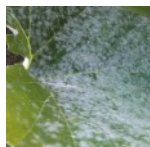




Don't mistaken ozone injury for injury, pesticide phytotoxicity, or nutrient deficiency. Learn

more about this air pollutant and how to check ozone levels.

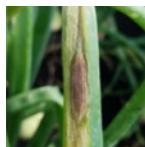
**PAGE 1**



Powdery mildew can rapidly become resistant to fungicides. Our updated cucurbit powdery mildew

fungicide recommendations for 2018 are provided.

**PAGE 3**



Managing fungicide resistance is crucial in controlling Stemphylium leaf

blight in onions. New developments are reported.

**PAGE 6**



NYSIPM is seeking farmer input to help them understand what tick issues and concerns farmers

are facing on their farms and home properties. Please take the survey!

**PAGE 8**



# VEGE<sub>Edge</sub>

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

● Volume 14 | ● Issue 13 | ● July 5, 2018

*Photo: Christy Hoepting*

**Cornell Cooperative Extension**  
Cornell Vegetable Program

## Spotting or Bronzing on Leaves May Be Ozone Injury

*Julie Kikkert, CCE Cornell Vegetable Program*

The recent stretch of blistering heat is likely to have stressed vegetable crops in many ways, including damage from air pollution. On hot, humid days with little wind, air inversions may form that trap warm air at the field level. Pollutants in the air cannot disperse causing them to build up to damaging levels. The most common pollutant that may injure plants is ground level ozone, formed by the action of sunlight on products of fuel combustion. Because ozone can also be transported long distances by wind, even rural areas can experience high levels (<https://www.epa.gov>). Visible injury to plants can develop when ozone levels are over 80 ppb for four or five consecutive hours, or 70 ppb for a day or two when foliage is at a susceptible stage of growth (G. Johnson, Univ. of Delaware). However, plant stress and yield loss can occur at even lower concentrations (USDA ARS). You can check ozone levels and other daily air quality information by



Ozone symptoms on snap bean. Photo: M. McGrath, Cornell

*continued on page 3*



**VegEdge** newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension regional agriculture team, serving 13 counties in Western New York.

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.

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CCE and its employees assume no liability for the effectiveness or results of any chemicals for pesticide usage. No endorsement of products or companies is made or implied. **READ THE LABEL BEFORE APPLYING ANY PESTICIDE.**

**Help us serve you better by telling us what you think. Email us at [cce-cvp@cornell.edu](mailto: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 will be July 11, 2018.*



**Elba Muck Donut Hour – a 20+ year tradition – is the “heart” of CVP onion programming.** From left to right: Leo Starowitz Jr., CVP Onion Specialist, Christy Hoepting, Emma Long, Matt Mortellaro, Chuck Barie, Guy Smith and Max Torrey.  
*Photo: Dan Starowitz*

visiting [www.airnow.gov](http://www.airnow.gov) or other weather forecasting sites. NYS DEC has a table that reports days with high ozone values during 2018 at several locations in NY, including 7 of the 13 counties in our program area at <http://www.dec.ny.gov/chemical/38377.html>. The table uses the 2015 Federal Air Quality Standard of 0.07 ppm, which calculates to 70 ppb.

Ozone is a strong oxidant. It enters leaves through stomata (pores) during normal gas exchange, where it then dissolves in the water within the plant and reacts with other chemicals. Symptoms can include chlorosis (yellowing) and necrosis (death of tissue). According to the USDA ARS Climate Change/Air Quality Laboratory in Raleigh, NC, “additional symptom types commonly associated with ozone include flecks (tiny light-tan irregular spots less than 1 mm diameter), stipples (small darkly pigmented areas approximately 2-4 mm diameter), bronzing, and reddening. Ozone symptoms usually occur between the veins on the upper leaf surface of older and middle-aged leaves, but may also involve both leaf surfaces (bifacial) for some species.”

Plant species and even different cultivars vary in their susceptibility to ozone. The most susceptible vegetable crops include: beans, broccoli, cucurbits (esp. watermelon), onion, potato, radish, spinach, sweet corn and tomato. Symptoms on potato are often dark spots, whereas damage on cucurbits develops as general yellowing with spots having a crusty center. Beans will often redden and have a bronze appearance (N. Gregory, Univ. of Delaware). Ozone injury can be confused with insect injury, pesticide phytotoxicity, or nutrient deficiency. At the farm level, selection of tolerant cultivars and reducing plant stress can help to avoid damage.



Ozone damage to potato leaves. Photo: N. Gregory, Univ. of DE

For further information and photos:  
Effects of Ozone Air Pollution on Plants:  
<https://www.ars.usda.gov/southeast-area/raleigh-nc/plant-science-research/docs/climate-changeair-quality-laboratory/ozone-effects-on-plants/>

Photos and information from Dr. Margaret McGrath, Cornell, Long Island Horticulture Research & Extension Center, Riverhead, NY:

Snap Bean <http://blogs.cornell.edu/livepath/gallery/beans/ozone-injury/>

Cucurbits <http://blogs.cornell.edu/livepath/gallery/cucurbits/ozone-injury-in-cucurbit-crops/>

Potato <http://blogs.cornell.edu/livepath/gallery/potatoes/ozone-injury-on-potato/>

Tomato <http://blogs.cornell.edu/livepath/gallery/tomato/ozone-injury-on-tomato/> ●

## Updated Cucurbit Powdery Mildew Fungicide Recommendations

Elizabeth Buck, CCE Cornell Vegetable Program; adapted from Meg McGrath's [Managing Cucurbit Powdery Mildew Successfully in NY in 2017](#)

**Why updates matter:** Powdery mildew **can rapidly become resistant** to fungicides. To maintain useful lifespan of materials and best protect the crop, be sure to **rotate between effective fungicides every time you spray**, use high rates, and start treatment early. Meg McGrath tests fungicides for their continued utility every year and makes annual updates.

