Cucumber downy mildew is headed north! All cucurbit growers should be putting out protective sprays, both organic and conventional, to reduce the risk.

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It is important to plan your Stemphylium Leaf Blight (SLB) strategy now in onions so that you do not get caught in rotation restrictions.

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Management of cucumber beetles is based on the plant growth stage and susceptibility to bacterial wilt. Learn how to control this pest of cucurbits.

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Late blight was detected on tomato in Ontario, Canada. WNY growers should be vigilant scouting and spray protective fungicides.

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VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

Volume 13 | Issue 13 | July 5, 2017

Cornell University
Cooperative Extension
Cornell Vegetable Program

Rain looming in the distance.
Photo: Christy Hoepting

Conventional and Organic Downy Mildew Management Updates

from Margaret McGrath, Plant Pathology & Plant-Microbe Biology, Cornell University; edited by R. Hadad, CCE CVP

[Downy mildew on vine crops has been spreading across Ontario, Canada, into Michigan and Ohio. With the winds coming in out of the west and northwest, it is best to presume that spores have probably made it into WNY. To successfully combat this disease, aggressive approaches are needed fronted by products that can do the job. Here is some of the latest information available. ed. R. Hadad, CVP]

Biopesticides for Managing Diseases of Cucurbits Organically

Most biopesticides are approved for organic production and most products approved for organic production are biopesticides, thus they have a logical excellent fit for managing diseases in organic crops. However some formulations are not approved, which can be due to inerts. For example, the potassium bicarbonate products EcoMate Armicarb O, Kaligreen and MilStop are approved whereas Armi-

Downy mildew. *Photo: Meg McGrath, Cornell*

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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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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 will be July 12, 2017.

Wild Parsnip in Bloom - Do NOT Touch It!

Darcy Telenko, CCE Cornell Vegetable Program

Wild parsnip (*Pastinaca sativa*) is a biennial or perennial herbaceous plant with human health and ecological impacts. I have noticed it blooming along field edges and roadsides this week.

Do Not Touch This Plant! The sap of wild parsnip contains chemicals called furanocoumarins which make skin more vulnerable to ultraviolet light. Skin contact with the sap in combination with sunlight can cause a severe burn that will appear within 24 to 48 hours. This reaction is called phytophotodermititis and can cause discoloration of the skin and increased sensitivity to sunlight for many years.

Protect yourself by learning to identify wild parsnip at the different life stages. Wear gloves, long-sleeved shirts, pants, boots and eye protection if working near wild parsnip to prevent skin contact with sap. Synthetic, water resistant materials are recommended.

Wild parsnip growing in corn field. Flowers are similar in appearance to Queen Ann's Lace but are yellow in color.
Photo: D. Telenko, CVP

For more photos and further information on identifying this plant and controlling its spread, contact DEC Forest Health or your local Partnership for Regional Invasive Species Management (PRISM) by visiting http://www.nyis.info/index.php?action=invasive_detail&id=61.

carb is not. Also, some biopesticidal substances are not allowed under NOP (National Organic Program), for example phosphorous acids and genetically-engineered PIPs. Additionally, there are important organic fungicides that are not biopesticides, including mineral oils, copper, and sulfur. Biopesticides break down in the environment, thus there is no concern about build-up in soil as with copper, which is an element. However, biopesticides generally do not have the breadth of activity, efficacy, or residual activity of copper; thus it is important to obtain information about these factors and to know the target disease(s) when selecting biopesticides. The earlier in disease development that applications are started, the more effective the product will be. This is not unique to biopesticides. Fungicides cannot eradicate established lesions.

Some biopesticides, notably Regalia and Serenade, have induced plant resistance as a mode of action. These need to be applied before infection for this activity to be effective.

Several biopesticides have proven effective for diseases affecting vegetable crops. Powdery mildew is perhaps the easiest foliar disease to manage with biopesticides. It can be controlled with several different biopesticides, including botanical oil (Organocide, Mildew Cure, etc), potassium bicarbonate (Kaligreen, MilStop), and microbials (Actinovate, Serenade, Sonata, etc).

See the full article at https://rvpadmin.cce.cornell.edu/uploads/doc_581.pdf

Efficacy of Organic Fungicides for Vegetable Diseases

For more on organic fungicides, see: https://rvpadmin.cce.cornell.edu/uploads/doc_582.pdf

Conventional DM Management

Conventional fungicides considered the best choices to alternate among this season are Ranman, Omega, Zing! or Gavel, and Curzate (follow with another fungicide about 5 days later). Forum could also be included in the program. Revus is another fungicide to consider for crops other than cucumber. Presidio and Previcur Flex are no longer recommended because of suspected resistance affecting efficacy in recent university fungicide evaluations. For more in-depth information, see the complete article: https://rvpadmin.cce.cornell.edu/uploads/doc_580.pdf

Be on the Watch for Bacterial Diseases of Beans

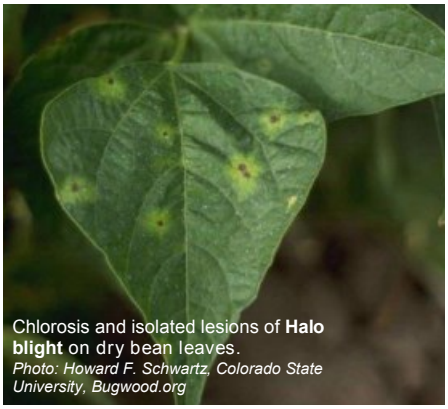
Julie Kikkert, CCE Cornell Vegetable Program

Bacterial diseases are likely to show up in beans following heavy rains this past week, which are very favorable for the development and spread of these diseases. Severe disease outbreaks typically occur seven to ten days after a period of humid, rainy weather. High winds and hail cause wounds which enable pathogens to enter and infect the tissue. Three different pathogens may be involved (see table). Each may cause lesions (spots) on leaves, stems or pods.

