Cornell Cooperative Extension | Cornell Vegetable Program

VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

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Four Lined Plant Bugs

Robert Hadad, Cornell Cooperative Extension, Cornell Vegetable Program

Four lined plant bugs are a generalist feeder with a host range of over 250 species of plants. Most commonly seen on ornamentals like herbaceous perennials including daisy, liatris, and mums; mint and basil, flowering shrubs, berry crops, and flowering annuals. In vegetables, **this pest can affect peppers, squash, and potatoes.**

The plant bugs hatch in late spring from overwintered eggs. The nymphs feed on the upper surface of leaves for a month or so. The nymphs molt and the adults emerge and continue to feed on plant leaves through July.

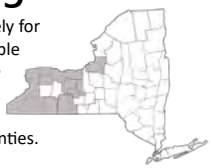
Four lined plant bug nymph. Leaf damage appears as white to brownish tan spots where the tissue falls away, leaving holes. *Photo: UMN Extension*

Feeding damage comes from the method in which four lined plant bugs feed. Their mouths are needle-like, piercing the leaf surface so that they can suck chlorophyll. The holes become sunken whitish spots. Eventually the dead tissue drops out leaving small holes. With severe feeding damage, leaves will shrivel turning brown. Young leaves can wilt. With more and more holes on a leaf, whole sections of the leaf can die off.

Management is tough; there's not very much directly labelled for this pest. Pyrethroids may be go-to items. In a tunnel, early releases of beneficial predatory insects like ladybird beetles might reduce nymphs early.

Adult four lined plant bug on a sweet green pepper plant within a high tunnel. The plants were severely damaged, losing more than 50% of the leaf mass across the crop. *Photo: R. Woodbridge, CCE Niagara*

About VegEdge



VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension partnership between Cornell University and CCE Associations in 14 counties.

The newsletter is a service to our enrollees and is intended for educational purposes, strengthening the relationship between our enrollees, the Cornell Vegetable Program team, and Cornell University.

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The next issue of VegEdge newsletter will be produced on July 13, 2022.

Accumulated Growing Degree Days, 7/4/22

Emma van der Heide, CCE Cornell Vegetable Program

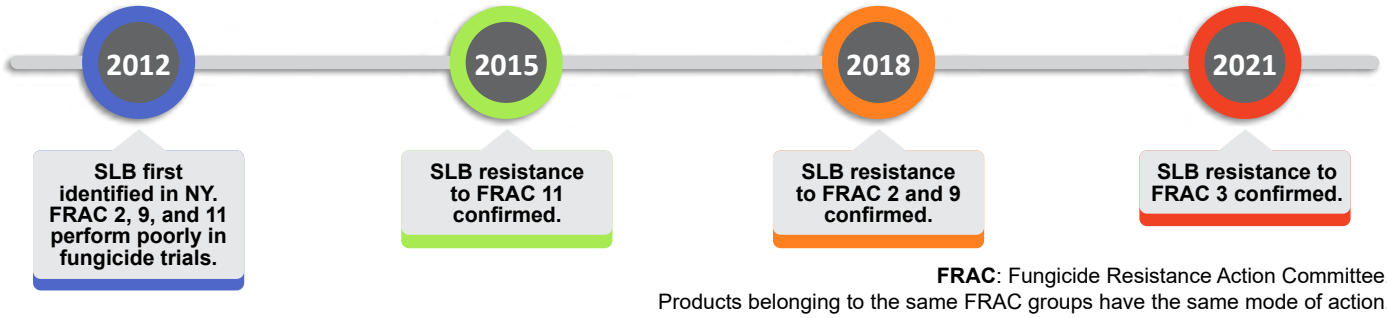
Accumulated Growing Degree Days (AGDD)
Base 50°F: April 1 - July 4, 2022

Location**	2022	2021	2020
Albion	1017	1041	917
Appleton	947	966	848
Arkport	846	836	771
Bergen	973	967	886
Brocton	994	999	901
Buffalo*	992	1063	908
Ceres	803	845	752
Elba	916	925	857
Fairville	937	929	863
Farmington	952	973	890
Fulton*	915	929	888
Geneva	984	1004	921
Hammondsport	941	940	873
Hanover	979	977	902
Jamestown	844	860	771
Lodi	1088	890	933
Lyndonville	870	984	898
Niagara Falls*	1041	1011	892
Penn Yan*	1019	1056	948
Rochester*	998	1009	915
Romulus	1005	1025	953
Sodus	1031	1033	847
Versailles	954	935	877
Waterport	930	946	871
Williamson	916	915	836

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

2021 Fungicide Research Highlights for Stemphylium Leaf Blight in Onion – The Fall of the FRAC 3s and Keeping Onions Green Despite Poor SLB Control

Christy Hoepting, Cornell Cooperative Extension, Cornell Vegetable Program, and Frank Hay, Dept. of Plant Pathology, Cornell AgriTech



FRAC: Fungicide Resistance Action Committee. Products belonging to the same FRAC groups have the same mode of action.

