



Beneficial insects are working for you for FREE! A predatory stink bug species

known as the spined soldier bug is patrolling your fields.

**PAGE 1**



Late blight is now confirmed in Wayne County! All potato and tomato growers in WNY, organic and conventional, should be applying fungicides.

**PAGE 3**



Garlic harvest is fast approaching. As we head into the home stretch, there are a few things you can do to prepare for a better harvest.

**PAGE 5**



Young pepper transplants showing ringspots repeatedly tested negative for common viruses. The culprit has been identified – Impatiens Necrotic Spot Virus.

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# VEGEEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

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Photo: Julie Kikkert

 **Cornell University**  
Cooperative Extension  
Cornell Vegetable Program

## Beneficial Bugs Working for You

Darcy Telenko, CCE Cornell Vegetable Program

As the weather and plant pests continue to rear their ugly heads there is some good news out in the field. Beneficial bugs are actively working for you, for FREE!!! This week we found some good news in an eggplant planting. It wasn't a bad stink bug but a good guy preying on Colorado potato beetles. The predatory stink bug species known as the spined soldier bug, *Podisus maculiventris* (Say). It is 'a generalist predator with a broad host range, reportedly attacking 90 insect species, which include several important economic pests. Reported prey include the larvae of Mexican bean beetle, European corn borer, diamondback moth, corn earworm, beet armyworm, fall armyworm, cabbage looper, imported cabbageworm, Colorado potato beetle, velvetbean caterpillar, and flea beetles.' [http://entnemdept.ifas.ufl.edu/creatures/beneficial/podisus\\_maculiventris.htm](http://entnemdept.ifas.ufl.edu/creatures/beneficial/podisus_maculiventris.htm) ●

**WARNING! Photo may not be suitable for the faint of heart!**

Spined soldier bug is sucking out the body fluid of a Colorado potato beetle in an eggplant field.

Photos courtesy of Mark Zittel, Amos Zittel & Sons Inc.







**VegEdge** newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension regional agriculture team, serving 11 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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*The next issue of VegEdge will be produced July 22, 2015.*



Flooding in pepper field in Eden, July 14, 2015.  
Photo courtesy of Mark Zittel, Amos Zittel & Sons Inc.

# Drainage Tile and/or Cover Crops for Unplanted Fields

Carol MacNeil, CCE Cornell Vegetable Program; cover crop info from T. Bjorkman, Cornell

There are many unplanted fields across Western NY and the Finger Lakes Region due to the excessively wet late spring and early summer. Make the best of a bad situation by improving the drainage and/or planting cover crops in those fields.

Drainage tile doesn't last forever. In many fields there are broken tiles, resulting in wet spots, or tile that's silted up, significantly slowing the flow of water and leaving sections of the field wet. The ditches where the tile lines drain may be filled in, plugging the tile. Check them out. The first step towards improving the soil health of your fields is to improve the drainage. There will be less temptation to work the soil when it's wet, causing compaction, which reduces crop growth. Improving drainage also allows you to do field work, plant and harvest sooner, which can be a great advantage. And crop yields should improve! For help with tile drainage questions, visit your local Soil and Water Conservation District office, or ask for the SWCD Drainage Guide. See the Guide at: [http://www.waynecountynysoilandwater.org/wp-content/uploads/drainage\\_guide\\_ny.pdf](http://www.waynecountynysoilandwater.org/wp-content/uploads/drainage_guide_ny.pdf) Find a reputable drainage contractor or well experienced grower with the equipment, someone who uses laser or GPS guidance, and schedule some tiling, or re-tiling for this summer or fall.

Unplanted fields should not be allowed to sit fallow and grow weed seed! Cover crops can crowd out weeds, add fresh organic matter to feed beneficial soil microbes and earthworms, improve the percentage of water-stable soil aggregates, and create root channels to improve drainage. Keep your fields covered! Sudangrass and buckwheat are two cover crops suited for summer planting.

There is still a time to plant sudangrass. It adds lots of organic matter and the root system helps reduce compaction. Sudangrass is a good choice for reducing root-knot nematodes if incorporated into your rotation. If weed suppression is the main goal, buckwheat is preferable. Buckwheat is good for "mellowing" the soil. It covers the ground earlier than sudangrass. Sudangrass requires a higher seeding rate for effective weed suppression. Both crops are sensitive to frost.