**When:** Begin using specific powdery mildew fungicides **when 1 out of 50 older leaves shows disease**. Look low and deep in the canopy, checking leaf undersides, for early detection.

### Recommended materials in 2018, in order of efficacy

Material	FRAC Group	PHI	REI	Restrictions	Resistance/Control	Notes
*Vivando	U8	0	12	3 apps/yr Do not mix with hort. oils	Excellent control, but only for powdery	Supplemental label
*Torino	U6	0	4	2 apps per field/12 mo.	Excellent control, but only for powdery	
Quintec	13	3	12	4 apps/yr (label)** No aerial sprays	Some insensitivity is developing	**Wise to use less than the max. # of applications on label
DMI class materials	3	Various, see labels (as low as 0)	Various, see labels	See labels: Use at highest rate	Some rate-dependent resistance is present	Proline> Rally & Procure > Inspire Super
Carboxamide class materials	7	Various. Luna Experience: 0	Various. Luna Experience: 12	See labels: Use at highest rates	Known resistance to some Group 7 fungicides	Luna Experience >> Merivon > Endura & Pristine (not recommended)

\*Include one or both of these in your **rotating program**.

**Remember:** Use mobile (aka systemic) class fungicides alongside a general protectant to improve control and gain adequate protection of lower leaf surfaces.

Many products are listed for organic control. See the full article, or request one from your local extension office. Keep in mind weather conditions and the risk of phytotoxicity with materials such as plant oils. ●

# CROP INSIGHTS

Good job keeping up with the irrigation. Hopefully we will catch some rain soon.

**Verticillium** and **Phytophthora capsici** are both active and killing plants. Don't be fooled by the dry conditions into thinking that soil borne pathogens aren't a concern. Infections that began earlier in the year are showing up now that the plants are stressed. Scout for vascular-choking pathogens like **verticillium**, **fusarium**, and **bacterial wilt** at mid-day on hot, windy days. Plants with wilt in an otherwise perky crop deserve investigation.

Remember that this is excellent **spidermite** weather. Check high tunnels, outside they seem to favor eggplants and water-melons. Leaves will look like they're covered in pinpricks of off-colored, yellow/bronze stippling. Flip the leaf over and use a hand lens to check for mites. If there is webbing, you've got a healthy sized population on your hands.

**Aphids** have been picking up, as well. – EB

## COLE CROPS

**Imported cabbage worm** butterflies are abundant, as are diamondback moth caterpillars and pupa (photo). When scouting be sure to check both leaf surfaces carefully, as young worms can be easy to miss near the midribs, tucked inside cupped leaves, or in frilly kale. **Flea beetles** are active on weedy hosts. – EB

## CUCURBITS (CUCUMBERS, MELONS, and OTHER VINES)

**Powdery mildew** continues to pick up through the area. Powdery mildew easily becomes resistant to fungicides; please be diligent about rotating modes of action (FRAC groups). See associated table for the latest list of effective materials, page 3. Spotted a couple **squash bugs** Tuesday, be on the lookout. **Downy mildew** has reached southern Jersey. The latest forecast places eastern PA and the area around Binghamton in the low risk category. – EB

## ONIONS

Bacterial decay of onions is far easier to spot in the foliage than the bulbs. Take a moment to walk your fresh market onion plantings to look for water-soaked, yellowed leaves in an otherwise green plant. You'll be much better able to plan (and manage the quality of) your onion marketing with an idea of the rot incidence before lodging. – EB

Onion thrips are the "hot" topic of the week, as these tiny insects thrive in the heat and their populations have exploded. Movento has clearly been working to hold pressure down in fields that have already been sprayed. Movento takes some time to work: it is not uncommon to see no change in thrips population one week after the first spray. In fact, the numbers may even go up. One week after the second application (applied one week after the first), is when we see the knockdown, which can last for at least one week, often 2-3 weeks. This is what is referred to as the "momentum of Movento". The stage is being set for the 2018 growing season to be a big thrips year. We rely on "momentum of Movento" as a placeholder to not have to apply insecticides during this time, which prevents from running out of effective products before the spray season is over. What may be tricky is when one week after the second application of Movento thrips are still at or above spray threshold (1 thrips per leaf). In this case, Agri-Mek is typically applied (better to be safe than sorry), but then the next week we typically see the knockdown from the double app of Movento + Agri-Mek, and then it will be at least a week before thrips reaches spray threshold again. We also have demonstrated cases of double application of Movento knocking down thrips population of 2-3 thrips per leaf. Similarly, we have demonstrated cases of Movento being effective when applied when onions are just starting to bulb (1 inch bulb for second app). If onions already have 1-inch bulb at the first application, it may not be as effective. Certainly, the second application a week later when bulbs are 2 inches would not be expected to be very effective. If you have missed your window to use Movento, start your spray program with a different insecticide. More information on the Cornell onion thrips insecticide management plan is available on the CVP website ([https://cvp.cce.cornell.edu/submission.php?id=587&crumb=crops|crops|onions|crop\\*20](https://cvp.cce.cornell.edu/submission.php?id=587&crumb=crops|crops|onions|crop*20)) and in the June 13<sup>th</sup> issue of VegEdge.