A Decade of SLB Defeating FRAC Groups

The year 2022 marks 10 years since Stemphylium leaf blight (SLB) was first identified as the cause of excessive leaf dieback of muck-grown onion in New York. Truthfully, the excessive leaf dieback was problematic since 2010, at least in the Elba muck. In the on-farm fungicide trial in 2012, the onions in the plots treated with Scala (FRAC 9a), Quadris (FRAC 11) and Rovral (FRAC 2) had excessive leaf dieback, while those treated with what were pipeline products at the time, Merivon (FRAC 7(2) + 11), Luna Tranquility (FRAC 7(1) + 9a), Fontelis (FRAC 7(2)), Inspire Super (FRAC 3b + 9a) and Quadris Top (FRAC 3b + 11) looked green and gorgeous. Shortly thereafter, Cornell Plant Pathologists confirmed that **SLB had developed fungicide resistance to FRAC 2, 9 and 11**. The 2017 growing season saw favorable conditions for leaf diseases, but thanks to newly registered Luna Tranquility, Merivon, Quadris Top and Inspire Super, muck onion growers rotated these top-performing FRAC 3 and 7 fungicides for the duration of the disease season and enjoyed phenomenal control of SLB and other leaf diseases, and high yields. Unfortunately, **in just 3 short years the reign of FRAC 7 fungicides ended as SLB had developed resistance to them all**. In 2019, FRAC 3 including Quadris Top, Inspire Super, Tilt and Viathon appeared to be the only fully functioning FRAC group available to control SLB. Growers leaned on FRAC 3 heavily to keep SLB under control and **by 2020, FRAC 3 began to slip in field trials**.

Laboratory Results – The Fall of the FRAC 3s

Table 1 shows the relative proportion of SLB isolates collected from commercial muck onion fields in 2018, 2020 and 2021 that were sensitive (labeled rate of fungicides should control SLB), moderately insensitive (high rates of fungicides should control SLB) and insensitive (high rates of fungicides may not control SLB) to three FRAC 3 active ingredients.

- The bad news is that **SLB has developed resistance to all three FRAC 3 fungicide active ingredients** difenaconazole (Quadris Top, Inspire Super, Luna Flex), propiconazole (Tilt) and tebuconazole (Viathon, Luna Experience).
- It appears that difenaconazole is the least prone to SLB fungicide resistance while tebuconazole is the most prone. This may reflect historic use, whether the active ingredients were co-applied with other FRAC fungicides or whether an active ingredient has slightly less activity at a given rate.
- Despite this, **cross-resistance among the three FRAC 3 active ingredients has been confirmed**. This means that SLB isolates from the insensitive category of one active ingredient are also highly likely to also be insensitive to the other active ingredients. The strongest correlations were between difenaconazole and tebuconazole (r = 0.772 in 2020, r = 0.875 in 2021), while the weakest were between tebuconazole and propiconazole (r = 0.425 in 2020, r = 0.293 in 2021).
- **SLB isolates that were insensitive to FRAC 3 fungicides did not test positive for the target site gene mutation that confers resistance to FRAC 3 (Cyp51).** This means that SLB is overcoming FRAC 3 fungicides in another way. For example, moderately insensitive isolates and insensitive isolates may be producing more of the proteins that FRAC 3 fungicides attack or have enhanced ability to detoxify FRAC 3 fungicide toxins.
    - **This means that SLB development to resistance of FRAC 3 is gradual and that use of increased fungicide rate (or FRAC 3 + 3 tank mixes) will work to control at least the moderately insensitive isolates.** Eventually, we will select for the insensitive isolates and the rate or number of FRAC 3 products in a tank mix to achieve control will increase, as appears to be the case in Orange Co.
- In 2021, only 11-27% of 20 onion fungicide spray programs in Elba, Wayne and Oswego exceeded 3 applications of FRAC 3. Of the total FRAC 3 applications, 47-68% of them were FRAC 3 + 3. It is possible, but not proven that this judicious use of FRAC fungicides has slowed development of SLB fungicide resistance.

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- **SLB fungicide resistance to FRAC 3 is different than it is for FRAC 7**, where mutations of the FRAC 7 target genes have been detected. This means that FRAC 7 fungicides do not work at any rate to control SLB. For example, prior to SLB developing resistance, there were no significant differences in SLB control in field trials between Luna Tranquility 8 fl oz/A, 12 fl oz/A and 16 fl oz/A, which all provided excellent control. After SLB developed resistance to FRAC 7, there were no significant differences between Luna Tranquility 16 fl oz/A, 20 fl oz/A and 24 fl oz/A, all of which provided poor control.