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

Management:

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



Chlorosis and isolated lesions of **Halo blight** on dry bean leaves.
Photo: Howard F. Schwartz, Colorado State University, Bugwood.org

Bacterial brown spot on dry bean pod.
Photo: Howard F. Schwartz, Colorado State University, Bugwood.org

Halo blight on bean pod.
Photo: Howard F. Schwartz, Colorado State University, Bugwood.org

For Additional Info and Photos: http://vegetablemdonline.ppath.cornell.edu/factsheets/Beans_Bacterial.htm and http://extension.colostate.edu/docs/pubs/crops/02913.pdf

Fungicide Program for Stemphylium Leaf Blight in Onion - Plan Now!

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 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. 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. It is important to plan your SLB fungicide strategy now so that you do not get caught in rotation restrictions and are not be able to use the products that you want to when you want to.

FRAC Group 3 & 7 Fungicides provide best control of SLB

Fungicide trials conducted in muck-grown onions between 2013 and 2016 (Hoepting *et. al*) showed that fungicides belonging to FRAC (Fungicide Resistance Action Committee) groups 3 and 7 provided the best control of SLB. **For best control of SLB, it is recommended to include a FRAC group 3 or 7 fungicide in every spray**, at least in situations where disease is expected to be high.

Table 1a. SLB Fungicide Rotation Strategy: Sample #1

	Product and Rate per acre	FRAC groups	Diseases Controlled	Disease Not Controlled
Week 1	Scala 9 fl oz + Bravo 1.5 pt	9, M5	SLB, BLB	DM*
Week 2	Quadris Top 14 fl oz Or Viathon 2.5 pt	**3** & 11 3 & 33	SLB, DM SLB, DM	BLB**
Week 3	Luna Tranquility 16 fl oz	**7** & 9	SLB, BLB	DM*
Week 4	Quadris Top 14 fl oz Or Viathon 2.5 pt	**3** & 11 **3** & 33	SLB, DM SLB, DM	BLB**
Week 5	Luna Tranquility 16 fl oz	**7** & 9	SLB, BLB	DM*
Week 6	Quadris Top 14 fl oz Or Viathon 2.5 pt	**3** & 11 **3** & 33	SLB, DM SLB, DM	BLB**
Week 7	Luna Tranquility 16 fl oz	**7** & 9	SLB, BLB	DM*
Week 8	Quadris Top 14 fl oz Or Viathon 2.5 pt	**3** & 11 **3** & 33	SLB, DM SLB, DM	BLB**

Table 1b. SLB Fungicide Rotation Strategy: Sample #2

	Product and Rate per acre	FRAC groups	Diseases Controlled	Disease Not Controlled
Week 1	Inspire Super 20 fl oz	**3** & 9	SLB, BLB***	DM*
Week 2	Luna Tranquility 16 fl oz	**7** & 9	SLB, BLB	DM*
Week 3	Merivon 9 fl oz	**7** & 11	SLB, BLB, DM	
Week 4	Inspire Super 20 fl oz	**3** & 9	SLB, BLB***	DM*
Week 5	Luna Tranquility 16 fl oz	**7** & 9	SLB, BLB	DM*
Week 6	Merivon 9 fl oz	**7** & 11	SLB, BLB, DM	
Week 7	Inspire Super 20 fl oz	**3** & 9	SLB, BLB***	DM*
Week 8	Luna Tranquility 16 fl oz	**7** & 9	SLB, BLB	DM*

Table 1c. SLB Fungicide Rotation Strategy: Sample #3

	Product and Rate per acre	FRAC groups	Diseases Controlled	Disease Not Controlled
Week 1	Inspire Super 20 fl oz	**3** & 9	SLB, BLB***	DM*
Week 2	Inspire Super 20 fl oz	**3** & 9	SLB, BLB***	DM*
Week 3	Merivon 9 fl oz	**7** & 11	SLB, BLB, DM	
Week 4	Merivon 9 fl oz	**7** & 11	SLB, BLB, DM	
Week 5	Inspire Super 20 fl oz	**3** & 9	SLB, BLB***	DM*
Week 6	Inspire Super 20 fl oz	**3** & 9	SLB, BLB***	DM*
Week 7	Merivon 9 fl oz	**7** & 11	SLB, BLB, DM	
Week 8	Luna Tranquility 16 fl oz	**7** & 9	SLB, BLB	DM*