Phytophthora capsici. Photos: E. Buck, CCE CVP



Diamondback moth pupa. Photo: E. Buck, CVP

continued on next page

Botrytis leaf blight (BLB) also increased across the region over the past week, most likely a result of last week's rain. There is tremendous variability in BLB pressure among fields. Bravo is the most effective fungicide for this disease. Unfortunately, it interferes with maximum performance of Movento and most other insecticides used for thrips control, so often, Rovral 1 pt + Scala 9 fl oz is substituted for Bravo when Movento is applied. If you have knocked down your thrips with Movento and are enjoying the ride of the "momentum of Movento", this would be a good time to resume Bravo for BLB. Direct seeded onions are on the verge of beginning their Stemphylium leaf blight (SLB) fungicide program. **There are new cases of SLB developing fungicide resistance in New York. In light of this, we are making resistance management strategies even more strict beyond the language on the label in order to preserve the useful longevity of the most effective SLB fungicides – see article, page 6.**

Finally, the [2018 Cornell Onion Fungicide Cheat-Sheet for Leaf Diseases](#) is now available at the CVP website. – CH

#### SOLANACEOUS (PEPPER, TOMATO, POTATO)

**Bacterial disease** in pepper and tomato is spreading within infected fields and in some cases moving from field to field within a farm. Spot and speck can be transmitted through touch, which includes workers, harvest equipment, and tractors. Cultural management practices will augment other control tactics: work in clean fields first, limit field operations before the foliage has dried, try to work in infected hotspots last whenever possible, consider rouging isolated plants, and plan to buy fresh stakes for next year.

**Leaf hoppers** are picking up and causing some minor damage in potato. Pay special attention to hopper levels in fields near alfalfa. Hoppers like alfalfa but may move when it is cut, and it looks like several alfalfa fields are sizable enough for second cutting.

Voracious **Colorado potato beetles** are happily devouring eggplant and potatoes.

Any **early blight** I've encountered has been minor thus far. – EB

## Importance of Irrigation Water Testing

Robert Hadad, CCE Cornell Vegetable Program



Anyone who has sat in on one of our Cornell Farm Food Safety workshops over the years has heard an ear full about the attention paid to irrigation water quality. Water testing is required for well water and surface water when using it for irrigation. Many bacterial and some parasitic foodborne disease can come from contaminated water.

Last week, the Centers for Disease Control (CDC) announced that the source of the romaine lettuce E. coli outbreak starting in Yuma, AZ has been discovered. Canals supplying water across a wide area and to a number of farms had tested positive for E. coli O157:H7. "CDC says the E. coli outbreak appears to be finished. It was a difficult and deadly outbreak:

- 5 people died, one each in Arkansas, California, and New York. Two died in Minnesota.

- 210 people were infected, and the outbreak spread across 36 states.
- 96 people were ill enough to require hospitalization. Of those, 27 developed hemolytic uremic syndrome, a type of kidney failure." (*Growing Produce* June 29, 2018)

There are still a number of questions that need to be answered but there are a lot of lessons that can be learned here too. When using surface water sources, minimize the risk through mode of application. When possible use drip rather than overhead. If using overhead then more frequent water testing during the growing season with a couple of tests nearing harvest.

The more test results you have, the better the baseline you can build.

Read the test results. When a test re-

sult comes back with a real high number then go out and see if you find out what's going on. Has there been runoff into your pond? Did cattle get into the creek? Were a flock of geese hanging out in the lake?

Retest if the number come back high. The second time round, what do the numbers say? If harvest is within a week and you know your numbers have been running high you have to decide if you can hold back from irrigating overhead or do you postpone harvest for a few more days.

There is a great deal to learn about irrigation water quality in the context of farm food safety. Pages can be written about this topic. If you have questions about water testing, what the numbers mean, where to test etc., contact the Produce Safety Alliance. Go to their website and check out their resources or talk to their educators about this:

[producesafetyalliance.cornell.edu](http://producesafetyalliance.cornell.edu) or contact Robert Hadad at [rgh26@cornell.edu](mailto:rgh26@cornell.edu) 📧

# New Developments for Managing Stemphylium Leaf Blight in Onion: Managing Fungicide Resistance is Crucial

Christy Hoepting, CCE Cornell Vegetable Program

As onions begin to bulb they pull resources from the foliage into the bulbs, which naturally causes tip burn and outer leaf die-back. It appears to be during this stage of growth when we first start to see Stemphylium leaf blight (SLB), as this disease prefers older plants and can easily become established on necrotic leaf tissue. Development of SLB is favored by warm (optimum 77°F) humid conditions and long periods of leaf wetness (16 hours or more). Unlike downy mildew and Botrytis leaf blight, SLB will even continue to develop in hot temperatures up to 93°F, while these other diseases shut down. Thus, SLB is the disease of summer in onions. SLB causes tan, black and purplish target-spot lesions on necrotic leaf tissue and excessive leaf dieback (Fig. 1). In severe cases, excessive leaf dieback may result in premature plant mortality where the onions “die standing up”. When this happens, incidence of bacterial bulb rot can increase significantly. Because most of the fungicides that are effective at controlling SLB have only a single site of action, they are prone to disease developing resistance to them. Thus, strict rotation restrictions and maximum use rates are included on their labels for resistance management to preserve the useful life of these new fungicides. ***In light of new findings that SLB is beginning to develop resistance to SLB, going beyond label restrictions may be necessary to ensure the useful longevity of our SLB fungicides.***