Table 1. Fungicide sensitivity of SLB isolates to FRAC 3 fungicides, 2018, 2020 and 2021 (Hay et. al., 2022). SLB isolates were collected from symptomatic leaves from ~ 20 commercial onion fields in muck lands of Elba (Orleans/Genesee), Wayne, Oswego and Orange counties.

Location and Year (n = No. isolates tested)	FRAC 3 a.i. difenaconazole (Quadris Top, Inspire Super, Luna Flex)			FRAC 3 a.i. propiconazole (Tilt)			FRAC 3 a.i. tebuconazole (Viathon, Luna Experience)		
	% of SLB isolates per category[1]			% of SLB isolates per category			% of SLB isolates per category		
	Sensitive	Moderately Insensitive	Insensitive	Sensitive	Moderately Insensitive	Insensitive	Sensitive	Moderately Insensitive	Insensitive
Elba 2018 (n = 17)	82.4	17.6	0.0	0.0	100	0.0	47.1	41.2	11.8
Elba 2020 (n = 44)	40.9	56.8	2.3	0.0	95.5	4.5	2.3	47.7	47.7
Elba 2021 (n = 33)	**57.6**	**42.4**	**0.0**	**0.0**	**93.8**	**6.3**	**0.0**	**66.7**	**33.3**
Wayne 2018 (n = 31)	90.3	9.7	0.0	7.7	88.5	3.8	30.8	61.5	7.7
Wayne 2020 (n = 24)	58.3	41.7	0.0	0.0	95.8	4.2	4.2	83.3	12.5
Wayne 2021 (n = 15)	**60.0**	**40.0**	**0.0**	**0.0**	**86.7**	**13.3**	**0.0**	**66.7**	**33.3**
Oswego 2018 (n = 55)	98.2	0.0	1.8	3.6	96.4	0.0	47.3	52.7	0.0
Oswego 2020 (n = 25)	72.0	24.0	4.0	0.0	100	0.0	4.0	72.0	24.0
Oswego 2021 (n = 20)	**50.0**	**45.0**	**5.0**	**0.0**	**95.0**	**5.0**	**0.0**	**50.0**	**50.0**
Orange 2018 (n = 29)	58.6	37.8	3.4	6.9	89.7	3.4	13.8	72.4	13.8
Orange 2020 (n = 39)	2.6	71.8	25.6	0.0	53.8	46.2	0.0	7.7	92.3
Orange 2021 (n = 12)	**0.0**	**91.7**	**8.3**	**13.8**	**66.7**	**33.3**	**0.0**	**0.0**	**100**

1 **Fungicide sensitivity category**: SLB isolates were grown on agar plates amended with 0, 1.0, and 10.0 µg/ml of difenaconazole, propiconazole and tebuconazole, and after 5 days the lowest concentration range (0-1, 1-10 or >10 µg/ml) necessary to reduce fungal growth (colony diameter) by 50% (EC50) in comparison to growth on plates without fungicide was identified for each isolate. **Sensitive**: % of SLB isolates for which a low concentration of fungicide (0-1 µg/ml) was able to inhibit fungal growth by more than 50%. Presumably, regular rate the fungicide active ingredient would effectively control these isolates. **Moderately insensitive**: % of SLB isolates for which a moderate concentration of fungicide (1-10 µg/ml) was required to inhibit fungal growth by more than 50%. Presumably high rates of FRAC 3 fungicide could control these isolates. **Insensitive**: % SLB isolates for which higher concentrations of fungicide (>10 µg/ml) were required before fungal growth was inhibited by 50% or more. Presumably, even high rates of FRAC 3 fungicide active ingredients may not control these isolates.

2021 On-farm Field Trial Results

Table 2 shows some of the plant health results from an on-farm small-plot fungicide trial in Elba muck. Treatments began on July 18 when onions had 8-10 leaves, 1.5-2" bulbs and 2% tipburn and SLB target spots were already present. Treatments were applied weekly for 6 weeks until August 21. SLB pressure in the trial was moderate.

Keeping Onions Green with FRAC 3 + 3 and P07

- FRAC 3 + 3 + P07 treatments (Table 2. Trts No. 1 & 3) resulted in the greenest foliage in the trial (33-37%) with the fewest plants that died standing up (2-3%).
- There was no significant difference between two and three FRAC 3 when co-applied with FRAC P07.
- FRAC 3 + 3 Cevya + Tilt had significantly 3-times more green foliage than FRAC 3 alone Cevya.
- FRAC 3 + P07 treatments Viathon and Cevya + Rampart had significantly 2-times and 3-times more green foliage than FRAC 3 alone Folicur (FRAC 3 in Viathon) and Cevya, respectively.
- FRAC 3 + P07 Cevya + Rampart was as green as FRAC 3 + P07 Viathon and FRAC 3 + 3 Cevya + Tilt.
- FRAC 3 + 7 + P07 Luna Experience + Rampart had significantly 1.7-times more green foliage and 1/10th of plants dying standing up than Luna Experience alone. This treatment was as good as the best treatment in the trial.
- FRAC 3 alone Cevya was not significantly different than the untreated control.
- FRAC P07 Rampart had significantly 6-times more green foliage and 1/20th of plants dying standing up compared to the untreated control.

