



Dense foliage in table beet rows is making them more susceptible to foliar diseases. 2017 New York

foliar disease management recommendations are provided.

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Squash bugs are in high numbers on cucurbits throughout our region. Read about them and

our other field observations in the Crop Insights.

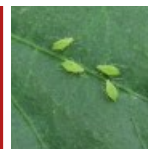
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Drought conditions – not this year so far! Interested in seeing how this year compares to

previous years in your county? New tools are available.

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Occasionally we find aphid outbreaks in greenhouse tomatoes. Populations

should be monitored and controlled if rising.

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VEGEEdge

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Cornell University
Cooperative Extension
Cornell Vegetable Program

Photo: Darcy Telenko

Leaf Disease Management for Table Beets in New York

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

The continued regular rainfall events and high temperature and relative humidity are conducive to *Cercospora* leaf spot and other foliar diseases. Many beet crops planted early in the season are also growing well and have a high density of foliage within rows making them more susceptible to foliar disease. In our scouting of large acreage beet fields this season, we are seeing a lot of bacterial leaf spot. It was first detected in the variety Merlin, but is also being seen on Ruby Queen. Our colleagues in Michigan are reporting a high occurrence on sugar beets there.

The following Foliar Disease Management Recommendations for New York in 2017 are written for large acreage fields to be harvested by top-pulling, however, smaller acreage growers will garner some useful information as well.

Cercospora leaf spot (CLS) is the predominant foliar disease of table beet worldwide. It is caused by the fungus *Cercospora beticola*.



Bacterial Leaf Spot on table beets in New York. Note the dark to black borders of the leaf spots. *Photo: Sarah Pethybridge, 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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Lesions are small and circular, with a light tan to brown center. The border is a distinct brown to purple halo. The inoculum for the disease survives in soil and alternative weedy hosts (lambsquarters and pigweed). Fields with longer rotations (3 + years) between table beet crops are of lower risk of foliar disease. Merlin is less susceptible to CLS than other highly susceptible cultivars (e.g. Pablo) which also reduces disease risk. Ruby Queen is less susceptible to CLS than Merlin. Rows orientated east-west which promotes airflow through the canopy also reduces the risk of foliar disease.

Phoma leaf spot is another fungal disease that can affect table beets. Lesions on the leaves are of different sizes and have a distinctive concentric ring pattern and fruiting bodies of the pathogen, which appear as small dark mounds. In addition to causing leaf spots, this disease can move into the crowns and is commonly associated with root rots leading to losses in storage. The inclusion of Tilt in the fungicide program will also reduce the incidence of Phoma. In our scouting, we have not seen this disease as yet this year.

Bacterial leaf spot is not usually a problem in New York, but is being seen this year. It is occurring at high levels in some fields. It causes irregular-shaped to circular spots measuring 3/16th to 1/4th inches in diameter. The lesions have tan to dark brown centers with very dark to near black borders. Copper fungicides (many are OMRI-listed) can be used. It is important to use the maximum labelled rate at regular (label specified) intervals.

Fungicides: Due to the high risk of significant crop loss from foliar disease due to the continuing conducive environmental conditions, we recommend applying fungicides to prevent the onset of foliar disease. Factors listing above as contributing to lower risk (e.g. cultivar, row orientation and rotation) are likely to have little effect this year.

Fungicides are primarily preventative. Once disease is established in the field,

fungicides may slow the rate of spread but will not provide a cure. A list of fungicides currently registered for foliar disease control in conventional table beet fields in New York is provided below.

Recommendations outlined below are based on results of small plot, replicated trials conducted at Geneva over several years.

First fungicide application: Tilt (4 fl oz/A)

Tilt is the most effective fungicide currently registered for foliar disease control on table beet. We recommend using this product as the first fungicide to most effectively provide disease control.

Second fungicide application: Merivon (5.5 fl oz/A)

Third fungicide application: Tilt (4 fl oz/A) - if required.

The interval between the second and third applications should be 10 to 14 days. If conditions are not conducive to foliar diseases the interval may be extended.

Quadris has not been recommended for foliar disease control due to the high proportion (50 to 80%) of resistant isolates within the fungal population. It remains as the most effective product for pocket rot and wirestem caused by *Rhizoctonia solani*.

Conventional fungicides registered for the control of Cercospora leaf spot in table beet in New York (2017) Please check the most recent versions of the labels for updated information and safety guidelines.