**Figure 1.** Tan (left), black (middle) and purplish-red (right) target-spot lesions on Stemphylium leaf blight (SLB) in necrotic onion tissue type. Photos: C. Hoepting

## SLB Resistance to Fungicides

**FRAC 11 fungicides.** In 2015 on-farm fungicide trials in Elba, FRAC 11 fungicides Quadris (a.i. azoxystrobin) and Cabrio (pyraclostrobin = FARC 11 in Pristine and Merivon) FAILED to control SLB. In the same year, 52% of SLB isolates collected from several onion fields throughout New York State were found to be insensitive to azoxystrobin (Hay *et al.*). The level of azoxystrobin insensitivity increased to 62% in isolates collected from the field in 2016.

**FRAC 7 fungicide boscalid lost to SLB resistance in 2017.** Boscalid is the original FRAC 7 fungicide used in onion. It is available by itself in Endura and in a premix with pyraclostrobin (= Cabrio) in Pristine. In 2015 on-farm SLB fungicide trial in Elba, Endura was close behind top performing fungicides Luna Tranquility and Merivon (placed 3<sup>rd</sup> out of 24). In 2016, in an on-farm fungicide trial in Sodus, Endura was still statistically as good as the best fungicides, but had slipped in rank (11<sup>th</sup> out of 17). In 2017, in an on-farm fungicide trial in Elba, Endura was not as statistically as good as the best or the second-best performing fungicides, although it was statistically better than the untreated, it ranked in the bottom quarter (14<sup>th</sup> out of 19). SLB isolates collected from the field in 2017 revealed that 61% were insensitive to boscalid in the laboratory assay. Unfortunately, this means that ***SLB has developed resistance to boscalid and is no longer recommended for SLB control.***

**Are the other FRAC 7 fungicides at risk?** The other FRAC 7 fungicides of importance for managing SLB in onion include fluopyram and fluxapyroxad, which are included in Luna Tranquility and Merivon, respectively. The concern is that ***if we just lost boscalid to SLB resistance, are we close to losing the other FRAC 7 fungicides?*** Fortunately, each of boscalid, fluopyram and fluxapyroxad all belong to different sub-classes within the FRAC 7 group, which means that their mode of action are all slightly different. Nonetheless, the Fungicide Resistance Action Committee (FRAC) ranks all FRAC 7 fungicides as medium to high risk for development of resistance. Very good news is that none of the SLB isolates collected in 2017 were resistant to fluopyram (in Luna Tranquility) and only 2.2% were resistant to fluxapyroxad (in Merivon). ***The fact that even 2% were found to be resistant suggests the possibility of a shift in the SLB population towards resistance in the future.*** Consequently, ***resistance management should be strictly adhered to in order to ensure useful longevity of the most effective fungicide class for controlling SLB in onion.***

**FRAC 9 SLB fungicides slipping – the writing is on the wall!** FRAC 9 fungicides with activity on SLB include pyrimethanil, which is the active ingredient in Scala and a component of Luna Tranquility (along with FRAC 7 fluopyram) and cyprodinil, which is a component of Inspire Super. Similarly to Endura, in 2015 and 2017 on-farm fungicide trials, Scala 18 fl oz was statistically not as good as the best or second-best fungicides, but statistically better than the untreated. In laboratory assays, of the SLB isolates collected from the field in 2017, 30% and 37% were insensitive to cyprodinil (in Inspire Super) and pyrimethanil (in Scala). ***This suggests that we could be seeing failures in the field in the near future.*** FRAC lists FRAC 9 fungicides as having medium risk for fungicide resistance. Our finding that SLB is developing resistance to a medium risk fungicide should signal to us to take fungicide resistance management very seriously for this disease.

**FRAC 2 and 3 still good!** Rovral (a.i. iprodione) has performed poorly in field trials for controlling SLB. However, when used in a tank mix with Scala, it placed in the top 5 in Sodus and Elba trials. This tank mix has also shown very good activity on Botrytis leaf blight (BLB), and has become a substitute for Bravo when used in a tank mix with Movento or other insecticides for thrips control (which do not work as well with Bravo). In the laboratory assay, only 2.2% of 2017 SLB isolates were insensitive to Rovral. This suggests that Rovral is effective against SLB, but there is potential to develop resistance in the future. For some unexplained reason, laboratory and field trial results are not entirely in agreement. However, as long as fungicide resistance management practices are followed, at least Rovral may be used effectively in a tank mix for effective SLB control. FRAC lists FRAC 2 fungicides as medium to high risk for fungicide resistance.

The most important FRAC 3 SLB fungicides include difenaconazole, which is included in Inspire Super and Quadris Top, as well as tebuconazole (in Viathon) and propiconazole (in Tilt). In the laboratory assay, none of the SLB isolates collected from 2017 were insensitive to difenaconazole. ***Great news! Difenaconazole is effective with no signs of insensitivity.*** Although the other FRAC 3 fungicides have not been tested, they all belong to the same sub-class with the exact same mode of action as difenaconazole. FRAC lists all FRAC 3 fungicides as medium risk for fungicide resistance.

