across the western NY region around the first of July, and have been monitored over the past three weeks. Numbers are starting to escalate across the region, and Penfield and LeRoy have both crossed 50-moth trap catch. Numbers are looking 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. Numbers over the next couple of weeks will provide more information on overall pest pressure for this season. Both the trap reports and scouting corn in fields near dry beans can help determine the risk. Growers should scout adjacent corn fields when

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cumulative WBC have reached >50 moths per trap. 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.

GARLIC

With harvest underway, be observant for disease, insect damage, and harvest injury. Damaged basal root plates often have a variety of insects feeding there. Cull poor looking bulbs to avoid bringing in problems into the drying area or storage. - RH

Seeing poor paper set on many garlic samples stemming from fusarium and the generally wet weather. Be sure to thoroughly dry your garlic to maintain quality post-harvest.

LETTUCE AND GREENS

The wet weather along with the heat has caused bottom rot issues. If this is a recurring problem for you, consider using raised beds or ridge planting, and space the plants further apart to allow more air flow around plants and for sun to reach the soil to help dry things off. Having drip irrigation set up will provide water during dry periods and also keep the leaves drier compared to overhead. - RH

ONIONS

Rain gauges in Elba, Wayne, and Oswego had 5, 3-4, and 3 inches of rain, respectively, for the past week, and the excessive rainfall has resulted in standing water in many onion fields this week. Fortunately, growers have been draining the water off their fields fairly quickly. The excessive rain also drowned a lot of thrips this week, as numbers were generally down or holding this week. Much to my surprise, leaf disease pressure was generally holding or had decreased since last week. However, it is possible that we will see diseases increase next week as it may take a coupe of weeks to see the results of this past week's favorable weather for disease (= long periods of leaf wetness). Additionally, thick crop canopies with plants tipping over resulting in poor aeration in combination with saturated soil and warm temperatures makes for a very humid microclimate within the canopy that is favorable for disease, especially for spore production. With bulbing well underway, tip burn and outer leaf dieback is naturally increasing, which makes onion plants more vulnerable to SLB infection and dieback. Under these circumstances, most growers have been "setting the stage for success" in an attempt to stay ahead of SLB by using the best control option that we have for control of SLB leaf dieback (and target spots and leaf tip spore colonization), FRAC 3 + 3 Viathon 3 pt + Tilt 8 fl oz. This treatment appeared to stop SLB in its tracks in a field where SLB was primary (= "showy" target spots and lot's of spores) and on the brink of leaf dieback becoming excessive last week. Viathon + Tilt is also performing well in our fungicide trial in Oswego. So that is good news that we have a fungicide treatment that works. The problem is that two applications meets the maximum allowable seasonal uses for both of these products, and nothing else is as good. We are certainly hoping for drier weather. No reports of downy mildew.

Unfortunately, hot and wet weather during bulbing is ideal for bacterial diseases, foliar symptoms of which ramped up this week (Fig. 1). Unfortunately, research trial results have not been very optimistic for bactericides (copper products), plant activators or sanitizers to provide much reprieve from bulb rot – see article on page 6. However, I do not discourage growers from using such products in the chance that they might work (results have been inconsistent). Be aware that phytotoxicity may occur when copper bactericides are used in combination with adjuvants when temperatures are very hot. Best timing for application of pesticides for reducing bulb rot is during bulbing. So far, trial results indicate that the most effective products for reducing bulb rot are copper sulfate bactericides MasterCop and Cuprofix Ultra 40 Disperss, and Mankocide (copper hydroxide + mancozeb), but this is certainly not conclusive and subject to change when more results come in from several research trials that are being conducted as part of the 'Stop the Rot' project. Various harvest and post-harvest practices may be effective in reducing bulb rot – more in upcoming issues of VegEdge. - CH

Figure 1. Foliar symptoms of bacterial disease in onion. Left: Close-up of middle-aged leaf bleached white and collapsing. Right: Single onion plant with bacterial diseases, leaves are white and collapsing. *Photos by C. Hoepting, CVP*

Bacterial rots are common in sweet onions grown for fresh market outlets. Part of this seems innate to raising sweets, and part of this is environmental. Thrips pressure has been high, and their excessive presence can exacerbate rot issues, as can excessive nitrogen and overly hot bulbs under black plastic. - EB

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PEPPERS

Starting to see bacterial spot in multiple locations. Aphids on indoor crops. - EB

POTATOES

Potato leafhopper nymphs are starting to show up in potatoes. Treatment is recommended at a threshold of 15 nymphs/50 leaves. Wet weather continues to create ideal conditions of disease development in potatoes. Be sure to monitor fields with low lying areas, or where water collects. -ML

Simcast forecasting indicates that all weather stations except for Burt and Williamson have surpassed or will surpass the 30 blight units (BU) needed to trigger a spray for late blight. Continued wet weather throughout the region makes potatoes susceptible to late blight development, so a fungicide application is recommended. 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. Weather data used to calculate SVs comes from weather stations located at each site, and can be accessed via http://newa.cornell.edu/index.php?page=all-weather-data. There are no reports of late blight on a national level. - ML

