Got spots on your table beets? It might not be Cercospora leaf spot. Learn how to identify and manage bacterial leaf spot and Cercospora leaf spot.

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Here are recommended post-seeding, pre-emergent herbicides for use in winter squash and pumpkins.

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Detecting downy mildew in onions takes a trained eye. Here are scouting tips for identifying downy mildew as it changes through its 4 stages.

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Since onion downy mildew has already been detected and weather remains cool and wet, efforts should be made to shut this disease down and keep it out of your fields.

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VEGEdge

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Photo: J. Reid

Cornell Cooperative Extension
Cornell Vegetable Program

Leaf Diseases Identification and Management on Table Beets in NYS

Julie Kikkert, CCE Cornell Vegetable Program, and Sarah Pethybridge, Cornell

We are starting to hear reports about leaf spots in table beets. While Cercospora leaf spot is the most common leaf disease on beets, it is actually fairly early in the season to be finding this disease in the field and the weather has not been favorable for its development. The most likely culprit at this time is Bacterial Leaf Spot, but beets will develop spots for many reasons and other pathogens could be at play. Hence, it is important to identify what is causing the leaf spots so that a proper management plan can be developed. Below is a description of the three most common leaf spots on table beets in New York, but other pathogens such as Alternaria could be the culprit.

Bacterial Leaf Spot. Note leaf puckering and black borders surrounding lesions.
Photo: Sarah Pethybridge, Cornell

BACTERIAL LEAF SPOT (BLS)

This disease is favored by cool (less than 75 F), rainy weather and usually develops on young plants early in the season. Lesions are irregular shaped and have black borders. Bacteria often enter hydathodes (natural openings) or wounds on the margins of the leaves and progress inward. This causes a characteristic twisting and puckering of the leaves. If you use a hand-lens, there is a noticeable lack of any black pin-point fungal structures in the center of the lesion, which instead appear skeleton-like with colorless cells.

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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.

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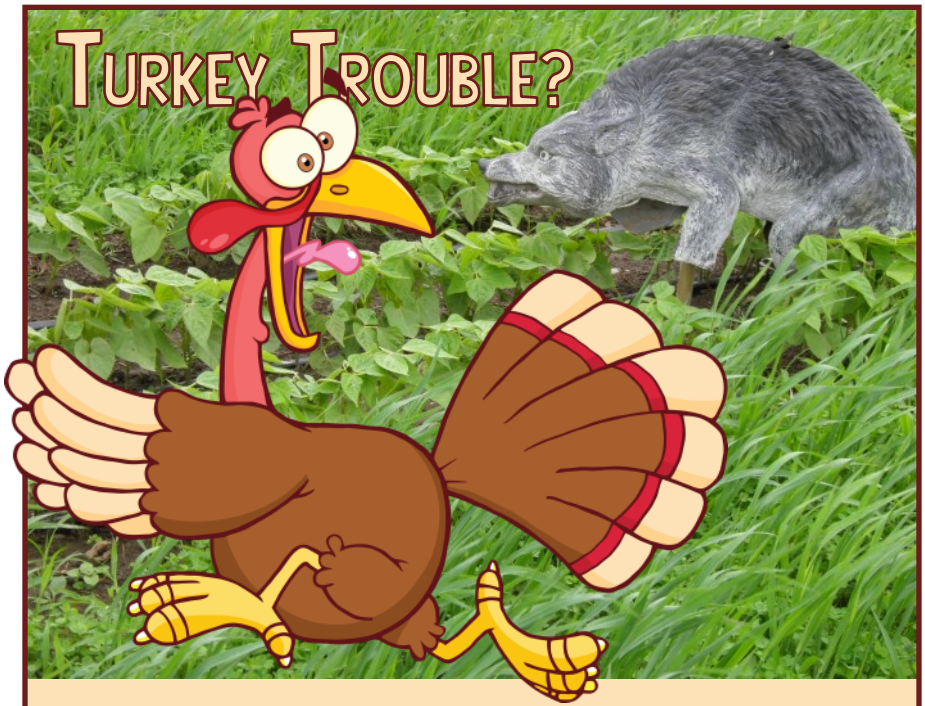
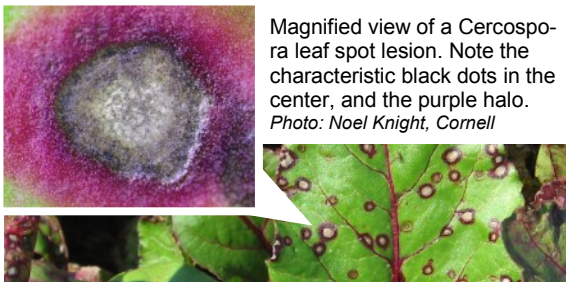
The next issue of VegEdge newsletter will be produced June 19, 2019.



Wild turkeys are a problem in some areas. Resident family groups are showing up with hens and chicks grazing vegetable plots like a salad bar. Signs of turkey damage are shredded leaves, young transplants pulled out of the ground and plants in harder soils scratched up. Coyote decoys set in the planting along the edges can be effective. The key with the decoys is to move them to new spots each day. This defense is also somewhat effective for deer and Canada geese. – *RH*

CERCOSPORA LEAF SPOT (CLS)

Typically, a mid to late season disease, favored by warm (75 F to 80 F) weather and long periods of rain or humidity. Lesions are larger than those of BLS and are often more distinct spots early in the disease cycle before they eventually coalesce and cause leaf death. The lesions are tan to gray. A distinguishing feature is the presence of stromata, tiny black pin-point structures that produce spores. These can be seen with a hand-lens.