Table 1d. SLB Fungicide Rotation Strategy: Sample #4

	Product and Rate per acre	FRAC groups	Diseases Controlled	Disease Not Controlled
Week 1	Rovral 1 pt + Scala 9 fl oz	9 & E3	SLB, BLB	DM*
Week 2	Rovral 1 pt + Scala 9 fl oz	9 & E3	SLB, BLB	DM*
Week 3	Rovral 1 pt + Scala 9 fl oz	9 & E3	SLB, BLB	DM*
Week 4	Rovral 1 pt + Scala 9 fl oz	9 & E3	SLB, BLB	DM*
Week 5	Merivon 9 fl oz	**7** & 11	SLB, BLB, DM	
Week 6	Merivon 9 fl oz	**7** & 11	SLB, BLB, DM	
Week 7	Luna Tranquility 16 fl oz	**7** & 9	SLB, BLB	DM*
Week 8	Merivon 9 fl oz	**7** & 11	SLB, BLB, DM	

*For DM protection, add fungicide with active ingredient mancozeb (M3) or phosphorous acid (33).
**For BLB protection, add Bravo 2-3 pt if not using Movento, Minecto Pro, Agri-Mek, Exirel or Radiant in tank mix. Add Scala 9 fl oz + Rovral 1 pt if using any of these insecticides in the tank mix.
***Inspire Super has some activity against BLB (mediocre), but if you would like to improve BLB control, add Rovral 1 pt to this tank mix.

continued on next page

Top performing Treatments:
- Luna Tranquility (7 & 9)
- Merivon (7 & 11)

Very Good Treatments:
- Inspire Super (3 & 9)
- Viathon (3 & 33)
- Quadris Top (3 & 11)
- Rovral 1 pt + Scala 9 fl oz

Failed to Control SLB:
- Quadris (11) – due to development of SLB resistance
- Cabrio (11) - due to development of SLB resistance
- a.i. mancozeb (M3)
- Bravo (M5)
- Rovral

Note: several other fungicides tested provided good or mediocre control of SLB – *see Fungicide "Cheat Sheet", page 6.*

The challenge is to adhere to rotation restrictions and maximum use rates on SLB fungicides:
- **Luna Tranquility/Sensation, Merivon, Inspire Super** and **Endura** may not be applied in more than **two** sequential applications before being rotated away to different FRAC groups.
- **Quadris Top** may not be applied more than **one** time before being rotated away to different chemical classes.
- Luna Tranquility/Sensation, Merivon, Inspire Super, Quadris Top, Endura, Tilt and Viathon have maximum allowable rates per season that do not exceed 2 to 4 maximum rate applications.
- Additionally, **Luna Tranquility/Sensation label states that no more than 2.1 lb of its active ingredient pyrimethanil (FRAC 9, also in Scala) may be applied per acre per season.** There are 0.024 lb/fl oz in Luna Tranquility and 0.039 lb/fl oz in Scala. Therefore, if you use three applications of Luna Tranquility this would use 1.15 lb of pyrimethanil (0.024 lb/fl oz x 16 fl oz x 3 apps), which would leave 0.95 lb of pyrimethanil that could be used as Scala (up to 24 fl oz of Scala at 9-18 fl oz per app). Luna Tranquility/Sensation also has maximum use rates for its FRAC 7 active ingredient, but this is not labeled in any other products in onion in NY currently.
- Additionally, **Inspire Super and Quadris Top labels state a maximum use of active ingredient difenoconazole (FRAC 3) of 0.46 lb per acre per season.** Maximum rates of Inspire Super (20 fl oz) and Quadris Top (14 fl oz) both contain 0.11 lb/acre of difenoconozole, so **if maximum rates are used, a maximum of four applications between the two products is allowed per season.**

Table 1 shows four examples of fungicide rotation plans using the four top performing SLB fungicides that adhere to the rotation restrictions and maximum use rates, while delivering a strong SLB program for each of 8 consecutive weeks. Of course, there are other possibilities as well, but each takes some planning ahead. An updated Cornell Onion Fungicide "Cheat Sheet" (see page 6) is also available to help you plan your fungicide spray program. Also included on our website is more information on relative performance of fungicides in Cornell trials.

CROP INSIGHTS

CUCURBITS

Cucumber downy mildew is headed north! Positive confirmations have recently been reported in both Ohio and Pennsylvania in addition to Ontario, Canada. All cucurbit growers should be putting out protective sprays both organic and conventional to reduce the risk. *See last week's newsletter for a table of fungicide options for control of both downy and powdery mildews, and read this week's cover article for additional resources.*

ONION

Onion thrips moved slightly over the past week with several direct seeded fields reaching the spray threshold (at least 0.5 OT per leaf) for the first application of Movento. Many direct seeded fields have had either one or two early (less than 0.5 OT per leaf) applications of Movento already. We are expecting double applications of Movento to hold the thrips pressure down for at least one week, if not 2-3 weeks – time will tell! Riding the "momentum of Movento" can certainly help to reduce number of total insecticide applications for season. Botrytis leaf blight (BLB) remained unchanged for the most part over the past week, likely due to effective fungicide programs and only moderate pressure. Several fields are showing weather injury (bruised and torn leaves) from driving heavy rain and in some cases hail. This could increase the risk of Stemphylium leaf blight (SLB), because the increase in necrotic tissue from the weather damage is favorable for SLB, which aggressively invades necrotic tissue. We begin to see SLB at this time of year anyway as onions begin to bulb and outer leaves and leaf tips die back naturally. Growers should plan their SLB program now as the most effective fungicides for managing SLB have rotation restrictions and maximum use rates per season – *see article, page 4.* Also, an updated Cornell Onion Fungicide Cheat Sheet is now available – *see page 6*. This year, it includes many more fungicides and detailed efficacy ratings per SLB, BLB and downy mildew (DM) from Cornell trials.