*continued on next page*

### Opportunity for Improved Affordability of FRAC 7 and 3 Fungicides

In 2017 on-farm fungicide trial in Elba, we compared Luna Tranquility 16 fl oz to 12 fl oz, Merivon 9 fl oz to 5.5 fl oz, and Inspire Super 20 fl oz to 16 fl oz. After six consecutive sprays, on Sep 6 (17 days after 6<sup>th</sup> app), there were no significant differences in plant health between the two rates for either product. Plant health is an estimate of percent green foliage per plot, which is very closely associated with SLB severity and leaf dieback. In this trial, each treatment was left to dry down completely before harvest on Sep 20. Yield was related to plant health (% green foliage) after lodging: treatments with the most green foliage on Sep 6 (Luna Tranquility 12 and 16 fl oz – 79% green foliage) had significantly 45% more jumbos than any other treatment at harvest with no difference among rates. For all other fungicides, although there were no statistical differences in % jumbos, the higher rates had higher yields by 34.6% for Merivon, by 35% for Inspire Super, and by 33.8% for Tilt (4 vs. 8 fl oz).

Luna Tranquility is labeled in onion at 16 to 27 fl oz/A. Therefore 12 fl oz is lower than the label rate. In New York, Department of Environmental Conservation allows for lower than labeled rates, as long as it is recommended by Cornell. Bayer CropScience will not support the lower than labeled rate when there are any issues with disease control. The risk with using lower rates is that resistant strains of the pathogen will escape increasing the risk of fungicide resistance. However, another way to look at this situation is that Luna Tranquility is so effective on SLB that 12 fl oz is the effective rate. In 2018 on-farm fungicide trials, an even lower rate will be trialed to see how “close to the edge” of effectiveness 12 fl oz truly is. Since there have been no differences in performance between 12 and 16 fl oz in two years of trialing, Cornell

will recommend use of the 12 fl oz rate for the 2018 season. Merivon is labeled from 5.5 to 11 fl oz/A in onion. Using Luna Tranquility 12 fl oz instead of 16 fl oz saves about \$10 per application, while Merivon 5.5 fl oz saves about \$25 per application.

In general, FRAC 7 SLB fungicide Luna Tranquility is the best performing fungicide, followed by FRAC 7 Merivon, and then the FRAC 3 fungicides, Inspire Super (3, 9), Quadris Top (3, 11), Viathon (3, 33) and Tilt (3), while Scala 9 fl oz + Rovral 1 pt (2, 9) is as good as Merivon. Although the lower rates of Luna Tranquility (12 fl oz) and Merivon (5.5 fl oz) appear to be adequate, since FRAC 3 fungicides are more “middle of the pack”, it is recommended to use the high rates (20 fl oz for Inspire Super, 14 fl oz for Quadris Top and 8 fl oz for Tilt) when disease pressure is high. With Tilt (and other generics of propiconazole) costing only \$3.50 per 4 fl oz and \$7 per 8 fl oz, **incorporating Tilt and low rates of Luna Tranquility and Merivon into SLB fungicide program can reduce cost considerably by 20 to 60% depending on the program.**

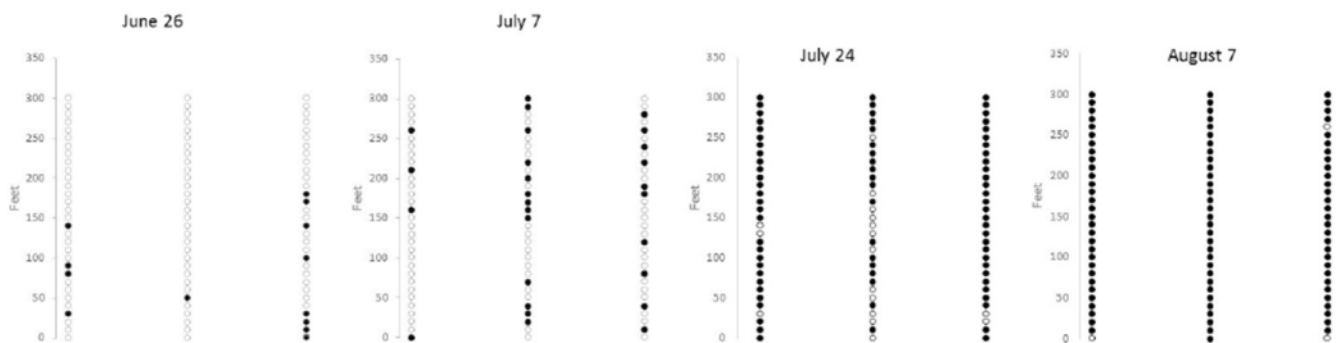
### Time SLB Fungicide Use to Peak SLB Activity

Two years of on-farm fungicide trials in Elba have shown that **critical timing for SLB fungicide application in direct seeded onions is from 1-inch bulbing in approximately mid-July until 50% lodging, which could represent a period of 5 to 9 weeks.** In an epidemiological study conducted by Cornell Plant Pathologist, Frank Hay in three fields in Elba in 2017, SLB first showed up in June, increased slightly by July 7, exploded during month of July, and remained very active throughout August (Fig. 2). These results also suggest that critical timing for SLB fungicides in direct seeded onions is sometime during first half of July. In the fungicide trial, we had significantly better SLB control and healthier plants when onions were sprayed weekly, compared to every other week. Consequently, **from mid-July until the rest of the season, an SLB fungicide should be applied every week.**

### New Rules for SLB Fungicide Resistance Management

In light of new research findings in 2017 that SLB fungicide resistance has expanded beyond FRAC 11 fungicides into FRAC 7 and 9, we recommend even more strict rules for resistance management beyond the rules of individual labels.