Product	Active Ingredient	Recommended Rate (A)*	Fungicide Resistance Grouping	Pre-Harvest Interval (days)	Re-Entry Interval (hours)
Quadris	Azoxystrobin	11 fl oz	11	0	4
Cabrio EG	Pyraclostrobin	10 oz	11	0	12
Reason 500 SC	Fenamidone	8.2 fl oz	11	14	12
Gem 500 SC	Trifloxystrobin	2 fl oz	11	7	12
Tilt/Propimax	Propiconazole	4 fl oz	3	14	12
Merivon Xemium	Fluxapyroxad + Pyraclostrobin	5.5 fl oz	7 + 11	7	12
Copper compounds (e.g. Champ)**		Use maximum label rate	M1	0	24

*Please check the maximum rate per acre per season.

**Please check interval restrictions on copper compounds as they vary with product (e.g. Cueva = 14 days).



Cercospora leaf spot on table beets. Photo: J. Kikkert, CVP

CROP INSIGHTS

CUCURBITS

Last week and again this week, during scouting trips through out WNY, powdery mildew (PM) was seen in summer squash and zucchini. This disease seems to be showing up earlier every year. The cooler nights and excess rain is probably to blame. The key to successful management of this disease is to regularly spray products on time and with make sure coverage of the leaves is complete. See the PM article in 6/21 issue of VegEdge. – RH

Phytophthora blight (*P. capsici*) has been found in the region where there has been saturated soils and standing water in fields. *P. capsici* will attack roots, stems, leaves, and fruit. Stem lesions have been found at the soil line causing the tissue to become discolored and collapse. A systemic wilting symptom can be observed in infected plants across a field. Fortunately, the short-lived spores of *P. capsici* cannot be spread by the wind between or within fields. The spores can be moved through water long distances and may also be splashed to aerial parts or between plants during heavy or wind-blown rain. If possible, rogue infected plants and dispose of culled fruit to reduce spread of spores in water within an infested field. A preventative fungicide schedule is needed for effective control. This program should alternate between fungicide groups for resistance management. – DT

We are also seeing the effects of early cucumber beetle feeding as bacteria wilt is starting to appear in numerous cucurbit crops. The beetles spread this vascular bacteria disease. Symptoms will first appear on a single leaf and eventually can cause the complete collapse of the plant. Angular leaf spot is also appearing around the region, this bacterial disease appears as leaf spots variable in size and angular in appearance. They first appear as brown water-soaked spots, they may be surrounded by a yellow halo, become white, and as they dry tear away from the healthy tissue, producing irregular holes in the affected leaf. – DT

Downy mildew continues to spread in western NY as it was detected in Niagara County this week. Continue to stay on top of spray programs, the weather prediction model puts the entire state of NY under a moderate to high risk for cucurbits. (See downy mildew in vine crops update, pg 6). – DT

Squash bugs are in high numbers on cucurbits! Squash bugs feeding on cucumbers, zucchini, pumpkin and squash is common throughout the region this week. Feeding damage mimics disease in that affected leaves will have marginal necrosis and wilting. The adults often feed lower in the canopy, although they can be found laying eggs higher up. The eggs are generally laid in organized groups and are copper colored. Both the adults and eggs are difficult, if not impossible to kill with insecticides, so we must target nymphs. Nymphs have grayish bodies and black legs. Scout daily to see when eggs hatch, then apply control materials. This will maximize efficacy. Assail, Pounce (both OD PHI) and Warrior (1 D PHI) are conventional options. Organic growers may find success targeting nymphs with Pyganic. Destroy older planting of zucchini and summer squash as soon as picking is done. Abandoned plantings become nurseries for abundant numbers of Squash Bug for neighboring crops. The pest overwinters as an adult, so rotation and distance from previous year's cucurbit fields will help reduce their population. – JR



Powdery mildew can occur on both leaf surfaces as well as on petioles and stems. Yellow spots may form on upper leaf surfaces on pumpkin, which is opposite from powdery mildew colonizing the underneath surface.

Photo: M. T. McGrath, Cornell University, Riverhead, Long Island, NY



Bacterial wilt of zucchini. Photo: D. Telenko, CVP



Squash bug and eggs on zucchini leaf. Photo: J. Reid, CVP



Squash bug eggs hatching. Photo: D. Ludwig, CVP



Squash bug feeding damage on zucchini leaf. Photo: J. Reid, CVP

ONION

The crop looks amazing right now! Early varieties of transplanted onions have lodged completely and are gorgeous (Fig. 1). Onions have been thriving in this cool season with ample rainfall. Pest pressure remains low for onion thrips, Botrytis leaf blight, Stemphylium leaf blight (SLB) and there have been no reports of downy mildew (DM). All growers have been implementing SLB fungicide programs and have been including protectants for DM in every tank mix. Protectants for DM include mancozeb, phosphorous acid (FRAC 33, such as Rampart, Viathon) and FRAC 11 fungicides such as Quadris Top and Merivon. With no reports of DM, if your SLB fungicide contains a FRAC 11 or 33 in the premix, this should suffice for DM protection at the moment, no need to add mancozeb. Incidence of bacterial