Late blight sporulation on tomato. *Photo: J. Reid, CVP*

TOMATO/POTATO

See Late Blight warning, page 9.

Cornell Onion Fungicide "Cheat Sheet" for Leaf Diseases in New York

Compiled by Christy Hoepting, CCE Cornell Vegetable Program, July 2017

Trade name	Active ingredient	FRAC[1] code	Relative Disease Control Rating[2]			Rotation restrictions	Rate (product/A)	Maximum allowable per season	
			BLB[3]	SLB	DM			Total Amount	No. of max rate apps
Bravo & generics	chlorothalonil	M5	**Best**	Fail	Fail	none	1-3 pt	20 pts	6 (3 pt)
Penncozeb & generics	mancozeb	M3	Fail	Fail	M-G	none	2-3 lb	32 lbs	10 (3 lb)
Rovral & generics	iprodione	E3	M	Fail	Fail	none	1 pt (in tankmix) 1.5 pt (alone)	10 pts (in tank mix) 7.5 pts (alone)	10 (1 pt) 5 (1.5 pt)
Bravo 1.5 pt + Scala 9 fl oz	chlorothalonil pyrimethanil	M5 9	**Best**	M	Fail	none			6
Scala	pyrimethanil	9	M-P	M-P	Fail	none	9*-18 fl oz	54 fl oz	3 (18 fl oz)
Rovral 1 pt + Scala 9 fl oz	iprodione pyrimethanil	E3 9	VG	VG	Fail	none			6
Luna Tranquility	Fluopyram pyrimethanil	7 9	VG	**Best**	Fail	**No more than 2** sequential apps before rotating to non-7 or 9 group fungicides	16-27 fl oz	54.7 fl oz[4]	3 (16 fl oz)
Luna Experience	Fluopyram tebuconazole	7 3	??[5]	**Best?**[5]	Fail	**No more than 2** sequential apps before rotating to non-3 or 7 group fungicides	12.8 fl oz	25.6 fl oz[4]	2 (12.8 fl oz)
Merivon	fluxapyroxad + pyraclostrobin	7 11	VG	**Best**	M	**No more than 2** sequential apps before rotating to non-7 or 11 group fungicides	5.5-11 fl oz	33 fl oz 3 apps	3 (11 fl oz)
Quadris Top	azoxystrobin + ifenoconazole	11 3	Fail	VG	M-G	**No more than 1** application before rotating to non-11 or 3 group fungicides	12-14 fl oz	56 fl oz[4]	4 (14 fl oz)
Inspire Super	difenoconazole + cyprodinil	3 9	M	VG	Fail	**No more than 2** sequential apps before rotating to non-3 or 9 group fungicides	16-20 fl oz	80 fl oz[4]	4 (20 fl oz)
Endura	boscolid	7	M	VG	Fail	**No more than 2** sequential apps before rotating to non-7 group fungicides	6.8 oz	41 oz 6 apps	6 (6.8 oz)
Tilt & generics	propiconazole	3	M	VG	Fail	none	4-8 fl oz (alone) 2-4 fl oz (in tank mix)	16 fl oz	2 (8 fl oz) 4 (4 fl oz)
Viathon	Phosphorous acid tebuconazole	33 3	M?	VG	M	none	2-3 pt	6 pt	2 (3 pt)
Quadris	azoxystrobin	11	Fail	Fail[6]	M	**No more than 1** application before rotating to non-11 group fungicides	9-15.5 fl oz	92.3 fl oz	6-8 11-15 fl oz
Cabrio	pyraclostrobin	11	Fail	Fail[6]	M	**No more than 1** application before rotating to non-11 group fungicides	8-12 fl oz	72 fl oz	6 (12 fl oz)
Ridomil Gold Bravo	Mefanoxam chlorothalonil	4 M5	M	Fail	**Best**	none	2.5 pt	12.5 pt	5 (2.5 pt)
Tanos	Cymoxanil famoxadone	27 11	??[5]	??[5]	M	**No more than 1** application before rotating to non-11 group fungicides	8 oz	84 oz	10 (8 oz)
Zampro	Dimethomorph ametostradin	40 45	Fail	Fail	M	**No more than 2** sequential applications	14 fl oz	42 fl oz	3 (14 fl oz)
Revus	mandipropamid	40	Fail	Fail	M	**No more than 2** sequential application before rotating to non-40 group fungicides	8 fl oz	32 fl oz	4 (8 fl oz)
Omega	fluazinam	29	??[5]	M-P	M-P	None: Do not use with adjuvant	1 pt	6 pt	6 (1 pt)
Gavel	zoxamide mancozeb	22 M3	??	P	M	None: Do not contact exposed bulbs	1.5-2 lb	16 lb	6 apps
Rampart, etc.	Phosphorous acid	33	Fail	Fail	M	none	1-3 qt		
Switch	Cyprodinil fludioxinil	9 12	P	P	Fail	**No more than 2** sequential application before rotating to non-40 group fungicides	11-14 oz	56 oz	4 (14 oz)