Keeping Onions Green with FRAC 7 Premixes/Tank Mixes

- FRAC 7 premixes Luna Tranquility (7 + 9), Luna Experience (7 + 3c) and Miravis Prime (7 + 12) had significantly 2-, 3- and 4-times more green foliage than FRAC 7 alone (Endura), which was not significantly different than the untreated.

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- Tank mixing FRAC 7 premix Luna Tranquility with FRAC 2 Rovral resulted in significantly 2-times more green foliage and half as many plants dying standing up as Luna Tranquility or Rovral alone. This treatment was as good as Viathon + Tilt.
- FRAC 2 Rovral had 6-times more green foliage and 1/20th of plants dying standing up as the untreated, which suggests that like FRAC P07, this active ingredient is also playing a role in preventing leaf dieback and/or enhancing plant health.

Compensating for Poor SLB Control with Improved Plant Health

- In this trial, there was only 14.9% difference between the best treatment and the nontreated for SLB spore colonization of necrotic tissue and no significant differences among treatments for the 11 different categories/combinations of categories of SLB target spots that were analyzed (data not shown), which is an indication that **SLB was not being controlled well by any of the treatments in the trial**.
- FRAC 2, 3 and 7 active ingredients alone were not effective at controlling SLB spores or target spots or preventing leaf die-back.
- Instead, premixes and tank mixes of FRAC 3 with 2-3 FRAC groups including FRAC 2, 3, 7, 9, 12 and especially P07, and FRAC 3 + 3 appeared to compensate for poor SLB control with improved plant health that resulted in acceptable yield and bulb quality.

Table 2. Field performance (in order from best to worst) of FRAC 3 fungicide treatments for preventing leaf dieback in muck-grown onion (c.v. Hamilton), in on-farm small-plot field trial, Elba, 2021 (Hoepting et. al.).

No.	Product and Rate/A	FRAC group[1]	% Green Foliage 8 days after 6th spray (Aug 29)		% Plants "Dying Standing Up" 34 days after 6th spray (Sep 24)	
1	Viathon 3 pt + Tilt 8 fl oz + Quadris Top 14 fl oz	3c + P07 + 3a + 3b + 11	37.0	aA[2]	2.0	h
2	Luna Experience 12.8 fl oz + Rampart 3 qt	3c + 7(1) + P07	33.8	ab	3.8	gh
3	Viathon 3 pt + Tilt 8 fl oz	3c + P07 + 3a	32.8	ab	2.8	gh
4	Luna Tranquility 16 fl oz + Rovral 1 pt	7(1) + 9a + 2	29.0	bc	6.5	e-h
5	Miravis Prime 11.4 fl oz + Rovral 1 pt	7(4) + 12 + 2	27.8	bcd	1.8	h
6	Viathon 3 pt	3c + P07	23.0	cde	5.3	fgh
7	Cevya 5 fl oz + Rampart 3 qt	3d + P07	21.5	de	3.5	gh
8	Miravis Prime 11.4 fl oz	7(4) + 12	21.5	de	6.8	e-h
9	Cevya 5 fl oz + Tilt 8 fl oz	3d + 3a	21.3	de	9.5	d-h
10	Luna Experience 12.8 fl oz	3c + 7(1)	19.8	ef	22.3	b-e
11	Rampart 3 qt	P07	17.5	efg	9.8	d-h
12	Rovral 1.5 pt	2	16.0	efg	8.0	c-h
13	Luna Tranquility 16 fl oz	7(1) + 9a	14.0	fgh	12.3	c-g
14	Folicur 432F 5.9 fl oz (FRAC 3c in Viathon)	3c	12.5	ghi	24.5	bcd
15	Cevya 5 fl oz	3d	7.3	hij	28.3	abc
16	Endura 6.8 oz	7(3)	6.8	ij		
17	Untreated (insecticides for thrips control only)	--	2.8	j	42.5	a

1 **FRAC**: Fungicide Resistance Action Committee. Products belonging to the same FRAC groups have the same mode of action.
2 Numbers in a column followed by the same letters are not significantly different, Fisher's Protected LSD test with 5% significance.
Green highlight: Not significantly different than the best treatment. Yellow highlight: Not significantly different than the worst treatment.