Magnified view of a Cercospora leaf spot lesion. Note the characteristic black dots in the center, and the purple halo. *Photo: Noel Knight, Cornell*

MANAGEMENT CONSIDERATIONS

Proper disease/pathogen identification is the first step in management. If you need assistance, please contact Julie. It is also beneficial if you snap a photo or two with your smartphone and email or text it to one or both of us. We can decide whether a field visit or sample collection is needed based on what we are seeing nearby and/or our overall field visit plans.

At this point, growers and consultants are often wondering "when and what to spray". The thought process should include: 1) Am I likely to experience economic loss based on my past experience and current goals and objectives, and harvest date for the field? 2) Does the weather forecast favor the development of one or more diseases? 3) Will the pesticide I chose be effective on the pathogen(s)? and 4) Is my field conventional or organic (yes there are OMRI-approved products for use in organic production)?

BLS tends to slow down as plants get older and the weather becomes hotter and drier. We don't have a lot of experience with this disease in New York, but on sugar beets it is generally considered not of economic importance. Still, if your young plants are hit hard and the weather is favorable, early season applications of copper products may be warranted. In 2107, we conducted 4 trials in commercial organic fields where naturally occurring BLS was the prominent disease. Plots sprayed 3 times with a copper product had 30 to 40 percent less leaf disease than non-treated plots. Heavy weed pressure doubled the incidence of disease, regardless of copper application. The best plots had both hand weeding and copper application.

CLS starts in isolated patches in a field, but with favorable weather continues to develop through the season as spores are released and spread by rain and wind. Eventually, heavily infected leaves die. New growth may also become infected, repeating the cycle. Fungicides should be considered preventative as they will not cure an infection. Furthermore, resistance within *C. beticola* to some fungicide modes of action is a concern. Group 11 fungicides (strobilurins) now considered ineffective in New York.

For conventional production, Tilt (4 oz/A) is the most effective registered fungicide for CLS in New York at this time and we recommend using this product as the first fungicide to most effectively provide disease control. A different second fungicide (see table) is recommended for resistance management. If required, Tilt could be used again for a third application (there is a 14-day interval required between applications of Tilt). Fungicides will not control BLS, and hence, a copper product should be included if BLS is present in the field. Often there is a mixture of pathogens. For organic production, a tank mix of Double Nickel and a copper product will reduce the incidence of both leaf pathogens if required.

Fungicides Registered for Control of Cercospora Leaf Spot in Table Beet in New York for 2019. Please check the most recent versions of the labels for updated information and safety guidelines.

Product	Active Ingredient	Rate (/A)[2]	Fungicide Resistance Grouping[3]	Pre-Harvest Interval (days)	Re-Entry Interval (hours)
Tilt®/PropiMax® EC	Propiconazole	3 to 4 fl oz	3	14	12
Merivon®	Fluxapyroxad + Pyraclostrobin	4 to 5.5 fl oz	7 + 11	7	12
Luna Sensation®	Fluopyram + Trifloxystrobin	5.8 fl oz	7 + 11	7	12
Luna Tranquility®	Fluopyram + Pyrimethanil	11.2 fl oz	7 + 9	7	12
[1]Double Nickel LC™	Bacillus amyloliquefaciens strain D747	0.5 to 4.5 pt	44	0	4
Badge® SC [1]Badge® X2	Copper hydroxide Copper oxychloride	0.75 to 4 pt	M01	0	48
[1]Cueva®	Copper octanoate	0.25 to 2.0 gal	M01	0	4
Copper Compounds (Various Formulations)	Copper	Use maximum recommended on label	M01	0	varies
The Group 11 fungicides below are no longer effective for Cercospora control in New York State.					
Quadris®	Azoxystrobin	9 to 15.5 fl oz	11	0	4
Cabrio® EG	Pyraclostrobin	8 to 12 oz	11	0	12
Flint Extra® 500 SC	Trifloxystrobin	2 to 2.9 fl oz	11	7	12
Gem® 500 SC	Trifloxystrobin	1.9 to 2.9 fl oz	11	7	12
Reason® 500 SC	Fenamidone	8.2 fl oz	11	14	12

[1] OMRI listed for use in organic production.
[2] Please check the maximum rate allowable per acre per season.
[3] According to the Fungicide Resistance Action Committee guidelines.