As a cover crop, buckwheat is in the ground just 35-40 days, when it should be promptly mowed to avoid seed production. Sudangrass needs at least 60-70 days to be effective. Mow it once when it reaches 3-4 ft. tall, leaving 8 in. stubble for re-growth. Sudangrass needs a final flail mowing in September and immediate incorporation to suppress nematodes. If the soil is hard or the field is prone to standing water, sudangrass is a good choice, but buck-

wheat will do poorly. However, if the field is low in nitrogen and phosphorous, buckwheat will do well, while sudangrass needs about 40 lb/acre of nitrogen (the nitrogen will be released on decomposition). If the crop to follow needs a fine seedbed buckwheat is a better choice since it decomposes quickly after incorporation. Sudangrass stalks and crowns take some time to break down.

Buckwheat seed is available from local farm seed retailers. A 50 lb. bag will seed an acre. Sorghum and sorghum-sudan grass are widely available. Grain types are inappropriate, however, and some new forage varieties ("sweet" or brown midrib) are low in dhurrin, the biofumigant in sudangrass. Piper sudangrass is readily available and has a similar composition to Trudan 8, the classic sudangrass for biofumigation. Sorghum-sudan grass hybrids are more vigorous and will produce more biomass than sudangrass, but the seed is more expensive. Locally available varieties include Sordan 79, Green Grazer, and Special Effort. Seed sudangrass or the hybrids at 30 lb/acre. Weed suppression requires 50 lb/acre.

For more info on cover crops go to the Cornell Cover Crop Guide at: <http://covercrops.cals.cornell.edu/> 

## Late Blight Now Confirmed in Wayne County!

Carol MacNeil and John Gibbons, CCE Cornell Vegetable Program

**Late blight (LB) has now been confirmed in a commercial potato field in Wayne County!** It was just determined to be the US-23 strain of LB. Early last week it was confirmed in potato fields in Livingston and Wyoming Counties. The Livingston County LB strain also was US-23, sensitive to Ridomil (mefenoxam fungicides). LB also showed up this week in tomato in southwest Ontario, Canada, and in potatoes in northern VT. **All tomatoes and potatoes in Western NY and the**

**Finger Lakes Region are at high risk of LB infection!**

Scout fields twice a week. Destroy all potato culls and volunteers. All tomato and potato growers, conventional and organic, should be applying fungicides at no longer than 7 day intervals. At some locations less than a 5 day spray interval may be needed according to the LB [Decision Support System \(DSS\)](#) forecast. See the accompanying chart. (Alternate fungicides; follow label directions!) See the "Late Blight Risk"

article in the July 8 issue of VegEdge for recommended fungicides, or see the *2015 Cornell Vegetable Guidelines*, or the *2015 Organic Production and IPM Guide for Potatoes* at: [http://www.nysipm.cornell.edu/organic\\_guide/veg\\_org\\_guide.asp](http://www.nysipm.cornell.edu/organic_guide/veg_org_guide.asp)

**If late blight is suspected or found ACT IMMEDIATELY!** Check out the photos at the links below. Seal a fresh sample (green foliage with disease spots) in a zip lock bag. Do not refrigerate. Kill LB

*continued on page 4*

hotspots and a 30 ft. border, then spray the field and nearby fields with a LB fungicide. Contact a CVP Vegetable Specialist ASAP so your sample can be sent to Cornell, Ithaca to determine the LB strain.

Photos of LB: <http://livegpath.cals.cornell.edu/gallery/tomato/tomato-late-blight/>

Distinguishing LB from other diseases: <https://www.youtube.com/watch?v=aA4PuEKaQpY>

Contact Carol MacNeil at [crm6@cornell.edu](mailto:crm6@cornell.edu) or 585-313-8796, or the closest CCE Cornell Vegetable Program Specialist at: [http://cvp.cce.cornell.edu/contact\\_information.php](http://cvp.cce.cornell.edu/contact_information.php) ●