- **Attempt to use four FRAC groups. FRAC 2, 3, 7 and 9 are currently effective.**
  - With exception of FRAC 7 boscalid (Endura, Pristine), which SLB is resistant
  - Note, FRAC 9 (= Scala, and FRAC 9 in Luna Tranquility and Inspire Super) will develop resistance in the near future. 1) Rely on for SLB control as little as possible. 2) Use early in season when SLB pressure is light (e.g. Rovral + Scala when used for both BLB and SLB control).
- **Ideally, do not make more than 3 applications per FRAC group per season.**
  - In an 8-week program, it can be very tricky to use only 3 FRAC 9 fungicides.
  - Since FRAC 7 fungicides in Luna Tranquility and Merivon belong to different subclasses with slightly different modes of action, try to use both of these actives to fulfill your three FRAC 7 limit.
  - If you need to use more than three applications of any FRAC group, FRAC 3 has the least risk for developing resistance.
- **Start SLB program at 1-inch bulbing (instead of before bulbing or at first sign of bulb swelling) or by third week of July (whichever comes first).**



**Figure 2.** This epidemiological study of Stemphylium leaf blight (SLB) in Elba muck land shows how the disease is present in June, and starts to build by mid-July, but explodes during the second half of July and remains very active throughout August (Hay 2017). Fungicides for SLB need to be applied weekly from mid-July until the end of August.

continued on page 8

### Example SLB Fungicide Program: Best of Everything

Table 1 shows an example SLB fungicide program that provides 8 weeks of control of SLB. **For resistance management:** This program uses four FRAC groups with no more than three applications of FRAC 2, 3 and 7. Unfortunately, in the 8-week program, four applications of FRAC 9 are made. If the program were to run only 7 weeks, then either of the Rovral + Scala treatments could be removed and there would only be three applications of FRAC 9. Another alternative would be to use Merivon instead of one of the Luna Tranquility applications. Two active ingredients are used to make up the three FRAC 7 applications by using both Luna Tranquility and Merivon. **For affordability:** This program used low rates of the most effective FRAC 7 fungicides Merivon and Luna Tranquility, and the maximum allowable per season of the inexpensive fungicide, Tilt. **For best SLB control:** Program uses FRAC 7 during

the end of July and August when SLB pressure is expected to be highest. **Modifications:** 1) High rates of Tilt may be used in week 2 & 4 and Viathon substituted in for week 7. 2) Higher rates of Luna Tranquility and Merivon may be used for better control. 3) Rotations may be made weekly or biweekly. Example: Scala + Rovral x2 fb. Tilt 4 fl oz x2. 4) FRAC 7 may be used earlier in program, and Scala + Rovral bumped until later. There is a lot of flexibility to make changes within this program that will still meet best practices for SLB fungicide resistance management.

**Table 1.** Example SLB fungicide resistance management plan: “Best of Everything”

	Product and Rate per acre	FRAC groups	Diseases Controlled	Disease Not Controlled
Week 1	Scala 9 fl oz + Rovral 1 pt	2, 9	SLB, BLB	DM*
Week 2	Tilt 4 fl oz	3	SLB, BLB	DM* BLB may need help**
Week 3	Scala 9 fl oz + Rovral 1 pt	2, 9	SLB, BLB	DM*
Week 4	Tilt 4 fl oz	3	SLB, BLB	DM* BLB may need help**
Week 5	Luna Tranquility 12 fl oz	7 & 9	SLB, BLB	DM*
Week 6	Merivon 5.5 fl oz	7 & 11	SLB, BLB, DM	
Week 7	Tilt 8 fl oz	3	SLB, BLB	DM* BLB may need help**
Week 8	Luna Tranquility 12 fl oz	7 & 9	SLB, BLB	DM*

\* Add mancozeb 3 lb or phosphorous acid for downy mildew (DM) protection.

\*\*Add Rovral 1 pt (if insecticides in tank mix) or Bravo 2 pt (if no insecticides in tankmix) for added Botrytis leaf blight (BLB) protection.

### For more information:

Presentations from the SLB Fungicide Resistance Management Workshop at the 2018 Empire Expo, which include relative performance of fungicides, fungicide timing and efficacy of SLB fungicide programs are available online at <http://www.hort.cornell.edu/expo/2018proceedings.php>.

### 2018 Cornell Onion Fungicide “Cheat-Sheet” for Leaf Diseases in New York

is now available online at the CCE Cornell Vegetable Program website at [cvc.cce.cornell.edu](http://cvc.cce.cornell.edu). For a print copy, contact Angela Parr at 585-394-3977 x426. ●

## High Temperatures Stressing Peas and Beans

Steve Reinert, Cornell

Extended periods of hot temperatures will have an effect on peas and beans. In peas, daytime temperatures exceeding 78 F at flowering and pod fill will significantly decrease yields. In addition, high temperatures near harvest will mature the peas quickly resulting in a shortened harvest window. Beans are more tolerant of heat but still prefer temperatures during the day of 70 – 80 F. Daytime temperatures over 86 F or night temperatures over 80 F at flowering can result in poor set. Moisture stress can also lead to problems in beans. Although the critical time for optimum soil moisture is at the time of flowering and set, dry conditions when the crop has two trifoliate leaves can decrease later vegetative growth and affect flower initiation. This may result in lowered yields and uneven crop maturity. ●

## Farmer Tick Survey, 2018 – From the NYSIPM Program

The Community IPM Program (part of NYSIPM) was funded by the NY State Senate Task Force on Lyme and Tick Borne Disease to create an educational campaign about the risks of tick exposure and tick awareness for New York. Community IPM addresses non-agricultural pest issues for every New York resident, including farmers. This survey is a research project to help us understand what tick issues and concerns NY farmers are facing on their farms and home properties. By completing this survey, you are agreeing to participate in this research. Your answers are completely anonymous and will help us understand how serious the issue is and how to raise awareness with the farming community.