FOR MORE INFORMATION

Comparision of Cercospora and Bacterial Leaf Spots on Sugar Beet, Fact Sheet, North Dakota State University. https://www.ag.ndsu.edu/publications/crops/comparison-of-cercospora-and-bacterial-leaf-spots-on-sugar-beet/pp1244.pdf

Cercospora Leaf Spot Fact Sheet, Cornell University. https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/0/5421/files/2014/12/CLS-Extension-Bulletin-Revised-2017_final-tbrddk.pdf

Herbicide Options for Pumpkins and Squash

Chuck Bornt, CCE ENY Commercial Horticulture Program

It seems like I say this every year – not much has changed for herbicide options in winter squash and pumpkins! I also know that this weather has not been very conducive to getting any cucurbits in the ground, but I wanted you to have this information in advance so you have your plan ready to go. Key to the best weed control in cucurbits: herbicides labeled and mentioned below all work best as post-plant, pre-emergent applications. They are mostly seed germination inhibitors or root inhibitors. In my opinion, there are three important factors for these herbicides to work their best:

⇒ **Field preparation:** Fit and plant the field as closely together as possible. Do not fit the field and let it sit for more than 2 or 3 days before planting it as this will allow weed seeds to germinate (if the conditions are right). Most of these products' activity and efficacy is reduced when seeds are already germinated. If you have to wait, consider re-fitting the field with a shallow cultivation before planting. Also, make sure the field is not full of clumps as this will also reduce the efficacy of the herbicides.

⇒ **Application timing:** As with field fitting, do not delay your herbicide application for more than a day after planting! The same reason applies—this gives seeds time to germinate and reduces their activity. Planting and spraying your herbicide within a day will improve weed control.

⇒ **Moisture:** All of these materials require either a rain or irrigation after application in order to "activate" them. Not only does this activate the herbicide, but it also activates seed germination. If it looks like there is no rain coming for a while and you don't have irrigation, my suggestion is to go ahead and still get the herbicide on. It's better than waiting for a rain.

I would not use any of these products pre-emergent/post-plant by themselves with the exception of Strategy (already has 2 different active ingredients: clomazone/Command 3ME and ethalfluralin/Curbit pre-mixed). We have seen that tank mixes are the best value and result in much better weed control. Many of these products have a narrow range of weeds they target so tank mixing a couple of them improves overall weed control. Tank mixes that we think have potential for pumpkins and winter squash are:

- Sandea (Profine is the generic version) plus Dual Magnum plus Command 3ME
- Sandea plus Command 3ME, or Strategy plus Sandea.

As always, please read the label carefully and if you have questions about what you read below, please do not hesitate to call a Cornell Vegetable Program Specialist.

Dual II Magnum and Dual Magnum Notes: We go over this every year, as I want to make sure everyone is in compliance! Yes, pumpkins are on both the Dual Magnum and Dual Magnum II label—however, if you read the label it clearly states that it can only be applied **"as an inter-row or inter-hill application in pumpkin. Leave 1 foot of untreated area over the row, or 6 inches to each side of the planted hill and/or any emerged pumpkin foliage (inter-row or inter-hill means not directly over the planted seed or young pumpkin plants)."**

What's it all mean? It means you cannot broadcast apply either Dual Magnum product according to the regular label that comes on the jug. **In order to use the broadcast application, you must have the 24C Special Local Needs (SLN) label and the only formulation that has the broadcast application is Dual Magnum! Therefore, you cannot use Dual II Magnum broadcast on either pumpkins or winter squash!** The broadcast method of Dual Magnum is an indemnified label which means that you accept the risk of using this material and any injury or crop loss is not the responsibility of the company. In order to obtain the correct label, you will need to register with Syngenta and indicate that you are using this product on those specific crops. **The use of generic "Dual" products such as Charger Max is not legal to use on pumpkins or winter squash.**

How do I get the "indemnified label"? The process is simple, but needs to be done via the internet and needs to be completed every year too! Registering with Syngenta and obtaining the 24C SLN:

1) Go to www.farmassist.com and in the top header bar click "Crop Protection" and then select "Indemnified Labels".
2) Either login or create a user name and password. Once you've logged in, the top of the header should say "Indemnified Label Search". Select New York and Dual Magnum.
3) Go to the second Dual Magnum 24 label that comes up and select the crop (it only allows you to choose one at a time so you will need to do this for as many crops as you want to use Dual Magnum on).
4) You will then be navigated to a "WAIVER OF LIABILITY AND INDEMNIFICATION AGREEMENT" page where you will either accept or decline the special instructions for using this product on the selected crops.
5) Once you've accepted the liability, the label will appear and you should print it as well as save it on your computer. If you decline it, the labels will not appear and you legally cannot apply Dual Magnum to the selected crop(s).
6) Farmassist will save all of the indemnified labels you have agreed to in case you lose your label and need another one. If you need assistance you can call the Syngenta Customer Resource Center at 866-796-4368.

Remember, you need to have a copy of the Dual Magnum 24C label in your possession when using this material. More information regarding other labeled materials can be found in Table 1.

continued on next page

Table 1: Recommended Pre-Emergent/Post-Seeding Herbicides for Pumpkins and Winter Squash