Other Tools for Managing SLB Underway

The Cornell SLB research team, headed up by Frank Hay and Sarah Pethybridge at Agri-Tech, has been diligently investigating sources (seed, transplants, crop residue, barley windbreaks, etc.) and survival of SLB spores, understanding the development and mechanisms of fungicide resistance and developing a predictive disease model. We are hopeful that we will be able to implement some new strategies for managing SLB in the near future.

Funding Sources

- NYFVI, USDA AFRI CARE and Federal Capacity Fund
- Crop protection industry including AgBiome, BASF, Bayer, Nichino America, and Syngenta

CROP Insights

Observations from the Field and Research-Based Recommendations

BEETS

The crop is suffering from heat and drought stress in much of our region where it is very dry. Even though crop stands and weed control are generally very good, top growth has been slow and canopies have not closed in like they normally would be at this time in the season. In these fields, the risk for disease remains low. However, fields with irrigation have a greater risk for leaf spot diseases. One field I was in last week had sunburn on the leaves, indicated by bleached, papery blotches. – JK

Sunburn on table beet leaves. *Photos: J. Kikkert, CCE Cornell Vegetable Program*

CARROTS

Fields are mixed with success this year depending on planting date and soil moisture. Continue scouting for diseases and leaf hoppers which can transmit Aster Yellows disease. – JK

ONIONS

The crop is looking great! Most direct seeded fields have 6-8 leaves and have started to bulb and their leaves are green to their tips. Earliest transplanted fields of early varieties have 2" or larger bulbs and are starting to lodge. After a 2-week drought, Elba muck finally got some rain on Friday. During bulbing is the most critical timing for rain/irrigation in onions. For the most part, Botrytis leaf light (BLB) halos and onion thrips are relatively in check with a few isolated blowouts. With wheat harvest right around the corner, we are seeing influxes of thrips creating high pressure in select fields. Stemphylium leaf blight (SLB) can be detected, mostly as spore colonization of necrotic leaf tissue, but remains passive. Most growers are enjoying the calm, so to speak, this week. There will be much more action in onion pest management in the weeks to come.

The **2022 Onion Fungicide Cheat Sheets** are now available online at the CVP website. If you would like a paper copy of the onion fungicide cheat sheets mailed to you, please contact Christy Hoepting at 585-721-6953. Also, see the article on page 3 to get the scoop on the fall of the FRAC 3s and keeping onions green despite poor SLB control. See the article in last week's issue of VegEdge (page 5) for an example fungicide spray program. – CH

PEAS

The processing crop is suffering from drought and heat stress in most of our region. In peas, daytime temperatures exceeding 78°F at flowering time and pod fill will significantly decrease yields. In addition, high temperatures near harvest will mature the peas quickly resulting in a shortened harvest window. Pea aphids are likely to build up in hot, dry weather. Peas near alfalfa fields that are being cut may be particularly vulnerable. During vegetative growth of peas, aphid infestations usually do not cause economic damage. Aphid feeding on flowers and pods can reduce the number of seeds produced, particularly if aphid numbers are very high. In addition, lady bugs are attracted to aphids and can become a contaminant at harvest. Scout fields at flowering, early pod-set, and especially during early pod fill. Monitor pea aphid populations using a sweep net. After checking with other states, we have determined an average threshold: if you find 25 to 35 aphids per sweep net and the peas are more than 10 days from harvest, insecticide treatment is recommended. In past years, Asana and Mustang Max have been used in processing pea fields. However, there are numerous labeled products. Make sure to consult the preharvest interval when selecting a product to use. – JK

PEPPERS

Four lined plant bug – see cover article in this issue of VegEdge for more information. These pests have show up on high tunnel peppers and mint cultivated in the field.

Aphids continue to be the most common pepper pest. Their feeding damage creates distorted leaves and stunted growth. In worse case scenarios aphids can kill the growing point on an otherwise healthy plant. There are several aphid specific materials available including Beleaf (group 29, 0 D PHI) and Fulfill (group 9B, 0 D PHI). Organic growers can use Mycotrol (*Beauve-*

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ria bassiana Strain GHA). All of these materials both have reportedly lower impact on beneficials than other sprays. But, do you need to spray? In fields this week, we have seen very high populations of beneficials such as lady beetles and predatory wasps. Given a chance, these 'good guys' can get aphids under control.