For more information about this survey or about ticks and tick prevention or control, please contact Jody Gangloff-Kaufmann at [jlg23@cornell.edu](mailto:jlg23@cornell.edu).

Please fill out the survey (just 10 questions!) here: <https://tinyurl.com/yc7rnd6r> ●



# WNY Sweet Corn Trap Network Report, 7/3/18

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

Thirty-two of 38 sites reported this week. European corn borer (ECB)-E was caught at 3 sites and ECB-Z was caught at 7 sites all in the single digits. Corn earworm was caught at 11 sites with 5 sites high enough to be on a 4, 5, or 6 day spray schedule (see table below). No fall armyworm (FAW) caught this week but 2 sites reported the first catch of Western bean cutworm (WBC), Florida and Penn Yan.

Even though ECB trap catch numbers remain low, feeding damage has been observed in the field. If corn is in the tassel emergence stage, scout the tassel for any signs of larvae or frass ([Scouting and Threshold Information](#)). The threshold for tassel emergence stage corn is 15%.

If the corn field is silking, scout for egg masses and larvae within the ear zone. The threshold for silking corn now drops to 5% infested plants. The ear zone is the area between the two leaves above the top ear and one leaf below the bottom ear. ECB egg masses are usually located on the underside of the leaf along the midrib. The egg mass consists of 5-50 flattened eggs that overlap like fish scales (see photo). Be sure to check the ear as well, as eggs are sometimes laid on the husk and flag leaves. Larvae are often found between the ear and stalk, or sometimes in the top of the silks. Tease the silks apart to look for feeding damage and larvae without causing too much "scouting damage". When scouting, be sure to select scouting locations throughout the entire field

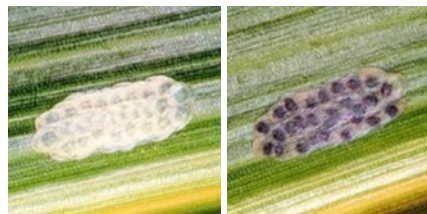
Average corn earworm catch and recommended spray interval

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 80°F for the previous 2-3 days.

to get a good estimate of infestation levels. If you would like to download a scouting form to use in the field please go to Sweet corn scouting form (pdf).

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.



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

## WNY Pheromone Trap Catches: July 3, 2018

Location	ECB-E	ECB-Z	CEW	FAW	WBC	DD to Date
Baldwinsville (Onondaga)	0	1	0	0	0	1105
Batavia (Genesee)	0	0	0	0	0	1103
Bellona (Yates)	0	0	0	0	0	1130
Eden (Erie)	0	0	3	0	0	1124
Farmington (Ontario)	1	0	0	0	0	1073
Geneva (Ontario)	NA	NA	NA	NA	NA	1098
Hamlin (Monroe)	NA	NA	NA	NA	NA	1013
Kennedy (Chautauqua)	0	0	0	0	0	1011
Pavilion	0	0	1	0	0	925
Penn Yan (Yates)	0	5	0	0	1	1133
Ransomville (Niagara)	0	0	0	0	0	1114
Seneca Castle (Ontario)	0	NA	1	0	0	1004
Williamson (Wayne)	0	0	0	0	0	990

ECB - European Corn Borer

CEW - Corn Earworm

FAW - Fall Armyworm

WBC - Western Bean Cutworm

NA - not available

DD - Degree Day (mod. base 50F) accumulation

## Late Blight Risk Update

John Gibbons, CCE Cornell Vegetable Program

Scout field twice a week. See the table for the Blight Units (BU) accumulation from around the region. The trigger in the Decision Support System (DSS) forecast for applying a fungicide is 30 BU's if the variety is susceptible. All tomato and potato growers, conventional and organic, should be applying a protectant fungicides and monitoring the DSS to determine spray intervals. Albion, Ceres, Buffalo, Gainesville, Penn Yan, Wellsville, Rochester, Farmington, Lyndonville, and Medina are the sites that have exceeded the 30 BU's through the forecast period.

Again, there have been new late blight confirmations this past week in southern PA. We will continue to watch the national occurrence map to track late blight movement.