continued on next page

disease increased this week and the first plants infected with Iris yellow spot virus (IYSV) were detected this week. Onion thrips pressure remains low and there are an unprecedented number of growers taking a ride with the momentum of Movento; some fields have reached a 3 week ride and counting. With harvest of wheat occurring now it will be interesting to see when Movento breaks – see article on when the ride of Movento is over for insight on what's next for thrips management, pg 8. – CH

PEPPER

Bacteria diseases are spreading in pepper, make sure protectant programs are being implemented, especially as we continue to see high moisture conditions as the bacteria will continue to be splash dispersed on new tissue. – DT

POTATO

Late blight continues to spread. Please let us know if you think you have it so we can update the regional map to monitor its movement and genotype. – DT

TOMATO

As expected we are starting to see diseases appear in tomato. I have seen a number of samples with early blight, and some bacteria speck and Septoria have been noted. Late blight is in the region so keep an eye on your tomatoes if you are growing a susceptible variety. – DT



Early Highlander transplanted onions at 100% lodging in Elba. This year, it took only a single application of Movento to keep onion thrips below threshold for the entire season. Photo: C. Hoefting, CVP

A New Drought Visualization Tool and Quarterly Updates are Available

Darcy Telenko, CCE Cornell Vegetable Program

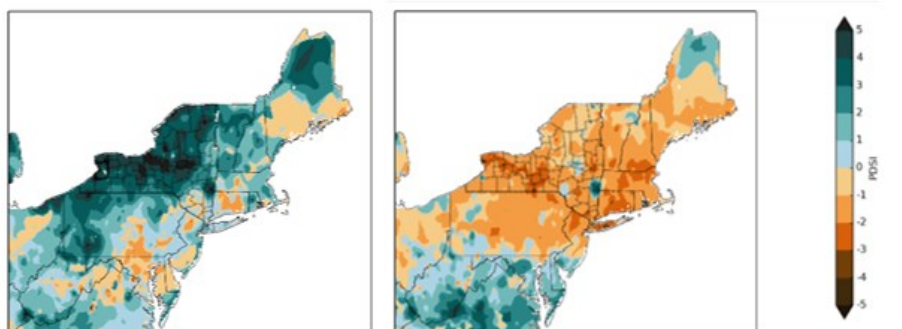
I know talking about drought conditions seem counter-intuitive as we are experiencing this wet season, but these new tools and updates can be quite informative if you are interested in determining how this year compares to others. Dr. Toby Ault, Assistant Professor – Dept. of Earth & Atmos. Science in collaboration with the Cornell Institute for Climate Smart Solutions (CICSS) has launched a new drought tool that maps monthly the Palmer Drought Severity Index (a measure of dryness based on recent precipitation and temperature) and allows historical review of conditions dating back to January 1950. See the current June 2017 map in comparison to the June 2016 map and the stark differences (Fig. 1). The darker the blue the more moisture, while the darker the brown the more severe the drought. The historical data can be pulled for each county on a timeline from 1950 to current conditions – see the three datasets I pulled for Erie, Genesee and Ontario counties (Fig. 2) – again if the bars are above and blue the month saw more moisture with dark blues being extremes and if the bars are below and tan/brown then the year saw more drought conditions with dark brown being severe. This tool is available at <http://climatesmartfarming.org/tools/csf-nys-ne-drought-atlas/>

Dr. Ault also just released his quarterly drought newsletter. His key points include: "Drought conditions have subsided for most of the Northeast (as anticipated).

Future condition (July-August-September) are likely to remain moist or above average, but marginal regions experiencing drought conditions might appear.