Product	Crops	Weeds controlled	Rate	Comments
Sandea, Profine 75 (halosulfuron)	All cucurbits	Broadleaves (pigweed, velvetleaf, etc.)	0.5 - 1.0 ounces per acre	Needs to be mixed with a grass herbicide when used pre-emergent. Can stunt and delay emergence especially at higher rates but temporary **(I recommend 0.5 oz rate)**, short residual of about 4 weeks, will start to see some weed species breaking through (common lambsquarter, Eastern black nightshade) around the 4th of July. Using a 0.5 oz. once pre-emergent allows you to use another 0.5oz. once post emergent.
Dual Magnum (S-metolachlor)	Pumpkins, winter squash	Mostly grasses and some broadleaf suppression	2/3—1.33 pints per acre depending on soil type	PLEASE SEE OTHER NOTES ON DUAL MAGNUM! I have seen very good results and limited injury using the 1.0 pints per acre rate. Do not incorporate as this increases the risk of severe injury! Best if used as a post plant pre-emergent and can be used post-transplant within 72 hours of planting (weed seed germination issues).
Command 3ME (clomazone)	All cucurbits	Annual grasses and some broadleaves	2/3 – 1.33 pints per acre depending on soil type	Labeled on all cucurbits (Label actually says "Do not use on Jack-O-Lantern pumpkins" because the companies distributing this product will not accept liability for potential off-color responses that have been observed in numerous varieties). I find that the 1.0 pint per acre rate is used and provides good control. Do not incorporate! The ME (micro-encapsulated) formulation does not need to be incorporated! May be used prior to seeding or transplanting (make sure transplant is planted below the chemical barrier) or post seeding but before crop emerges.
Curbit EC (ethalfluralin)	All cucurbits	Mostly annual grasses and some broadleaf suppression	3.0—4.5 pints per acre depending on soil & organic matter level	Use as a post plant pre-emergent application only within 2 days of planting or banded application between rows after crop emergence or transplanting (be very careful of drifting onto the crop). **Do not use under plastic mulches or rowcovers.** Cold, wet soils can increase injury or even result in crop failure! Label recommends using a minimum of 20 gals/acre fixed spray volume. Weed control may be reduced on soils with organic matter over 5%. Not recommended for soils with more than 10% organic matter.
Strategy (Pre-mix of Command and Curbit) (clomazone + ethalfluralin)	All cucurbits	Most annual grasses and some broadleaves	2.0 - 6.0 pints depending on soil texture	I would recommend no less than 4 pints/acre. Do not incorporate, recommended as a post plant pre-emergent or banded application between rows after emergence or transplanting. Do not broadcast apply and then transplant into treated soil as severe injury will occur. It can also be banded to row middles after a cultivation. Do not let this material freeze in storage as it could potentially settle out and clog your sprayer screens, tips etc. Label also recommends to use 10 to 30 gallons per acre finished spray volume. Be sure to check the label as there are crop rotational restrictions that are rate dependent.
Reflex (fomesafen)	Pumpkins and winter squash **except butternut**	Broadleaves and some annual grass suppression	0.5—1.0 pints per acre	24C Special Local Needs label on pumpkins, summer squash and most varieties of winter squash, except butternut. "Indemnified" label like Dual Magnum which means you accept any crop losses associated with using this material and same registration process as Dual Magnum. See the "Registering with Syngenta and obtaining the 24 c SLN" section under Dual Magnum. For direct seeded crops you need to apply to the row middles only or leave the area over the seed furrow untreated. **Do not use as a broadcast application on direct seeded pumpkins or squash!** However, for transplants you can use it as a pre-transplant non-incorporated pre-emergence (weed seeds) broadcast application up to 7 days prior to transplanting. Do not exceed 1 pint per acre of Reflex on pumpkins, winter or summer squash per season. Please note the 18-month crop rotation restrictions for sweet corn. Do not use Reflex alone.

CROP INSIGHTS

GENERAL

Cucumber beetles are voraciously feeding on all vine crops. Heavy feeding damage will set back cucumbers and summer squash. Passage of bacterial wilt is a worry in cucumbers and melons. – *RH*

Squash bug adults have also been seen. This is a periodic problem but left unchecked can cause headaches down the road. Treat early to reduce the population as they go into egg-laying mode. – *RH*

Flea beetles numbers vary across but are worse in fields near where last fall's cabbage weren't tilled under before winter set in. – *RH*

ASPARAGUS

Asparagus beetles are actively laying eggs and larval stages have been found eating the fronds in many plantings. Remember that some chemical spray products can only be used on the fronds, not the spears. Read the labels thoroughly before application. – *RH*

BEETS/CHARD

Beets and Chard are showing some spots on the leaves. Growers will want to be on top of identification and management of leaf diseases as soon as symptoms appear. In discussions with Dr. Sarah Pethybridge, Cornell, the weather models have shown low risk for Cercospora leaf spot so far in the field, so there could be other pathogens involved. Refer to the general article on page 1 and let us know if you need assistance with identification – *RH and JK*

GARLIC

Lookout for thrips feeding down where the leaves come out of the stem. Signs of damage are light colored flecking on the leaves . – *RH*

ONIONS

This week, the earliest transplants are getting ready to bulb, while the latest planted direct seeded fields are in the flag leaf stage with the majority of direct seeded crop at 2-3 leaf stage. With pre-emergent weed control being better than usual with the continuous moist soil conditions, in some fields we have not had the race between getting onions big enough (2-leaf) to be safe before the weeds get too big (> 2 inch) to be effectively controlled by post-emergent herbicides. Not having to apply post-emergent herbicides on the "early side" has spared some onion injury. On the other hand, we are generally seeing **more than usual onion injury from post-emergent herbicides**, because lack of sunshine and low humidity has not allowed the onions to armor themselves with very much waxy cuticle. Similarly, weed escapes also have sensitive skin, and growers have enjoyed some awesome post-emergent weed control. Under such "soft" conditions, substituting Goal 2XL for Goaltender has been an effective way to reduce onion injury. The 2-leaf stage has been fairly tolerant to post-emergent herbicide injury from Chateau, Goaltender and Buctril so far. Rates of Chateau, Goal and Buctril can also be lowered from the rates used last year to protect against onion injury. We noticed an injury complex between Chateau/Goaltender and Outlook injury, where "looping" injury of Outlook predisposed onion seedling to more Chateau/Goaltender injury, because the looped leaf is broadly exposed to the post-herbicide, as opposed to when uninjured leaves are upright (Fig. 1). Also, Outlook injury sometimes causes an onion leaf to lay flat on the ground instead of upright as the loop pushes it down, which also allows for more direct exposure to post-emergent herbicide injury, including at the soil level. Long story short: you may want to delay post-emergent herbicide application until more onions have grown out of Outlook injury. **Botrytis leaf blight** can be found in some onion fields with 3 leaves as well as transplants, but did not move much since last week. Bravo makes the most sense at this time for BLB. **Still no sign of onion thrips.**