[1]**FRAC:** Fungicide Resistance Action Committee Chemical class code. [2]**Relative disease control ratings** are based on fungicide trials, 2006-2013 (Hoepting *et. al*). SLB trialed 2013-2015. **Best:** best (or one of the best) of all fungicides tested; **VG:** very good; **G:** good; **M:** mediocre/middle of the pack; **P:** poor; **Fail:** failed to control disease, not different than untreated control. **inconsistent results showing range of results across trials. **??**: No trial data by Hoepting. [3]**BLB:** Botrytis Leaf Blight; **SLB:** Stemphylium Leaf Blight; **DM:** Downy mildew. [4]**Maximum allowable limit of active ingredient per acre per season:** pyrimethanil – 2.1 lb (= 0.024 lb/fl oz Luna Tranquility; = 0.039 lb/fl oz Scala); difenoconazole – 0.46 lb (= 0.0057 lb/fl Inspire Super; = 0.0082 lb/fl oz Quadris Top); fluopyram – 0.446 lb (= 0.013 lb/fl oz Luna Experience; = 0.008 lb/fl oz in Luna Tranquility); tebuconazole – 0.335 lb (= 0.013 lb/fl Luna Experience; = 0.003 lb/fl oz Viathon). [5]?Not tested in Cornell trials. Expect FRAC 3 & 7 to be very good on SLB. [6]SLB has been found to be resistant to FRAC 11 fungicides in New York. For more information on relative performance of fungicides for management of leaf diseases in onions, visit the Cornel Vegetable Program website http://cvp.cce.cornell.edu/.

Pest Profile: Colorado Potato Beetles

David Ludwig and Darcy Telenko, CCE Cornell Vegetable Program

Colorado Potato Beetles (*Leptinotarsa decemlineata*) have been spotted damaging numerous vegetable crops around Western New York this year. These pests of potatoes, tomatoes, and eggplant can rapidly defoliate a plant if left unchecked (Figure 1). Larvae are small with black heads and soft, humpbacked, rusty bodies ornamented by two sets of black spots on either side. Adults beetles are 3/8-inch-long with alternating black and yellow-orange stripes running vertically down each wing cover. Both larvae and adults damage crops, and can often be found feeding on leaves and stems. Eggs are found in masses of 20 to 40 and are small, cylindrical, and yellow-orange in color. They can be found on the underside of host plant leaves (Figure 2).

Figure 1. Eggplant infested with Colorado Potato Beetle larvae. *Photo: D. Ludwig, CVP*

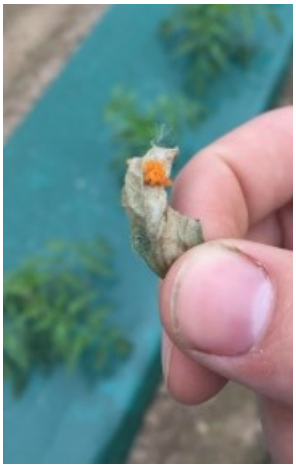


Figure 2. Colorado Potato Beetle egg mass found on a tomato plant. *Photo: D. Ludwig, CVP*

Insecticide resistance, especially neonicotinoids, has been observed in populations of Colorado Potato Beatles (CPB). It is crucial to use best IPM practices to help slow the development of resistance and maintain effective control. One-year rotations from potatoes, tomatoes, or eggplant to a corn or small-grain crop can dramatically reduce infestations. When vulnerable crops are rotated, plant them in fields as far as practical from where they were grown the previous year. Resistant varieties of potatoes (Elba, Prince Hairy, and King Hairy) are available, although no such resistance can be found in tomatoes or eggplant. When scouting for CPB on eggplant and tomatoes, begin inspecting plant leaves early in the season and use the thresholds in Tables 1-2 to determine when pesticide use is appropriate. For detailed instructions of scouting for CPB on potatoes, refer to page 317 of the 2017 Cornell Integrated Crop and Pest Management Guidelines for Commercial Vegetable Production. This section also offers 6 different insecticide rotations designed to limit the development of pesticide resistance and maintain effective control. Insecticides are most effective when larvae are small (i.e. in their first or second instar).

Other methods of control for CPBs include promoting natural enemies: a number of predatory and parasitoid insects which prey on CPB can be found in New York. However, natural predators alone are usually insufficient for controlling infestations. Flaming can provide effective control on potatoes when plants are small (<6 inches tall). Operating a burner 8 to 10 inches above the soil on warm, sunny days can kill adults feeding in the upper foliage while having little effect on overall plant health or yield. Trap crops of potatoes or eggplant can also be planted early on the edges of fields. Adults from overwintering populations, attracted to the traps, can be destroyed there before they damage primary crops. Flaming, vacuuming, and spraying are effective to eliminate insects in trap crops. Plastic-lined trench traps can also be installed between adjacent fields or between fields and overwintering sites to capture adults, which disperse by walking early in the season. Treating border rows early with systemic insecticides can also kill most adults migrating into a field.