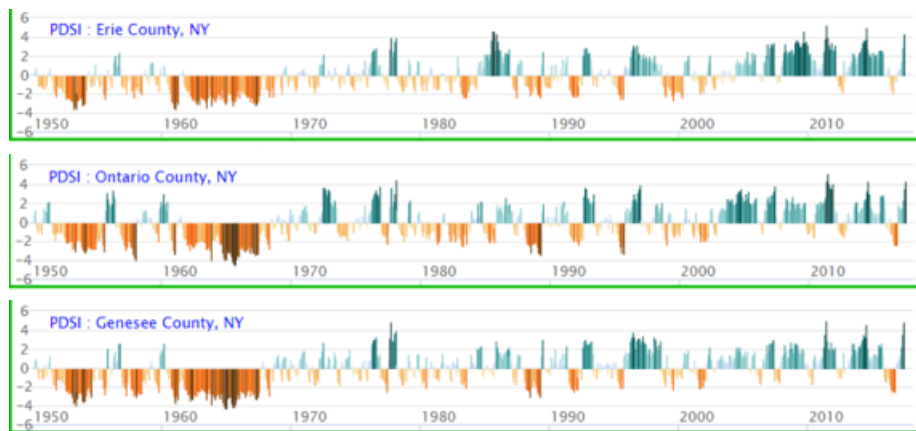
Can't completely rule out the possibility of drought in late summer, despite considerable improvements over last year's conditions."

More information can be found at <http://ecrl.eas.cornell.edu/Misc/NEDrought/ECRL-CICCS-NEDroughtNewsletter.vol1.2.pdf>



© Cornell University, 2017. Credits: Tool Developed by Dr. Toby Ault. Web development by Brian Belcher.

Figure 1. New York State/Northeast Drought Atlas June 2017 vs. June 2016. Blue colors correspond to more moisture while tan/brown colors correspond to drought conditions.



© Cornell University, 2017. Credits: Tool Developed by Dr. Toby Ault. Web development by Brian Belcher.

Figure 2. Historical drought conditions from 1950 to today for Erie, Ontario and Genesee Counties. (If bars are above zero and blue the month saw more moisture with dark blues being extremes and if the bars are below zero and tan/brown then the month saw more drought conditions with dark brown being severe.)

Late Blight Continues to Spread in Western New York!

Darcy Telenko and John Gibbons, CCE Cornell Vegetable Program

Late blight (LB) was confirmed in Livingston County on potato this week (the genotype is still being determined). The sample from Erie County from last week was determined to be US-23 which is sensitive to metalaxyl. **All of Western NY is at risk for Late Blight infection.** Severity values continue build at all stations. The frequent and continuing rainfall has been extremely favorable for the development of LB. Scout fields 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. All sites, except Lodi, have exceeded the 30 BU's for this past week which triggers the recommendation for an addition fungicide application (see last week's table for details on fungicides available for use). Remember to rotate fungicide FRAC groups and use contact fungicides in your program to minimize the chances of fungicides resistance.

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.

Please **take a sample for isolate identification**. It is very important to **track disease movement**. Contact cCE Cornell Vegetable Program Specialists for assistance: 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

Late Blight Risk Chart, 7/18/17

Location ¹	Blight Units ¹ 7/12-7/18	Blight Units ² 7/19-7/21	Location ¹	Blight Units ¹ 7/12-7/18	Blight Units ² 7/19-7/21
Albion	49	18	Lodi	5	14
Baldwinsville	39	20	Lyndonville	39	17
Bergen	35	16	Medina	46	17
Buffalo	45	17	Niagara Falls	36	14
Ceres	39	17	Penn Yan	31	18
Elba	NA	NA	Rochester	47	17
Fairville	37	17	Sodus	38	18
Farmington	47	18	Versailles	38	20
Gainesville	NA	NA	Volney	40	20
Geneva	31	17	Wellsville	38	17
Kendall	31	12	Williamson	39	19
Knowlesville	NA	NA	Wolcott	33	19

¹ Past week Simcast Blight Units (BU)

² Three day predicted Simcast Blight Units (BUs) ●

Downy Mildew in Vine Crops Update

Robert Hadad, CCE Cornell Vegetable Program

The Eastern NY Commercial Horticulture team sent out a downy mildew alert for their region. The disease was found in Dutchess County in cucumbers. This disease is now present in both eastern and western NY. With their alert they gave a brief synopsis of spray options that bears repeating here because it drives home the options for management of the DM for conventional and organic growers.

"If you are in the Hudson Valley or another high risk area, now is the time to apply mobile (systemic, translaminar) fungicides with an active ingredient that specifically targets DM. For conventional growers I have seen where a tank mix of Curzate plus Ranman or Zampro plus a protectant like chlorothalonil (Bravo, Initiate etc.) has done a very good job. Curzate provides some kickback or burnout activity but does not have much residual which is why it needs to be tank mixed with a second mobile fungicide or another application



Downy mildew on cucumber leaf – top view (left) and underside of leaf (right). Photos: D. Telenko, CCE CVP

needs to be made 3-4 days later. Mobile fungicides are needed to control the disease from developing on the **UNDERSIDE** of the leaf. Fungi-

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cides should be re-applied according to disease severity and label instructions (keep pre harvest intervals in mind, maximum use rates and please rotate chemical classes using the FRAC codes found on all the labels."