Figure 1. Injury complex between Chateau/ Goaltender and Outlook injury, where "looping" injury of Outlook predisposed onion seedling to more Chateau/Goaltender injury (necrotic flecking), because the looped leaf is broadly exposed to the post-herbicide, as opposed an upright uninjured leaf. *Photo: C. Hoepting, CVP*

Onion downy mildew (DM) was detected in small-scale production in Chautauqua County this week. This is very early for this disease to show up, although not surprising, because it is favored by cool and wet conditions. Once summer arrives, high daytime temperatures and reduced periods of leaf wetness should dry this disease out and halt it in its tracks. Because DM can be so ravaging in onion when favorable conditions are unrelenting, it can do a lot of damage when it shows up early. Growers should keep an eye out for downy mildew, which can be very tricky to identify early – see scouting tips, pg 8. If DM is detected, it should be kept in check with fungicides. As long as weather remains cool and wet, growers may want to consider using a fungicide protectant, especially on bigger onions (≥ 6-leaf). See fungicide control options, pg 9.

Hope to see you at the **Oswego Onion Growers Twilight Meeting next Thursday, June 20** from 4:30 pm to 6:45 pm at John Dunsmoor Lake Elizabeth Farm (see page 10 for event details). Program will feature 2019 onion herbicide trial results and tour including our first look at effect of variety on Outlook injury, and new fungicide recommendations for leaf diseases for 2019 growing season. – *CH*

POTATOES

Potato planting continues and stands are starting to emerge. Much more Colorado potato activity was seen on potato volunteers this week. Egg laying is also starting to increase. Other states are starting to report potato leafhoppers migrating in. As the weather warms watch out for this pest. – *JG*

SPINACH

No signs of trouble in the field but Dr. Meg McGrath, Cornell Plant Pathologist is looking for samples of a new disease issue. Stemphillium leaf spot looks a lot like chemical or fertilizer burn on the leaves. The disease starts to become noticeable as whitish flecks on the top side of the leaves. Slowly the specks widen, leaving the leaf material with the feel of grocery bag paper. Please let us know if you have leaf symptoms as shown to the right. – *RH*

Stemphillium leaf spot on spinach.

Late Blight Risk – Severity Value Accumulations

John Gibbons, CCE Cornell Vegetable Program

Late blight severity values continue to rise for many locations. The **first fungicide application** will usually be triggered by the late blight forecast and should occur as soon as possible after 18 Blitecast severity values have accumulated since first potato tissue emergence in your region. Based on weather forecasts using first emergence of potatoes on May 15, **eleven locations have exceeded the threshold: Baldwinsville, Buffalo, Butler, Fulton, Medina, Niagara Falls, Penn Yan, Rochester, Vesailles, and Wellsville.** When the 18 severity value threshold is reached or forecast, apply a fungicide as soon as you can to any potato fields or tomato fields with plants larger than four inches tall. Once you've applied your first fungicide, use Simcast or early blight P-Days to help schedule your fungicide applications for the remainder of the season. This can be found on NEWA at the following address: http://newa.cornell.edu/index.php?page=potato-diseases

Late Blight Severity Values* 6/11/2019

Location	Total	Forecast 6/12-6/14	Location	Total	Forecast 6/12-6/14
Albion	8	2	Kendall	9	3
Arkport	9	4	Knowlesville	12	2
Baldwinsville	17	6	Lodi	NA	NA
Bergen	20	3	Lyndonville	12	6
Buffalo	30	5	Medina	17	2
Burt	11	6	Niagara Falls	27	2
Butler	18	2	Penn Yan	21	1
Ceres	13	1	Rochester	19	2
Fairville	5	2	Sodus	10	4
Farmington	15	2	Versailles	19	2
Fulton	22	2	Wellsville	39	6
Geneva	6	2	Williamson	7	3

* Severity value accumulations start 5/15/2019

The BlightPro Decision Support System (DSS) is a late blight management tool. This system was formerly available on Cornell servers but in 2019 the DSS migrated to a fee service that will be managed by UKKO Agro. More information can be obtained by contacting – Ketan Kashish, ketan@ukko.ag We hope to have more information on this in the future.

There have been no new light blight reports nationally. The only positive sites remain in north Florida. You can monitor this by going to the late blight website: https://usablight.org/?q=map

NY Sweet Corn Trap Network Report, 6/11/19

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

Seventeen sites reporting this week. European corn borer (ECB)-E was caught at six sites with high counts of 20 and 27 in Hurley and Seneca Castle. ECB-Z was caught at four sites. Four sites also caught corn earworm (CEW).