Colorado Potato Beetles have proven themselves able to evolve resistance to multiple classes of insecticides. Practicing good integrated pest management, using a variety of cultural practices, and varying the mode of action of insecticides used are all essential to control for these pests and maintain healthy yields.

Table 1: CPB Thresholds for Eggplant (from 2017 Cornell IPM Guidelines)

Height of plant	Number of CPB per plant
<6”	2 small larvae or 1 large larva
>6”	4 small larvae or 2 large larvae

Table 2: CPB Thresholds for Tomato (from 2017 Cornell IPM Guidelines)

Plant height/stage	Number of insects/level of plant damage
Up to 10”	Average ¾ adult/plant or ≥10% defoliation
10” to early fruit set	If using Bt's, ≥5% of plants with egg masses, and ≥30% egg masses have hatched. If using conventional insecticides, average 1 adult or larva per plant or ≥20% defoliation
Early fruit set to maturity	≥10% defoliation or ≥2% plants with at least one freshly injured fruit

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WNY Sweet Corn Trap Network Report, 7/4/17

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

Only twenty sites reporting this week. European corn borer (ECB)-E was trapped at four sites and ECB-Z was trapped at four sites as well. Corn earworm (CEW) was trapped at seven sites, but only the Baldwinsville site was high enough to be on a 6 day spray schedule (see chart). Fall armyworm (FAW) was trapped at three sites and Western Bean cutworm (WBC) was trapped at six sites this week.

The degree day accumulations given in the table are now based on accumulations beginning May 1st with a base 50°F. This is to help predict WBC emergence. We are just beginning to see WBC at some of the sites with peak emergence usually happening the last week of July into the first week of August.

Michigan State University recommends scouting for WBC egg masses when cumulative trap catch numbers reach 100 moth/trap for field corn, however egg masses have been found in sweet corn when trap catches were still in the single digits. Therefore it is recommended that all fields that are in the whorl or early tassel stage be scouted for egg masses with a 4% threshold for processing sweet corn and a 1% threshold for fresh market sweet corn.

Degree-day accumulations in relation to percent moth emergence (beginning May 1, base 50°F)

Accumulated Degree-days	% Moth Emergence
1319	25%
1422	50%
1536	75%

Percent WBC moth emergence based on degree day accumulation, data from University of Nebraska

WNY Pheromone Trap Catches: July 4, 2017

Location	ECB-E	ECB-Z	CEW	FAW	WBC	DD to Date
Baldwinsville (Onondaga)	0	1	2	3	0	791
Batavia (Genesee)	NA	NA	NA	NA	NA	753
Bellona (Yates)	NA	NA	NA	NA	NA	866
Eden (Erie)	1	0	0	0	7	793
Farmersville (Cattaraugus)	NA	NA	NA	NA	NA	742
Farmington (Ontario)	0	0	0	0	0	733
Hamlin (Monroe)	1	3	1	0	1	757
LeRoy (Genesee)	5	2	0	0	4	768
Pavilion	0	0	0	0	0	742
Penn Yan (Yates)	0	1	0	2	1	828
Ransomville (Niagara)	0	0	1	0	0	822
Seneca Castle (Ontario)	0	0	0	0	0	775
Williamson (Wayne)	NA	NA	NA	NA	NA	713

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

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.

Cucumber Beetles

Bethany Hunt and Darcy Telenko, CCE Cornell Vegetable Program

The spotted cucumber beetle (*Diabrotica undecimpunctata*) and the striped cucumber beetle (*Acalymma vittatum*) can cause significant damage to cucurbit crops (Figure 1). Cucumber beetles directly damage cucurbits through feeding on foliage, and can kill young plants if feeding pressure is heavy. They can also spread bacterial wilt among vulnerable cucurbits, like cucumber. Seedlings and small plants are the most affected, so scouting and early detection are crucial. When determining whether to spray for cucumber beetles, plant growth stage and susceptibility to bacterial wilt should be taken into account. Small plants should be sprayed when there are greater than 5 beetles per plant, while older plants (greater than 5th leaf stage) can withstand more foliar damage and should only be sprayed if beetles are damaging flowers. In plants that are susceptible to bacterial wilt, from the 4-leaf stage until vines begin to run, insecticides should be applied when beetle densities are at or above 1 beetle per plant.

Figure 1. Cucumber beetle feeding damage. *Photos: B. Hunt, CVP*

Figure 2. Spotted cucumber beetle (left) and striped cucumber beetle (right). *Photos: B. Hunt, CVP*

Both cucumber beetles are yellow and black, but spotted cucumber beetles are slightly larger than striped cucumber beetles and, as their names imply, spotted cucumber beetles have black spots on their abdomens, while striped cucumber beetles have black stripes that meet at the base of their abdomens (Figure 2). Spotted cucumber beetles feed on a wide variety of plants, while striped cucumber beetles feed almost exclusively on cucurbits. Striped cucumber beetle lay their eggs in the soil, and their larvae feed upon cucurbit roots, while spotted cucumber larvae do not feed upon cucurbits.

continued on next page

continued – Cucumber Beetles

To manage cucumber beetles, a number of commercial sprays can be used (refer to Ch 17 in the 2017 Cornell Integrated Crop and Pest Management Guidelines for Commercial Vegetable Production). Organic chemical control options include Kaolin clay, Pyrethrum, and Spinosad. Cucumber beetles also have several natural enemies that can help suppress populations. Larger predators, like wolf spiders and ground beetles, feed upon cucumber beetles, and they are parasitized by a tachinid fly and a parasitoid wasp.