"According to Cornell Pathologists Margaret McGrath, one of the better organic products evaluated is Timorex Gold (Tea Tree oil) and is labeled in. See label for the rates and note that there is a 48-hour re-entry interval and do not apply within 48 hours of harvesting. Do not spray during the warm hours of the day and in hot seasons with temperatures above 95°F (35°C) and do not apply this product through any type of irrigation system. Alternate with copper every 5-7 days." 📌

WNY Sweet Corn Trap Network Report, 7/18/17

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

Thirty-one sites reporting this week. European corn borer (ECB)-E was trapped at twelve sites and ECB-Z was trapped at five sites. Corn earworm (CEW) was trapped at ten sites, with four sites high enough to be on a 5 or 6 day spray schedule (see chart below). Fall armyworm (FAW) was trapped at six sites and Western Bean cutworm (WBC) was trapped at eighteen sites this week.

Western bean cutworm numbers are beginning to increase. Peak flight usually occurs around the first week of August. It is important to begin scouting for egg masses even if cumulative trap catches have not reached 100, as egg masses have been found when cumulative trap catches were still in the single digits. WBC will usually lay eggs on the upper side of the top 1-3 leaves of pre-tassel corn, close to the leaf base. After tasseling has finished WBC seek out younger corn or dry beans. To scout for egg masses check the top 3 leaves of ten corn plants in ten locations throughout the field. The eggs are easy to observe if you view the leaf while holding it towards the sun. The egg mass will appear as a distinct shadow (see photo).



WBC egg mass shadow.
Photo: T. Baute

WBC egg mass.

WBC eggs become purple prior to hatch.
Photo: Marlin Rice

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

It takes between 5-7 days for eggs to hatch. It is critical that sprays are timed before the larvae have a chance to enter the ear. The egg mass will become purple in color approximately 24 hours before egg hatch (see photo).

WNY Pheromone Trap Catches: July 18, 2017

Location	ECB-E	ECB-Z	CEW	FAW	WBC	DD to Date
Baldwinsville (Onondaga)	0	0	0	1	3	1092
Batavia (Genesee)	2	0	1	0	5	833
Bellona (Yates)	0	1	0	2	7	1176
Eden (Erie)	0	0	5	1	21	1076
Farmersville (Cattaraugus)	0	0	0	0	6	1029
Farmington (Ontario)	2	1	0	0	10	1010
Hamlin (Monroe)	NA	NA	NA	NA	NA	1039
LeRoy (Genesee)	NA	NA	NA	NA	NA	1052
Pavilion	1	1	0	0	0	1029
Penn Yan (Yates)	0	0	0	0	1	1134
Ransomville (Niagara)	0	0	0	0	0	1109
Seneca Castle (Ontario)	1	0	0	0	0	1065
Williamson (Wayne)	2	0	0	0	5	1103

ECB - European Corn Borer

WBC - Western Bean Cutworm

CEW - Corn Earworm

NA - not available

FAW - Fall Armyworm

DD - Degree Day (mod. base 50°F) 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. 📌

Dodder: More of a Nuisance than a Problem

Robert Hadad, CCE Cornell Vegetable Program

Dodder is not a serious problem for the most part. This parasitic plant can, if left uncontrolled, become a nuisance growing like a vine tying up crop plants. In more than 25 years, I have come across it twice in peppers and eggplant. This season, I have found it 4 times growing on lambsquarters and pigweed near potato, tomato, and bush bean plantings.

Rogueing out the dodder before it becomes an issue is the best advice. Don't wait till it becomes a huge problem. Unlike other vining weeds, dodder attaches itself to the host plant and will drain off nutrients.



Dodder parasitizing a host plant. Photo: R. Hadad, CVP 📌

Onion Thrips Management After the Ride with Movento is Over

Christy Hoepting, CCE Cornell Vegetable Program

Going for a ride with the “Momentum of Movento”

Due to the phenomenal residual activity of Movento, when this insecticide is applied to onion plants up until the early bulbing stage, it can result in keeping onion thrips pressure below the spray threshold (1.0 thrips per leaf) for one to three weeks before it breaks and another insecticide needs to be applied. In fact, the record for the longest ride with the momentum of Movento is 5 weeks, which occurred in a cool season with lots of rain, such as the one that we are having. Typically, double applications of Movento spaced 7 to 10 days apart are used. Research last year and this year have shown that the momentum of Movento lasts longer with two applications of Movento compared with a single application (see June 14 issue of VegEdge).