ECB eggs and larvae were found this week in fields with high trap catches. For fields that are in early tassel emergence, scout for any signs of eggs, larvae and feeding damage in the emerging tassel. Separate the leaves and look down into the tassel for any signs of feeding, frass or larvae. The treatment threshold at tassel emergence is 15% infested plants. ECB egg masses are usually located on the underside of the leaf along the midrib. The egg mass consists of 10-35 flattened eggs that overlap like fish scales. Eggs take approximately 100 base 50 degree days to hatch. Egg masses will change from white to cream to black as they age. When they appear black they are in the "black head" stage and will most likely hatch with 24 hours (see photo).

WNY Pheromone Trap Catches, 6/11/19

Location	ECB-E	ECB-Z	CEW	FAW	WBC	DD to Date
Batavia (Genesee)	0	0	5	0	0	530
Bellona (Yates)	NA	NA	NA	NA	NA	525
Eden (Erie)	NA	NA	NA	NA	NA	525
Farmington (Ontario)	1	0	0	0	0	529
Geneva (Ontario)	NA	NA	NA	NA	NA	502
Hamlin (Monroe)	NA	NA	NA	NA	NA	455
Kennedy (Chautauqua)	NA	NA	NA	NA	NA	547
Lyndonville (Orleans)	NA	NA	NA	NA	NA	452
Penn Yan (Yates)	1	0	1	0	0	513
Portville (Cattaraugus)	0	0	1	0	0	544
Ransomville (Niagara)	NA	NA	NA	NA	NA	455
Seneca Castle (Ontario)	27	1	0	0	0	477
Williamson (Wayne)	NA	NA	NA	NA	NA	410

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

ECB egg mass – white in color (left). ECB egg mass "black head" stage. *Photos: University of Nebraska*

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

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

from J.W. Apple, Department of Entomology, Univ. of Wisconsin-Madison

Scouting Tips for Identifying Downy Mildew in Onions

Christy Hoepting, CCE Cornell Vegetable Program

Downy mildew (DM) tends to occur sporadically in "hot spots" within a field. Detecting this disease often is the result of a trained eye recognizing the disease when one happens to come across it. The look of this disease changes as it progresses through its stages and can be tricky to identify.

Stage 1: Middle-aged leaves tend to become infected first; they turn pale and sometimes yellowish in elongated patches and have a grayish-purple fuzzy growth on otherwise green leaf tissue (Fig. 1). Sporulation is most easily observed when conditions are moist/humid. This stage is generally not detected from a distance; scouting fields regularly on foot increases the chances of detecting DM in its earliest stage.

Figure 1. Early detection of downy mildew in onion (stage 1): look for elongated pale green or yellow patches with purplish fuzzy sporulation, which usually first appear on middle-aged leaves. *Photo: C. Hoepting, CVP*

Stage 2: DM attacks green leaf tissue and then kills it leaving a necrotic spot at the original infection site. Often, several necrotic spots occur in a group. The downy mildew spores or remnants of them can usually be seen on the lesion and extending along the surrounding green tissue – this is diagnostic of downy mildew (Fig. 2).

Photo: C. Hoepting, CVP

Figure 2. Downy mildew attacks green leaf tissue of onion and then kills it leaving a necrotic spot at the original infection site (stage 2). Often, several necrotic spots occur in a group. The downy mildew spores or remnants of them can usually be seen on the lesion and extending along the surrounding green tissue (yellow arrow) – this is diagnostic of downy mildew.

Stage 3: The necrotic infection sites initially caused by DM are readily invaded by secondary pathogens including the purple blotch and Stemphylium leaf blight pathogens, which have purple or black spores. At this stage, the target spot diseases make the disease complex showy and easier to spot, but close inspection is still required to identify DM in the mix.

Stage 4: Eventually, multiple infection sites occur on the same plant, which eventually results in leaf dieback (Fig. 3). If you see patches in fields with a lot of black sporulation and leaf dieback, take a closer look and see if you can find purplish-gray spores on the green leaf tissue surrounding the necrotic and blackened patches (Fig. 4). At this stage, DM can be detected from a distance. By the time you find this stage, the disease has likely already been active and spreading in your fields for about 4 weeks.

Figure 3. Older DM infections with multiple infection sites per plant, lot's of black sporulation and resulting in leaf dieback (stage 4). *Photo: C. Hoepting, CVP*

Figure 4. Close-up of downy mildew sporulation along original infection site and black sporulation of secondary pathogens (stages 3 & 4). *Photos: C. Hoepting, CVP*

Don't confuse downy mildew with Botrytis. Sometimes sporulation of *Botrytis spp*. (Fig. 5) can be confused with sporulation of downy mildew. The differences are that sporulation of Botrytis occurs exclusively on necrotic tissue, especially on leaf tips, is gray in color and protrude farther out from the plant surface.

Figure 5. Sporulation of *Botrytis spp*. differs from that of downy mildew by exclusively occurring on necrotic tissue, especially on leaf tips, is gray in color and protrudes farther out from the plant surface.