Several lady beetle species are transitioning from pupal to adult stages. They are voracious aphid eaters! *Photo: J. Reid, CCE CVP*

This pepper plant is loaded with beneficial lady beetles. Holding off on sprays gives them a chance to do their job. *Photo: J. Reid, CCE*

Predatory wasps have laid eggs in the aphids on this Lambsquarters. The dead aphids are brown shells, called 'mummies'. *Photo: J. Reid*

PUMPKIN

Anthracnose on pumpkin has been found in the eastern part of the CVP region this week. On foliage, anthracnose begins as lighter colored lesions, that can turn water-soaked and black, sometimes falling apart. This disease can impact fruit as well, reducing post-harvest viability with a circular, sunken canker. Control of this disease now is very important for fruit quality in the fall. Conventional fungicide programs include:

- Mancocide (groups M 03 and M 01, 5 D PHI)
- Bravo (group M 05, 0 D PHI)
- Aprovia Top (groups 3 and 7, 0 D PHI)
- Inspire Super (groups 3 and 9, 7 D PHI)

The good news is this program positions growers well for Powdery Mildew control too. Organic growers can use copper products, and all growers should practice long rotations out of cucurbits.

Anthracnose begins as lighter colored lesions, that can turn water-soaked and black, sometimes falling apart. *Photo: J. Reid, CCE CVP*

The underside of this pumpkin lead shows the water soaked black, lesions. *Photo: Judson Reid, CCE CVP*

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POTATOES

This week, I was seeing many large Colorado potato beetle larvae feeding in potatoes. In most fields, insecticides applied to seed or at planting were able to control population numbers of the first generation of beetles, though if you're seeing large numbers of larvae in your fields now, a foliar spray for the second generation should be considered. The large larvae in fields now will soon pupate and emerge in a week or two as adults to begin laying eggs. Fields with pressure from larvae in this first generation should be monitored for egg laying from the second generation.

Simcast forecasting indicates that Ceres has reached the 30 blight units (BU) needed to trigger a spray for late blight this week, while Buffalo, Dansville, Fulton, Niagara Falls, Penn Yan, Rochester, Versailles, and Wellsville will surpass 30 BUs by the end of the week. If the weather station closest to you has not yet reached 30 BU and the forecast indicates that it will in the next 2-3 days, a spray is still recommended. Because weather conditions can vary depending on topography and altitude, the recent disease information and disease forecasts will be most accurate very close to the weather station used. For locations that are not close to a weather station, forecast information should only be used as a *general indication* of how favorable weather has been for late blight. On a national level, late blight has only been reported in Florida so far this year. – ML

Late Blight Risk Chart, 7/6/22

Location	Blight Units 6/29-7/5[1]	Blight Units 7/6-7/8[2]
Albion	10	16
Arkport	7	18
Baldwinsville	0	6
Bergen	5	10
Brant	6	12
Buffalo	12	31
Burt	-	-
Ceres	34	45
Dansville	17	36
Elba	6	12
Fairville	16	27
Farmington	10	21
Fulton	17	37
Geneva	10	16
Hammondsport	5	5
Knowlesville	10	16
Lyndonville	16	22
Medina	22	35
Niagara Falls	12	31
Penn Yan	18	30
Rochester	17	37
Sodus	11	29
Versailles	24	37
Wellsville	12	32
Williamson	0	5

Calculated using a May 26 crop emergence date, last fungicide application June 22, cultivar Reba. Numbers in red indicate locations that have or will surpass the 30 BUs needed to trigger a fungicide application.

1 Past week Simcast Blight Units (BU)

2 Three-day predicted Simcast Blight Units (BU)

SNAP BEANS

Pressure from potato leaf hoppers remains high across the state. Cruiser insecticide seed treatments generally protect the crop through the time of flowering, but it is still a good idea to scout fields. The presence of nymphs indicates that the population is reproducing on beans and a foliar treatment may be warranted. Check the 2022 Cornell Vegetable Guidelines for thresholds and treatment options. Japanese beetles are out and may feed on beans, however, they generally don't require treatment unless populations are very high. Mexican bean beetles and spider mites are other insects to be scouting for currently. Dry soil conditions do not favor emergence of plantings that would still be going in at this time for late harvest. For fields that are in flower, the high temperatures will likely inhibit pollination, potentially causing reduced or split sets, a problem for one-pass harvest used in processing beans. From S. Reiners, Cornell: 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. – JK

SQUASH

Squash vine borer moths are beginning egg laying. The adults resemble wasps and are often mistaken as a beneficial. The females search vine drops for a spot to lay eggs on or near the crown of the plants. Repeated applications following label instructions are necessary to keep the hatching larvae from burrowing into the vines. A vine is infested if you see frass coming out of the entrance hole. Bt and spinosad products are effective with repeat applications. See the Guidelines for other labelled products.

Squash vine borer moth.