New Insecticide Minecto Pro is a premix of Agri-Mek and Exirel posing a challenge for resistance management

As you know, the rules for onion thrips resistance management include:

- Do not use the same chemical class of insecticide more than once per growing season
- Do not use the same chemical class for more than two sequential applications

These restrictions are in place to ensure that consecutive generations of onion thrips (2 to 4 weeks per generation) are not exposed to the same insecticide chemical class (Table 1). Because Minecto Pro is a premix of the active ingredients in Agri-Mek and Exirel, double applications of two or more of these insecticides cannot be made in the same field within the same season without violating the resistance management rules. For example, two sequential applications of Agri-Mek cannot be followed by any applications of Minecto Pro. Another challenge is that the pre-harvest interval (PHI) for Minecto Pro and all Agri-Mek products is 30 days, which limits its use to no later than the middle of the spray season. Radiant, Warrior (including generics and other pyrethroids) and Lannate all belong to different chemical classes (Table 1) and have PHIs closer to harvest.

A note on price.

In very general terms, Warrior and Agri-Mek (and generics) are by far the cheapest options costing about 1/6th to 1/10th the cost of Exirel, Radiant, Lannate or Minecto Pro. The low rates of Exirel and Minecto Pro and the high rate of Radiant are about \$50 per acre.

Table 1. Chemical Class/Mode of Action (MOA) of insecticides used to control onion thrips in NY

Insecticide Trade Name	IRAC ¹ Group
Movento	23
Agri-Mek SC Agri-Mek EC and generics	6
Exirel	28
Minecto Pro	6, 28
Radiant	5
Warrior and generics	3A
Lannate	1A

¹IRAC: Insecticide resistance action committee

A note on efficacy.

Radiant has always been our “big gun”, and growers are implementing a concerted effort to prolong its useful longevity by not overusing and abusing this insecticide. Radiant at rates of 8 to 10 fl oz per acre have demonstrated the ability to knockdown thrips populations of 4.0 per leaf and greater. In Brian Nault’s studies, the high low rate of Exirel at 13.5 fl oz per acre was similar to Radiant at both 6 and 10 fl oz per acre for controlling a thrips population at 4.0 per leaf, but at higher thrips populations, only the high rate of Radiant at 10 fl oz per acre could manage the infestation. Agri-Mek alone is capable of holding a thrips population of 1-2 thrips per leaf, but will fall apart with pressure much higher than that. Adding Warrior to Agri-Mek has demonstrated knocking down a thrips population of about 2-3 thrips per leaf. Also in Brian’s trials, Minecto Pro at both the 7 and 10 fl oz per acre rates performed as well as Radiant at a rate of 8 fl oz per acre. Lannate has mediocre activity (~40-50% control) and Warrior is weak (~25% control if any).

Radiant = Minecto Pro > Exirel = Agri-Mek + Warrior > Agri-Mek > Lannate > Warrior

When the ride with Movento is over and...

The June 27 issue of VegEdge illustrates the 2017 guidelines for onion thrips management plan. In a nutshell, after Movento, Option A includes Minecto Pro (2 apps) followed by Radiant (2 apps) followed by Lannate + Warrior (up to 2 apps if need be). Option B includes Agri-Mek (2 apps) followed by either up to 2 applications of Exirel (followed by Radiant) or Radiant. Obviously, there are several possibilities and following are a few examples to consider.

Scenario #1: Thrips pressure is low (e.g. 0.6 to 1.5 per leaf) and there are 4-6 weeks before harvest.

Try to save some money and start with Agri-Mek (IRAC 6). For an additional \$2, Warrior (IRAC 3A) may be added, especially if thrips are 1.3 to 1.5 per leaf. If 7 days after this spray, thrips pressure is within the range of Agri-Mek +/- Warrior, make a second application. After these treatments, you may not use Agri-Mek (IRAC 6) or Minecto Pro (IRAC 6, 28) again this season. After this, treatments will get expensive with Exirel (IRAC 28) and Radiant (IRAC 5) being your choices.

If, after the first application of Agri-Mek, thrips pressure exceeds 2.0 per leaf, you may jump track and apply Minecto Pro.

Note that after Agri-Mek (IRAC 6) followed by Minecto Pro (IRAC 6, 28), you may not apply either of these insecticides again. Your choices would include Radiant, Exirel and Lannate. Technically, if you used Warrior with Agri-Mek, you should not use it again for the rest of the season either. Although, we do not consider Warrior a strong insecticide, preserving its effectiveness in order to top off Agri-Mek or Lannate would be helpful.

Scenario #2: Thrips pressure is high (> 2.0 thrips per leaf) and there are 4-6 weeks before harvest.