## New Late Blight Risk Chart, 7/03/18

Location <sup>1</sup>	Blight Units <sup>1</sup> 6/27-7/03	Blight Units <sup>2</sup> 7/04-7/06	Location <sup>1</sup>	Blight Units <sup>1</sup> 6/27-7/03	Blight Units <sup>2</sup> 7/04-7/06
Albion	33	14	Lodi	0	7
Baldwinsville	10	11	Lyndonville	12	21
Bergen	12	15	Medina	17	14
Buffalo	23	8	Niagara Falls	14	8
Burt	7	5	Penn Yan	23	11
Ceres	38	21	Rochester	27	15
Fairville	18	12	Sodus	20	6
Farmington	30	15	Versailles	11	15
Gainesville	28	10	Volney	14	9
Geneva	7	10	Wellsville	32	20
Kendall	8	15	Williamson	15	12
Knowlesville	12	8			

<sup>1</sup> Past week Simcast Blight Units (BU)

<sup>2</sup> Three day predicted Simcast Blight Units (BUs)



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

## Chautauqua Produce Auction Growers Meeting

July 10, 2018 | 6:30 PM

Mahlon C. Byler farm, 7156 Burdick Rd, Dewittville, NY 14728



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. We will walk the fields and provide a hands-on demonstration of weed, insect and disease identification in vegetables including management options. FREE! Contact Judson Reid at 585-313-8912 for more info.

## Respirator Fit Testing Clinic, DEC Region 8

July 16-17, 2018 | by appointment only (1 hr each)

Fulkerson Winery, 5576 State Route 14, Dundee, NY 14837

The New York Center for Agricultural Medicine and Health (NYCAMH) is providing respirator fit testing clinics in DEC Region 8, Finger Lakes (**Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, Yates**). During the clinics NYCAMH will provide medical evaluations; respirator fit tests; and WPS complaint trainings on how to properly inspect, put on, take off, fit, seal check, use, clean, maintain, and store respirators. Clinic appointments are 1 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.

You must schedule an appointment to attend. You may contact NYCAMH between June 18 and July 13 to schedule your appointment. Call 607-547-6023 or 800-343-7527, Mon-Fri 8:00 AM - 4:30 PM and 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, and make and model of each respirator to be tested. If a worker wears more than one respirator style, including filtering facepieces, they must be fit tested for each one.

## Ontario Produce Auction Growers Meeting

July 17, 2018 | 6:00 PM - 8:00 PM

Jonathan Sensenig farm, 5299 Crowe Rd, Stanley, NY 14561



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. FREE! Contact Judson Reid at 585-313-8912 for more info.

## New York Soil Health Summit

July 18, 2018 | 9:30 AM - 6:00 PM

Empire State Plaza Conference Center, downtown Albany, NY

This event, organized by the New York Soil Health project, is for farmers, researchers, agriculture service providers, government agencies, non-profits and policy-makers interested in advancing soil health efforts across the state. Topics include local experts/grower panel, research and policies relevant to soil health, and Soil Health Roadmap breakout sessions.

Registration, summit agenda, and other details are available at: [summit.newyorksoilhealth.org](http://summit.newyorksoilhealth.org) For more information, contact David Wolfe (dww5@cornell.edu) or Aaron Ristow (ajr229@cornell.edu). *New York Soil Health is funded through New York State Department of Agriculture & Markets.*

## Genesee Valley Produce Auction Growers Meeting

July 20, 2018 | 1:00 PM - 3:00 PM

Mahlon Girod farm, 7918 Tucker Hill Rd, Houghton, NY 14744

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 Cornell Vegetable Program along with CCE staff will instruct participants and facilitate peer-based learning.

## Weather Charts

John Gibbons, CCE Cornell Vegetable Program

### Weekly Weather Summary: 6/26 - 7/02/18

Location**	Rainfall (inch)		Temp (°F)	
	Week	Month June	Max	Min
Albion	0.14	1.72	95	47
Baldwinsville	1.40	3.21	97	45
Bergen	0.33	2.06	95	42
Buffalo*	1.30	2.82	91	51
Burt	0.19	1.47	93	46
Ceres	1.02	3.17	93	42
Fairville	0.68	3.12	95	43
Farmington	0.75	NA	96	44
Gainesville	1.29	3.53	93	39
Geneva	1.12	2.50	93	46
Lodi	0.44	2.52	96	45
Niagara Falls*	0.21	1.35	94	50
Ovid	0.68	2.52	96	45
Penn Yan*	0.61	4.11	93	48
Phelps	0.68	2.50	96	45
Portland	0.53	3.40	86	59
Rochester*	0.58	2.22	95	48
Silver Creek	1.02	2.87	86	47
Sodus	NA	NA	94	42
Versailles	NA	NA	NA	NA
Volney	0.97	1.72	95	45
Williamson	0.57	2.20	93	45

### Accumulated Growing Degree Days (AGDD) Base 50°F: April 1 - July 02, 2018

Location	2018	2017	2016
Albion	1003	874	858
Baldwinsville	1053	930	886
Bergen	936	849	762
Buffalo	1057	901	898
Burt	881	821	NA
Ceres	900	794	661
Fairville	906	833	747
Farmington	939	833	786
Gainesville	784	783	609
Geneva	975	881	827
Lodi	1077	1005	915
Niagara Falls	1132	994	948
Ovid	1017	948	871
Penn Yan	1029	948	883
Phelps	858	882	804
Portland	1005	948	833
Rochester	1080	948	894
Silver Creek	908	909	793
Sodus	892	866	722
Versailles	987	920	781
Volney	903	810	NA
Williamson	874	877	737

\* Airport stations

\*\* Data from other station/airport sites is at: <http://nwa.cornell.edu/> Weather Data, Daily Summary and Degree Days.

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# Cornell Cooperative Extension Cornell Vegetable Program

480 North Main Street  
Canandaigua, NY 14424



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.



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Cornell Cooperative Extension  
Cornell Vegetable Program

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