Late Blight Risk Chart, 7/21/21

Location	Blight Units 7/14-7/20[1]	Blight Units 7/21-7/23[2]	Location	Blight Units 7/14-7/20	Blight Units 7/21-7/23
Albion	25	19	Geneva	32	18
Arkport	26	20	Hammondsport	26	17
Baldwinsville	25	19	Knowlesville	27	19
Bergen	23	19	Lyndonville	27	20
Brant	38	19	Medina	27	19
Buffalo	41	18	Niagara Falls	46	19
Burt	19	5	Penn Yan	41	17
Ceres	41	20	Rochester	45	18
Elba	31	19	Sodus	40	19
Fairville	32	19	Versailles	32	12
Farmington	37	19	Wellsville	49	20
Fulton	-	-	Williamson	6	11

Calculated using a May 26 crop emergence date, last fungicide application July 14, cultivar Reba

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

SNAP BEANS

Flooded fields and wet spots because of recent heavy rains put plants at risk of drowned roots and diseases such as Pythium crown rot and *Phytophthora capsici*. Fields with a history of Sclerotinia white mold and with dense canopies are most at risk for developing white mold. Rainy weather is highly favorable! Flowers become infected and disease spreads to the rest of the plant. A first fungicide should be applied to fields at risk when there is an average of 1 open flower/plant in 10% of the plants; a second application may be considered at 100% bloom (this may happen within a day or two in some varieties in warm weather). Research in the Pethybridge group at Cornell focused on the products Endura, Topsin 4.5 FL, and Omega 500F. Each of these products is highly efficacious when applied at optimal timing and there was no significant difference in the disease control between the products. In further teasing out the optimal application timings, our research has shown that the optimal timing of Topsin 4.5 FL is at 10% bloom, and that this product is not effective when applied at 100% bloom. Furthermore, there is no benefit to a second application. Conversely, disease control with Omega 500F was not related to timing (10% or 100% bloom) and there was no benefit from a second application even when applied at 100% bloom. For growers who were not able to put on a spray at 10%, then Omega 500F would be the choice product to use. Timing of the other possible fungicides was not tested. For organic growers, the most efficacious and reliable product from year to year is Double Nickel (Bacillus amyloliquefaciens strain D747). Both the LC and 55 formulations are equally effective. While labeled at the rate of 1 to 2 quart/acre, there was no benefit of the higher rate, and thus 1 quart/acre is recommended. - JK

SQUASH

Squash bug eggs and juveniles. Powdery in zukes and summer squash, corresponding to fruiting. Many fungal foliar diseases are occurring. Seeing some striking bacterial leaf spot infections out there. Vine crops are not thrilled about the excessive amount of water. Couldn't imagine better phytophthora conditions and fields with histories are expectedly struggling. -EB

SWEET CORN

With tasseling and silking comes Japanese beetles and sap beetles. Some of the same products being used for the worm complex can knock down these beetle pests but the insect activity may be more problematic between regularly scheduled sprays. Silk damage is the worrisome problem though a heave Japanese beetle infestation is persistent and can damage tassels. The cost of the extra spray must be weighed against the profit from the corn sales.- RH

HIGH TUNNEL TOMATOES

Two Spotted Spider Mites (TSSM) can be found at high numbers throughout our region. This pest can devastate a high tunnel planting and even contribute to populations in the field on tomatoes, vine crops and strawberries. Keeping them under control in high tunnels requires strategic, preventive action. This includes removing pruned tomato material, reducing dust within and without the tunnel and early applications of predatory mites. To reduce dust inside apply straw mulch to row middles. Outside the tunnel, avoid drive lanes adjacent to the sidewalls (which make dust), plant a vegetative buffer such as white clover. Pesticide options with short pre-harvest intervals are very limited. These include Portal XL (group 21A, non-restricted use, 0 D PHI). Organic growers may see some benefit from sulfur applications (also a good option for Powdery Mildew control), but predatory mites such as *P. persimilis* and *N. californicius* are effective (and a great idea for conventional growers too). Also see the June 30th VegEdge article, "Hot, Dry Weather = A Mite-y Big Problem".

Upcoming Events

Events are listed at CVP.CCE.CORNELL.EDU

Orleans Regional Vegetable Meeting

July 28, 2021 (Wednesday) | 6:30 - 8:30pm
Gregg Rush Farms, 2644 Eagle Harbor-Waterport Rd, Albion, NY 14411

2 DEC credits available in 1a, 10, and 23. Field-walk style meeting with planned topics on soil health, pest control, and disease management. FREE! Pre-register by 12pm on 7/28 to Elizabeth Buck at 585-406-3419.

Niagara Region Summer Vegetable Meeting

August 3, 2021 (Tuesday) | 6:00 - 8:15pm
Peter Russell & Voelpel's, Appleton (pre-register to receive field addresses)

1.5 DEC credits requested. 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. Pre-register by 12pm on 8/3 to 585-406-3419.

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

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Cornell Vegetable Program

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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.

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Cornell Cooperative Extension
Cornell Vegetable Program

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