Cultural practices can also temper cucumber beetle damage. Cucumber beetles generally overwinter near the cucurbit crops they feed on, so planting the current year's cucurbits as far away as possible from the previous year's cucurbits can delay damage. Cucumber beetle feeding and bacterial wilt are the most harmful to seedlings and small plants, so using transplants instead of direct seed protects the plants at their most susceptible stages. Floating row covers (to be removed once flowering begins) are the best bet in preventing cucumber beetles from reaching your crop, but this must be weighed against cost and weed management. Some cucurbits, like Blue Hubbard squash, are more attractive to cucumber beetles than others, and could be used as a trap crop. Combining various control methods is the most effective way to prevent cucumber beetles from wiping out your cucurbits. For more information on organic management options, see http://articles.extension.org/pages/64274/managing-cucumber-beetles-in-organic-farming-systems.

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Late Blight Detected in Ontario, Canada!

Darcy Telenko and John Gibbons, CCE Cornell Vegetable Program

Late blight (LB) was detected late last week on tomato in Chatham-Kent Division, Ontario Canada. Due to all the rain this past week Dr. Chris Smart has sent out the following warning "... *late blight in tomato has been found in Ontario Canada near Michigan but given the weather we have had I would expect it to spread quickly. I will keep you updated when there are additional findings. Growers in Western NY should be vigilant scouting and spray protective fungicides.*"

All of Western NY is at risk for Late Blight Infection. Severity values continue to build at all locations. Frequent rainfall has been extremely favorable for the development of LB. 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, and the last fungicide used was chlorothalonil, mancozeb, Tanos, Curzate, Reason, Quadris Opti, Forum, Phostrol or Headline (potato)/Cabrio (tomato).

All tomato and potato growers, conventional and organic, should be applying a protectant fungicides and monitoring the DSS to determine spray intervals. Albion is one site that has exceeded the 30 bu's, this past week which triggers the recommendation for an addition fungicide application. Most of the other stations have exceeded the 30 BU's in the 3 day forecasted period. Nine stations have not reached the 30 BU trigger are Geneva, Lodi, Lyndonville, Baldwinsville, Knowlesville, Fairville, Niagara Falls, Wolcott and Wellsville. We will continue to watch the national occurrence map to track late blight movement.

If Late blight is suspected act immediately! Under favorable environmental conditions late blight develops very rapidly and can spread many miles in a short period.

- Check out photos at: http://livegpath.cals.cornell.edu/gallery/tomato/tomato-late-blight/
- Contact a Vegetable Specialist ASAP for confirmation
- Save fresh foliage with dark lesions in a sealed plastic bag for confirmation and late blight strain analysis, and contact a Vegetable Specialist ASAP
- Kill LB hotspots and a 30 ft. border to stop spore production there.
- Spray the field with a fungicide and keep a very tight spray interval.

***New* Late Blight Risk Chart, 7/04/17**

Location[1]	Blight Units[1] 6/28-7/04	Blight Units[2] 7/05-7/07	Location[1]	Blight Units[1] 6/28-7/04	Blight Units[2] 7/05-7/07
Albion	40	14	Lodi	6	13
Baldwinsville	17	12	Lyndonville	11	16
Bergen	15	15	Medina	22	18
Buffalo	19	13	Niagara Falls	17	12
Ceres	26	17	Penn Yan	18	18
Elba	22	14	Rochester	29	18
Fairville	13	12	Sodus	29	19
Farmington	17	18	Versailles	13	19
Gainesville	NA	NA	Volney	31	19
Geneva	7	13	Wellsville	17	12
Kendall	21	20	Williamson	18	20
Knowlesville	1	13	Wolcott	18	10

[1] Past week Simcast Blight Units (BU)
[2] Three day predicted Simcast Blight Units (BUs)

CCE Cornell Vegetable Program Specialists: Darcy Telenko at dep10@cornell.edu or 716-697-4965 or nearest CVP Specialist to you at https://cvp.cce.cornell.edu/contact_information.php

UPCOMING EVENTS

view all Cornell Vegetable Program upcoming events at cvp.cce.cornell.edu

2017 Vegetable Pest and Cultural Management Field Meetings for Auction Growers

July 21, 2017 | 6:00 PM
Yates County rescheduled (from 6/30 to 7/21) – **Allen Zimmerman farm, 3351 Hoyt Rd, Penn Yan, NY 14527**

August 4, 2017 | 6:00 PM
Orleans County – **Albion farm TBD**

August 8, 2017 | 6:00 PM
Chautauqua County – **Jacob Hostetler farm, 561 Frew Run, Frewsburg, NY 14738**

These courses 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 associates Telenko and Hadad will instruct participants and facilitate peer-based learning. Details on each topic will focus on field observations at the farm.