In this case, it would be best to use Minecto Pro (IRAC 6, 28). After two applications of Minecto Pro, you may no longer use Agri-Mek (IRAC 6) or Exirel (IRAC 28) for the rest of the season. Choices after Minecto Pro are Radiant or Lannate + Warrior.

If after the first application of Minecto Pro, thrips pressure is reduced to 1.5 or less, you may jump track and save some money by applying Agri-Mek +/- Warrior. After this combination, you may not apply Agri-Mek or Minecto Pro again for the rest of the season. Your most obvious choice remaining would be Radiant.

Scenario #3: Thrips pressure is high (>2.0 thrips per leaf) and there are less than 4 weeks before harvest.

There is not enough of a pre-harvest interval to use Agri-Mek or Minecto Pro (30 day PHI), so you would have to use Radiant and hopefully this will be all you need. 🍅

Aphids on Tunnel/Greenhouse Tomatoes

Judson Reid, CCE Cornell Vegetable Program

Occasionally we find outbreaks of aphids on greenhouse tomatoes, although they are much more common (and destructive) on peppers and greens. Since aphids have a high reproductive capacity, any population should be monitored and controlled if rising. In addition to feeding on plant sap, aphids can transmit certain viruses and their droppings lead to Sooty Mold. Fortunately we do have some low-to-non toxic controls for this pest.



Aphids on greenhouse tomato. Photo: J. Reid, CVP



Sooty mold as a result of aphid infestation. Photo: J. Reid, CVP

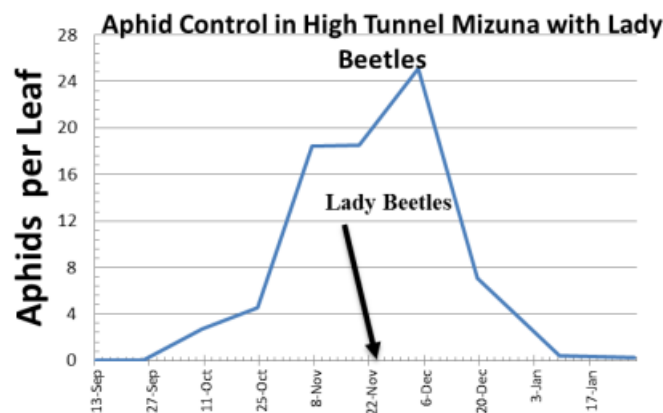


Figure 1. In the winter time, low tunnels keep Lady Beetles where we want them: close to the crop. In the summer they may move out of high tunnels.

Biological control, with beneficial insects, is one of these options. Predators such as lady beetles have performed well in CVP trials in winter crops (Fig. 1), but, with roll-up sides open during the summer, lady beetles may fly away. Sometimes, natural populations of lady beetles will find aphid hot spots. The larvae of this beneficial can be found hunting for prey (see photo) throughout the canopy. If observed, consider allowing the predatory larvae the chance to control the population before using an insecticide.



Lady beetle larvae feeding on aphid in cucumber crop. Photo: J. Reid, CVP

Predatory wasp mixtures (including species such as *Aphidius colemani*) are another biocontrol option. These wasps lay eggs in live aphids, which then hatch out and kill their host. Since this process takes a couple of weeks, we prefer predatory wasps earlier in the crop cycle.

Another approach to consider would be applications of commercial formulations of 'entomopathogenic' fungi. This refers to biological sprays that can infect, and kill, insect pests. CVP research found that multiple applications with products that contain *Beauveria bassiana*, such as Botanigard or Mycotrol (organic), controlled aphids in high tunnel greens (Fig. 2). Since this is a contact material, higher pressure, mist sprays will help target aphids within the dense tomato canopy.

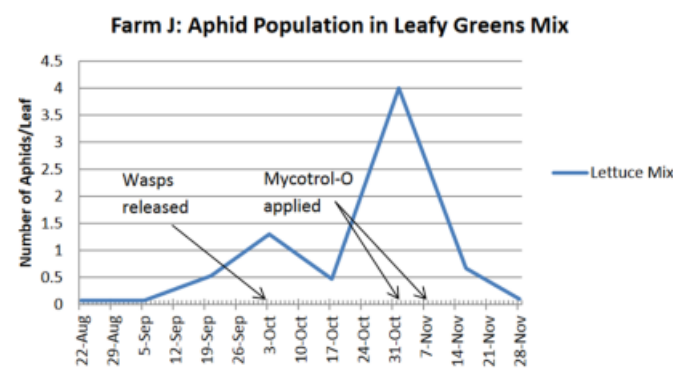


Figure 2. Mycotrol applications reduced aphid populations on fall high tunnel greens.

continued on next page

Finally, we may need to look to broader spectrum spray materials if populations require immediate and drastic reduction. Fulfill (0 D PHI) and Admire are conventional options. Admire Pro may be applied at a rate of 0.6 ounces per 1000 plants in a minimum of 16 gallons water to the rootzone via drip irrigation, with 0 day PHI. This is restricted to a single application per season, and cannot follow other imidicloprid applications. Note this is a different rate and PHI than field applications. Aside from the above mentioned biocontrols and Mycotrol, certified organic growers could also apply Pyganic or AzaGuard (combined with crop-safe oil). ●

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 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.