Control of Onion Downy Mildew with Fungicides

Christy Hoepting, CCE Cornell Vegetable Program

When downy mildew (DM) shows up early in the season, it can be an extremely aggressive leaf disease of onion, especially when favorable conditions are unrelenting. It is a sporadic disease, favored by cool temperatures (less than 72˚F) and wet conditions, especially when there is heavy dew at night time. Spores are produced at night and are easily blown long distances in moist air. They can germinate on onion tissue in 1.5 to 7 hours when temperatures are 50 to 54˚F. High daytime temperatures (> 74˚F) and short or interrupted periods of humidity at night can prevent sporulation. Therefore, downy mildew is normally not a concern in onions until mid-August through September once the heat wave of summertime passes and when cool nights and heavy dews are common. **Since onion downy mildew has already been detected and weather remains cool and wet, efforts should be made to shut this disease down and keep it out.** If the weather heats up and dries out (e.g. if summer ever comes) such conditions will likely naturally shut this disease down.

Fungicide use for control of onion downy mildew:

- At this time, downy mildew will likely **target larger onion plants first**, which would be those grown from transplants, while large-scale production of direct seeded onions in the 2-3 leaf stage and younger should be okay (not need to be sprayed).
- Table 1 lists several fungicide FRAC groups (mode of action classes) that have activity on onion downy mildew that are labeled on onion.
- Growers no matter the scale should have several of these products on hand for control of downy mildews and other diseases in other vegetables. Any of these products can be used to protect onions against DM.
- Some of these products also have activity on Botrytis leaf blight and Stemphylium leaf blight in onion, such as Merivon, Quadris Top and Viathon.
- Many of these products are general use pesticides (e.g. do not require a pesticide license to use).
- Be very aware that with exception of FRAC M1 and M3, all of these **fungicides are at risk for DM to develop fungicide resistance** and the labels will have restrictions for number of sequential uses before rotating to different FRAC group, and maximum use rates per season for product, active ingredient and FRAC groups.
- Fungicides should be applied weekly when conditions are favorable for disease with **careful attention to rotating FRAC groups.**
- **The most effective fungicides for controlling onion DM are the Ridomil and Orondis products.**
- **For organic control**, effective options are slim. Since onion DM can be very challenging to control even with the best fungicides, I would expect that copper and biological products may be better than nothing as a protectant, but would let through and fail to control a raging disease. Sanitizers like Oxidate may have some utility in killing spores once the disease is present, but there are so many spores to kill…

Table 1. Fungicide options for control of downy mildew in onion.

FRAC[1] Group	Trade Name(s)	Active Ingredient[2]	Restricted Use[3]
M1	MANY Badge, Champ, Kocide, etc., etc.	Copper hydroxide, basic copper sulfate, etc, etc.	none
M3	MANY Manzate, Dithane, Etc., etc.	mancozeb	Varies by product, eg. Manzate Pro Stik – none Manzate Max – yes
4 BEST	Ridomil products	mefanoxam	none
11	Merivon/Cabrio	pyraclostrobin	yes
	Quadris/Quadris Top	azoxystrobin	none
	Tanos	famoxadone	none
	Reason	fenamidone	none
21	Ranman	cyazofamid	none
33	MANY Viathon, Rampart, etc.	phosphorous acid	none
40	Zampro Forum	dimethomorph	Zampro – yes Forum – none
	Revus	mandipropamid	none
43	Presidio	fluopicolide	yes
U15 BEST	Orondis products	oxathiapiprolin	none

[1]FRAC: Fungicide Resistance Action Committee – fungicide classes with different modes of action.
[2]Only active ingredient with activity on downy mildew is listed. Note, that many fungicide products contain more than one active ingredient.
[3]Restricted Use – require a pesticide license to purchase and use in New York.

view all Cornell Vegetable Program upcoming events at CVP.CCE.CORNELL.EDU

Annual Oswego County Onion Twilight Meeting

June 20, 2019 (Thursday) | 4:30 - 6:45 PM educational meeting; 7:15 PM dinner at Sorbello's
John Dunsmoor Farms – Lake Elizabeth, 777.5 County Route 53, Oswego, NY 13126

This in-field twilight meeting will feature:

- Fresh 2019 onion herbicide trial results including:
  - First look at differences in Outlook injury among variety
  - Tour of pre- and post-emergent herbicide trials featuring control of marsh yellowcress
  - Interesting results from other 2019 herbicide trials
- New fungicide recommendations for 2019 growing season for Stemphylium leaf blight and Botrytis leaf blight

2.0 DEC (categories 1a, 10, 23) and CCA credits will be available. The event is FREE to attend thanks to sponsors and Oswego County Vegetable Growers Improvement Association. BBQ Chicken Dinner at Sorbello & Sons, 630 County Rte. 8, Fulton, NY at 7:15 PM is included. **RSVP for dinner by Tuesday June 18th** to Kathy Stancampiano (onionstan8@aol.com or call/text 315 -591-3478) would be much appreciated.

Women in Agriculture Discussion Group: Maple and Agroforestry

June 24, 2019 (Monday) | 6:00 - 7:30 PM
Gabel's Maple Syrup, 5095 Kaiser Rd, Lawtons, NY 14091

Each monthly Women in Ag discussion group meeting will feature an established, innovative Farm-her leading the group on a tour of her operation and sharing her expertise on business management and production. Several guest speakers, as well as Cornell Vegetable Program staff, will be brought in to act as resource people for developing solutions to common production challenges.