This event is FREE! DEC recertification credits will be available. For more information about these events, contact Judson Reid at 585-313-8912 or jer11@cornell.edu.

WNY Soil Health Alliance Summer Field Day

August 22, 2017 | 8:30 AM - 3:30 PM
Orleans County 4-H Fairgrounds Trolley Bldg, 12690 Rt 31, Albion NY 14411

Two guest speakers will kick off this exciting event: Wendy Taheri, a nationally recognized expert in Mycorrhizal Fungi, and John Wallace, soon to be an Assistant Professor at Cornell with extensive experience in drilled interseedings of corn. In the afternoon, attendees will observe 8 cover crop trials and explore a soil pit, with on-site discussion led by Wendy Taheri, TerraNimbus LLC. There will also be cover crop interseeder and herbicide demonstrations. The full agenda and information on how to register is available at http://www.wnysoilhealth.com/events/. $40/pre-registered participant; $50/walk-in. Lunch included.

Good Agricultural Practices/Harmonized GAPs Farm Food Safety Training

September 26-27, 2017 | 9:30 AM - 4:00 PM
TBD but will likely be in Cattaraugus County

Farm food safety is common-sense practices organized to assist farmers to improve their skill set to continue to grow safe and healthy food.

Day One of this GAPs training will be an educational training on farm food safety principles and practices to provide the background and information for farmers to understand how to minimize the risk of food born disease contamination. Day Two will be for those who want help with writing a farm food safety plan. If you want to be certified under the GAPs or HGAPs program, a farm food safety plan is needed for the audit.

Cost: Pre-registration is required. $25 for first farm attendee ($15 for second) for County Extension enrollees; $35 and $15 for non-enrollees. Online registration will be available soon. For more information, contact Robert Hadad at rgh26@cornell.edu or 585-739-4065.

Fresh Produce Buyer/Purchaser Farm Food Safety Educational Meeting

October 17, 2017 | 9:30 AM - 2:30 PM
NYS Agricultural Experiment Station, 630 W North St, Jordan Hall, Geneva, NY 14456

Anyone who purchases locally grown produce directly from farmers should attend this session to better understand the issues of farm food safety along with the basic principles and practices that farmers are involved with. This workshop will cover programs like GAPs and HGAPs as well as the new federal regulations under the Food Modernization Act. Having a clear understanding of standards, regulatory requirements, and the practices followed to reduce microbial risk will be covered. Also covered will be a discussion on the regulations governing locally processed foods.

Cost: $25. Online registration will be available soon. For more info, contact Robert Hadad at rgh26@cornell.edu 585-739-4065.

Good Agricultural Practices/Harmonized GAPs Farm Food Safety Training

Late Fall/Early Winter 2017 | 9:30 AM - 4:00 PM
Niagara/Orleans County area - location TBD

For more information, contact Robert Hadad rgh26@cornell.edu or 585-739-4065.

Weather Charts

John Gibbons, CCE Cornell Vegetable Program

Weekly Weather Summary: 6/28 – 7/3/17

Location	Rainfall (inch)		Temp (°F)	
	Week	Month June	Max	Min
Albion	0.52	2.88	80	54
Appleton, North	0.80	3.88	81	50
Baldwinsville	1.36	5.57	81	53
Buffalo*	0.25	2.20	81	56
Ceres	1.25	4.55	81	44
Elba	0.70	2.04	82	51
Fairville	NA	NA	81	52
Farmington	1.54	3.09	81	51
Gainesville	NA	NA	NA	NA
Geneva	1.11	4.00	80	55
Lodi	1.66	1.88	83	54
Niagara Falls*	0.58	3.73	82	57
Ovid	1.08	3.29	82	56
Penn Yan*	0.74	2.59	82	55
Phelps	1.45	3.37	81	51
Portland	0.99	3.72	82	58
Rochester*	0.81	3.56	82	52
Silver Creek	NA	NA	NA	NA
Sodus	NA	NA	82	55
Versailles	NA	NA	83	55
Volney	0.85	2.93	79	53
Williamson	1.13	4.23	80	54

Accumulated Growing Degree Days (AGDD) Base 50°F: April 1 – July 3, 2017

Location	2017	2016	2015
Albion	894	879	937
Appleton, North	791	735	747
Baldwinsville	919	872	958
Buffalo	920	916	960
Ceres	812	672	851
Elba	854	619	724
Fairville	851	766	NA
Farmington	853	805	915
Gainesville	NA	622	754
Geneva	901	846	936
Lodi	1028	936	1054
Niagara Falls	1014	969	880
Ovid	967	891	1005
Penn Yan	968	904	1009
Phelps	901	824	951
Portland	967	850	906
Rochester	967	913	1025
Silver Creek	NA	808	866
Sodus	886	NA	NA
Versailles	939	794	901
Volney	829	NA	NA
Williamson	857	770	794

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

Cornell University
Cooperative Extension
Cornell Vegetable Program

480 North Main Street
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VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

VEGEdge
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VegEdge is the award-winning newsletter produced by the Cornell Vegetable Program in Western New York. 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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