Integrated Pest Management in High Tunnels

August 10, 2017 | 1:00 PM

Andy Miller farm, 7396 Albro Rd, Gainesville, NY 14066



Join Cornell, NYS IPM, Cornell Vegetable Program, and CCE staff for a discussion on taking a pro-active approach to managing insects and diseases in the high tunnel or greenhouse setting. Andy Miller - Background on his farm, farm tour; Elizabeth Lamb & Don Gasiewicz - Creating your IPM plan and working with CCE; Judson Reid - Soil fertility project, soil and water testing; Brian Eshenaur - Preventative disease management; and Marvin Pritts - Berry production in high tunnels.

Cost: \$10/farm. Download the registration form at <https://cvp.cce.cornell.edu/event.php?id=792> to mail in your registration and payment by August 4. For more information or questions, contact Don Gasiewicz 585-786-2251 x113 or email Don at drg35@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 interseed 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.

Sustainable and Organic Vegetable Pest Management Field Day

August 29, 2017 | 3:00 PM - 9:00 PM

Cornell Lake Erie Research and Extension Laboratory, 6592 West Main Rd, Portland, NY 14769



Join Cornell Vegetable Program Specialists (Telenko, Hadad, Reid) and Cornell University faculty (Wallace, Smart, Reinert, Bjorkman) for an evening of touring Cornell Vegetable Program research sites and answering questions on sustainable and organic pest management options for fresh market vegetable growers. Information will be provided for both conventional and organic growers at all levels of expertise. Network for Environmental and Weather Application (NEWA) will be on-hand to teach growers how they can use the forecasting models for pest management in various crops. Sponsoring industry representatives will have the opportunity to meet with growers to comment on their products.

The full agenda will be posted on our website soon! DEC and CCA credits will be available for portions of the day.

Weather Charts

John Gibbons, CCE Cornell Vegetable Program

Weekly Weather Summary: 7/11 – 7/17/17

Location	Rainfall (inch)		Temp (°F)	
	Week	Month July	Max	Min
Albion	1.57	2.06	82	61
Appleton, North	2.34	2.76	81	59
Baldwinsville	1.29	2.79	84	62
Buffalo*	2.80	3.10	82	62
Ceres	0.52	2.47	83	56
Elba	NA	NA	NA	NA
Fairville	2.28	3.79	85	61
Farmington	2.26	3.92	86	61
Gainesville	NA	NA	NA	NA
Geneva	3.33	4.68	83	63
Lodi	3.76	5.05	85	60
Niagara Falls*	2.04	3.73	84	63
Ovid	0.76	2.02	86	59
Penn Yan*	4.28	5.23	85	64
Phelps	2.15	3.77	87	62
Portland	0.23	0.59	79	63
Rochester*	2.18	3.08	84	62
Silver Creek	NA	NA	79	64
Sodus	NA	NA	82	62
Versailles	0.16	0.88	79	59
Volney	1.86	NA	83	61
Williamson	1.86	2.48	84	61

Accumulated Growing Degree Days (AGDD) Base 50°F: April 1 – July 17, 2017

Location	2017	2016	2015
Albion	1179	1229	1205
Appleton, North	1056	1047	985
Baldwinsville	1221	1213	1221
Buffalo	1215	1257	1230
Ceres	1069	952	1092
Elba	NA	893	930
Fairville	1132	1083	NA
Farmington	1130	1126	1164
Gainesville	1109	899	967
Geneva	1191	1176	1186
Lodi	1333	1301	1314
Niagara Falls	1332	1341	1134
Ovid	1265	1235	1265
Penn Yan	1274	1254	1265
Phelps	1198	1154	1203
Portland	1257	1175	1156
Rochester	1270	1269	1296
Silver Creek	1220	1126	1115
Sodus	1179	1142	1110
Versailles	1222	1106	1138
Volney	1117	NA	NA
Williamson	1147	1099	1042

* Airport stations

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

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VegEdge is the award-winning newsletter produced by the Cornell Vegetable Program 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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