The June 24 meeting will cover maple production and putting woodlots to work led by Sharon Bachman, CCE Erie County. The meeting will be hosted by Lynn Gabel (Gabel's Maple Syrup). Lynn will share her experience in event agritourism and marketing value-added products.

View the full Women in Ag discussion group schedule on our website at cvp.cce.cornell.edu. For more info, including the most recent meeting and speaker schedule, or to join the discussion group, contact Elizabeth Buck at 585-406-3419.

Vegetable Pest and Cultural Management Field Meetings for Auction Growers

July 3, 2019 (Wednesday) | 7:00 - 9:00 PM
Jonas Peachy farm, 5461 Rt 414, Romulus, NY 14541 (Seneca County)

July 9, 2019 (Tuesday) | 7:00 - 9:00 PM
Alan Nolt farm, 5000 Phelps Rd, Stanley, NY 14561 (Ontario County)

July 19, 2019 (Friday) | 7:00 - 9:00 PM
Noah Hoover farm, 3095 Himrod Rd, Himrod, NY 14842 (Yates County)

This course will demonstrate pest management in fresh market vegetables in both field and greenhouse (high tunnel) vegetables, primarily for those growing for wholesale auction. A hands-on demonstration of weed, insect and disease identification in vegetables including management options such as inter-row cover crops, grafting, and where appropriate, spray options will be used to educate growers. Judson Reid, Senior Extension Associate with the CCE Cornell Vegetable Program along with CCE staff will instruct participants and facilitate peer-based learning. Planned topics:

- Weed Control in Row Crop Vegetables – Why and How
- Tomato and Potato Disease Updates
- Cucurbits – Grafting for Vigor and Yield, Downy and Powdery Mildew Management, Insect Pest Management
- Food Safety News
- Q&A and other farm-specific crop observations

1.75 DEC recertification credits (categories 10, 1a, 23) and 1.25 (category 24) will be offered. FREE to attend! For more info, contact Judson Reid at 585-313-8912.

Weather Charts

John Gibbons, CCE Cornell Vegetable Program

Weekly Weather Summary: 6/4 - 6/10/19

Location**	Rainfall (inch)		Temp (°F)	
	Week	Month June	Max	Min
Albion	1.40	1.68	86	45
Arkport	1.08	1.42	78	43
Bergen	1.18	1.26	83	48
Brocton	NA	NA	NA	NA
Buffalo*	1.57	1.87	84	54
Burt	1.27	1.61	83	46
Ceres	0.80	2.34	80	34
Elba	1.64	1.97	85	45
Fairville	0.88	0.97	83	45
Farmington	1.06	1.14	83	47
Fulton*	1.39	2.00	83	37
Geneva	0.82	0.96	81	46
Hanover	1.46	2.40	84	40
Lodi	0.80	0.94	80	44
Niagara Falls*	1.43	1.68	83	43
Penn Yan*	0.74	0.84	81	45
Rochester*	0.78	0.88	84	43
Sodus	1.50	1.61	84	42
South Bristol	0.87	1.06	80	45
Varick	1.27	1.51	81	44
Versailles	1.12	1.75	82	37
Williamson	0.89	0.98	83	43

Accumulated Growing Degree Days (AGDD)
Base 50°F: April 1 - June 10, 2019

Location**	2019	2018	2017
Albion	360	581	332
Arkport	358	634	406
Bergen	367	542	414
Brocton	NA	NA	NA
Buffalo*	354	624	450
Burt	296	481	382
Ceres	428	521	410
Elba	340	566	409
Fairville	337	525	407
Farmington	352	545	420
Fulton*	328	529	423
Geneva	383	558	450
Hanover	400	575	NA
Lodi	411	589	505
Niagara Falls*	323	639	515
Penn Yan*	417	594	490
Rochester*	426	631	488
Sodus	331	516	432
South Bristol	372	558	436
Varick	429	590	498
Versailles	408	565	489
Williamson	303	500	457

* Airport stations
** Data from other station/airport sites is at: http://newa.cornell.edu/ Weather Data, Daily Summary and Degree Days.

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VegEdge is the award-winning 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 and Cornell Cooperative Extension. VegEdge is produced every few weeks, with frequency increasing leading up to and during the growing season.

VEGETABLE SPECIALISTS

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

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

Christy Hoepting | 585-721-6953 cell | 585-798-4265 x38 office | cah59@cornell.edu
onions, cabbage, broccoli, and pesticide management

Julie Kikkert | 585-313-8160 cell | 585-394-3977 x404 office | jrk2@cornell.edu
processing crops (table beets, carrots, lima beans, 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 | 315-536-5123 office | jer11@cornell.edu
greenhouse production, small farming operations, and fresh market vegetables

PRECISION AG SPECIALIST

Ali Nafchi | 585-313-6197 cell | anafchi@cornell.edu

PROGRAM ASSISTANTS

Amy Celentano | ac2642@cornell.edu

John Gibbons | 716-474-5238 cell | jpg10@cornell.edu

Angela Ochterski | 585-394-3977 x426 | aep63@cornell.edu

Sarah Vande Brake | sv483@cornell.edu

Emma van der Heide | ev247@cornell.edu

Caitlin Vore | cv275@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 us at CVP.CCE.CORNELL.EDU

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