Judging When Garlic is Ready to Harvest

Crystal Stewart-Coutens, Cornell Cooperative Extension, Eastern NY Commercial Horticulture Program

Everyone knows the balancing act that is garlic harvesting—too early and the cloves are small and don't store well, too late and the head pops, making it unmarketable and more susceptible to diseases. So, as we near harvest, how should a grower decide if the garlic is ready? The best answer is to pull a few plants, cut through the head sideways (so you cut through all the cloves), and see how well developed the cloves are (Fig. 1). You can use the leaves as a guide to decide when to do this (lowest third or half of the leaves yellowing and dying is a good mark to start with), but looking at the cloves is the best way to know if the garlic is ready. Cloves should fill the wrappers—if they seem a little loose, the garlic has a little ways to grow. A little of the very outer wrapper may have started to decay at this point. That is okay—it's a normal part of the maturation process. The key is to harvest before the bulbs pop, which can happen relatively quickly, especially if it is wet during harvest time. If you don't think you will be able to get out and harvest for a period of time, it's better to harvest bulbs a little too early than a little too late.

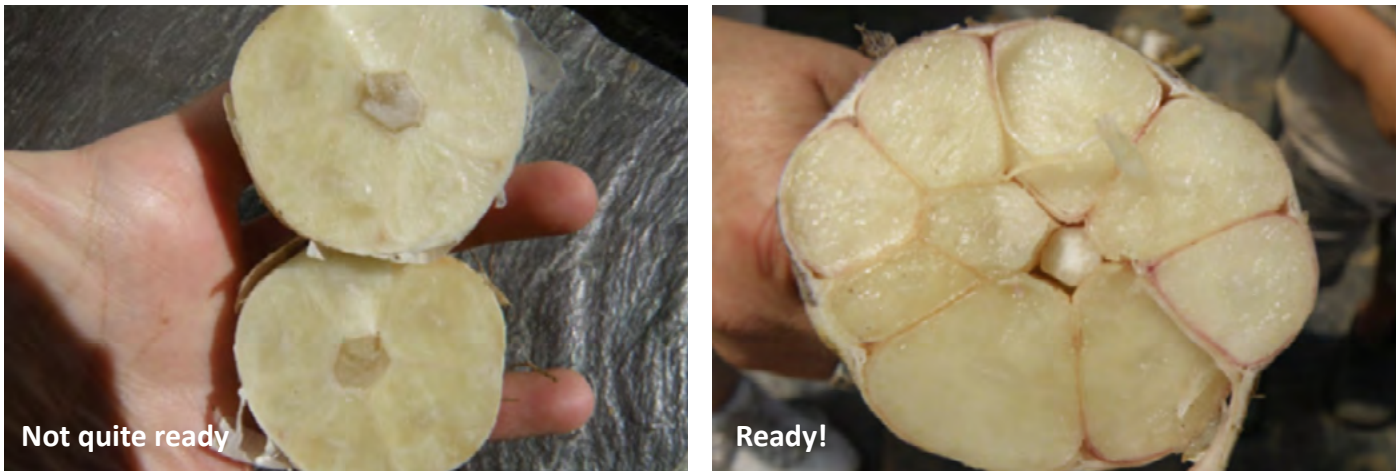

Figure 1. To judge the maturity of garlic, cut the bulb across the cloves; you want the bulb to be very firm in its skins and you want to see a small gap around the scape. The clove on the left is not quite ready, while the one on the right is ready to harvest. *Photos by Crystal Stewart-Courtens, CCE ENY Commercial Horticulture Program*

Scouting Tips for Onion Thrips in Onions

Christy Hoepting, Cornell Vegetable Program

To find the first thrips of the season, look deep into the leaf axils. The adults are brown, sliver-like and up to 2 mm in length (Fig. 1), while the nymphs are yellow and 0.5 to 1.2 mm in length (Fig. 2). Inspect 20 to 30 plants and count the total number of OT per plant and divide by the average number of leaves per plant to get the number of OT per leaf. Thrips feeding causes silvery streaking along the leaves. If you can already see thrips feeding damage (Fig. 3) that is also a good indication that it is time to spray. If there is a lot of feeding damage, than you likely missed a timely first spray.

Figure 1. Adult onion thrips are the first thrips of the season. They are tiny brown, sliver-like insects up to 2 mm in length. *Photo: C. Hoepting, CCE CVP*

Figure 2. Onion thrips nymphs in leaf axil of onion plant. *Photo by Whitney Cranshaw, Colorado State University, from Bugwood.org*

Figure 3. Subtle streaking along leaves is an early indication of early onion thrips feeding. This plant has reached the spray threshold.

Upcoming Events

Chautauqua Vegetable Grower Meeting

July 12, 2022 (Tuesday) | Arrive at 6:15 pm to sign up for DEC credits; 6:30 pm - 8:30 pm
Hidden Valley Produce, 324 Warren Rd, Frewsburg, NY 14738

Fresh market field walk. All attendees should wear long pants. Free to attend. 2.0 DEC credits requested in categories 1a and 23. Contact Elizabeth Buck for more information: 585-406-3419, emb273@cornell.edu

Eden Valley Twilight Meeting

July 13, 2022 (Wednesday) | 5:15 pm dinner; meeting 6:00 - 8:00 pm
Agle's Farm Market, 7952 Gowanda State Rd, Eden, NY 14057

Topics include laser scarecrows, tar spot control, disease management in cucurbits, optimizing your spray tank water, and cabbage maggot control debrief. 1.5 DEC credits requested in categories 1a, 10, and 23. Arrive by 5:45 to sign up for DEC credits.

Dinner cost is only $5—thanks to the generous support of BASF. Pay for dinner the day of the event with cash. **Pre-registration for dinner required by NOON on July 8th** to Elizabeth Buck: 585-406-3419, emb273@cornell.edu. The meeting is free to attend.

Vegetable Pest and Cultural Management Field Meetings for Auction Growers

July 19, 2022 (Tuesday) – *notice the new date for this meeting* | 6:00 pm - 8:00 pm
L. Stoltzfus Farm, 4825 Rt 414, Romulus, NY 14541 (Seneca County)

July 22, 2022 (Friday) | 7:00 pm - 9:00 pm
Ray Hoover Farm, 4341 Rt 14A, Rock Stream, NY 14878 (Schuyler County)

July 26, 2022 (Tuesday) | 7:00 pm - 9:00 pm
L. Weaver Farm, 3396 Depew Rd, Canandaigua, NY 14424 (Ontario County)

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 staff will instruct participants and facilitate peer-based learning. Details on each topic will focus on field observations at these farms.

Free to attend. DEC recertification credits will be offered (2.0 credits in categories 10, 1a, 23; 1.75 credits in category 24). For more information, contact Judson Reid at 585-313-8912.

Niagara County Twilight Meeting

July 28, 2022 (Thursday)
Rickard Nursery Growers and Harris Farm Market, Gasport, NY 14067

Topics include fresh market field walk on pest and disease management, laser scarecrows, powdery mildew management, phytophthora mitigation. More information will be available soon. Contact Elizabeth Buck for more information: 585-406-3419, emb273@cornell.edu

NY Sweet Corn Trap Report, 7/5/22

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

Flight for WBC is just starting with most sites in the <1% flight completion based on degree-day accumulation. 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 photos). 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 to get a good estimate of infestation levels.

Eggs take approximately 100 base 50 degree days to hatch. Egg masses will change from white to cream to black as they age (see photos). When they appear black they are in the "black head" stage and will most likely hatch with 24 hours.

ECB egg masses will change from cream to black as they age.
Photos: University of Nebraska

Average Corn Earworm Catch			Days Between Sprays
Per Day	Per Five Days	Per Week	
<0.2	<1.0	<1.4	No spray (for CEW)
0.2-0.5	1.0-2.5	1.4-3.5	6 days
0.5-1.0	2.5-5.0	3.5-7.0	5 days
1-13	5-65	7-91	4 days
over 13	over 65	over 91	3 days

Add one day to the recommended spray interval if daily maximum temperatures are less than 80F for the previous 2-3 days.

WNY Pheromone Trap Catches: July 5, 2022

Location	ECB-E	ECB-Z	ECB Hybrid	CEW	FAW	WBC	DD to Date
Batavia (Genesee)	0	0	NA	1	0	0	1921
Bellona (Yates)	NA	NA	NA	NA	NA	NA	1971
Collins (Erie)	NA	NA	NA	NA	NA	NA	1826
Eden (Erie)	0	0	NA	1	0	1	1914
Farmington (Ontario)	0	2	NA	1	0	2	1970
Geneva (Ontario)	0	0	0	4	0	0	1951
Hamlin (Monroe)	NA	NA	NA	NA	NA	NA	1866
Leroy (Genesee)	0	0	NA	2	0	0	1908
Lyndonville (Orleans)	0	0	NA	0	0	0	1837
Oswego (Oswego)	0	0	NA	0	0	0	1746
Panama (Chautauqua)	0	0	NA	11	0	0	1681
Penn Yan (Yates)	0	0	0	1	0	0	1912
Portville (Cattaraugus)	0	0	NA	0	0	0	1696
Ransomville (Niagara)	0	1	NA	1	0	0	1893
Seneca Castle (Ontario)	0	1	1	0	0	1	1905
Williamson (Wayne)	0	0	0	NA	NA	NA	1752

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

Cornell Cooperative Extension
Cornell Vegetable Program

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VegEdge is the highly regarded newsletter produced by the Cornell Vegetable Program. It provides readers with information on upcoming meetings, pesticide updates, pest management strategies, cultural practices, marketing ideas and research results from Cornell University and Cornell Cooperative Extension. VegEdge is produced every few weeks, with frequency increasing leading up to and during the growing season.

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