Late Blight Risk Chart, 7/14/15<sup>3</sup>

Location <sup>1</sup>	Blight Units <sup>2</sup> 7/08-7/14	Blight Units <sup>2</sup> 7/15-7/17	Location <sup>1</sup>	Blight Units <sup>2</sup> 7/08-7/14	Blight Units <sup>2</sup> 7/15-7/17
Appleton	29	17	Kendall	43	13
Arkport	56	17	Lodi	36	19
Baldwinsville	33	19	Lock/Niag F.	50	12
Bergen	31	12	Lyndonville	54	13
Buffalo	39	12	Medina	44	13
Butler	44	12	Penn Yan	53	18
Ceres	45	15	Rochester	39	12
Elba	55	12	Sodus	40	6
Farmington	40	17	Versailles	44	9
Gainesville	56	16	Wellsville	52	14
Geneva	39	17	Williamson	43	11

1 Past week Simcast Blight Units (BU)

2 Three day predicted Simcast Blight Units (BUs)

3 Threshold = 30 Bus (susceptible variety, last fungicide-shorter residual)

## Strategic Management of Onion Thrips in Onions, 2015

Christy Hoepting, CCE Cornell Vegetable Program, and Brian Nault, NYSAES

Onion thrips is a very important pest of onions. Thrips feeding reduces the photosynthetic capacity of the onion plant, which can reduce yield and bulb size by 30% or more. We are fortunate in New York to have an Entomologist at Cornell, Brian Nault, who annually conducts extensive field research on onion thrips. Additionally, his research-based recommendations are vigorously field tested through my Extension scouting program so that we can make very specific and strategic recommendations to optimize control of onion thrips. There is tremendous opportunity to achieve excellent control of onion thrips and to reduce the number of insecticide sprays per season. Scouting your fields and knowing the thrips pressure in your fields is key to making informed decisions every week.

### What You Need to Know About Using Insecticides to Control Onion Thrips:

- 1) **Do not make more than two sequential applications of an insecticide before switching to another insecticide with a different mode of action.** This recommendation is for resistance management to not expose a single generation of thrips to more than one chemical class. Moven-to and Agri-Mek have label restrictions that only permit them to be used two times per season. Below is additional information that will help inform you about deciding what product to use and when:
  - a. If it takes more than 3 weeks for the population to reach spray threshold after the first application, instead of making a second application of the same material, switch to a different product belonging to a different chemical class.
  - b. If the population continues to increase and excessively exceeds the spray threshold 7 days after the first spray, switch to another chemical class. **The caveat to**

**this rule is with Movento**, as our experience has shown that when thrips numbers are above 1.0 per leaf 7 days after the first spray and a second application of Movento is made at that time, the population will be significantly knocked down 7 days after that second spray.

- 2) **Movento, Agri-Mek, Radiant and Exirel must be used with a penetrating surfactant** for optimum performance of these systemic and translaminar materials. Use of these materials without a penetrating surfactant can reduce efficacy by as much as 50%. Nault's 2014 research results **showed that some surfactants worked better than others.** Particularly, MSO did not perform quite as well as non-ionic surfactants like Induce and mineral oils like JMS Stylet Oil. M-Pede also worked very well in a surfactant-type role to improve insecticide efficacy against onion thrips. M-Pede is not a surfactant, rather it is an OMRI-approved insecticide-miticide-fungicide with an active ingredient of potassium salts of fatty acids. Although M-Pede provides poor control of onion thrips on its own, co-applications of M-Pede with insecticides like Movento, Agri-Mek and Radiant provided the same high level of thrips control as co-applications of these same insecticides with Induce.
- 3) **When Movento, Agri-Mek and Radiant are tank mixed with Bravo Weatherstik (or generic versions of chlorothalonil), efficacy of insecticide is reduced by 12 to 35%.** See article on this tank mix dilemma in June 17 2015 issue of VegEdge.

A strategic plan for managing onion thrips in onions, which includes a strategic order of applying the different insecticides, as well as how to make critical deviations from this order based on pest pressure, relative performance of different products and time to harvest can be found on the CVP website at [http://rvpadmin.cce.cornell.edu/uploads/doc\\_320.pdf](http://rvpadmin.cce.cornell.edu/uploads/doc_320.pdf) ●



# Preparing for Garlic Harvest – The Home Stretch

Crystal Stewart, CCE Eastern NY Commercial Horticulture Program

Garlic harvest is fast approaching with some fields already being harvested. Overall, the garlic is looking pretty nice, though the tip browning that happened earlier in the season has progressed in some areas and is colonized by black mold, or *Aspergillus*. Low spots in fields are suffering due to the wet periods we are having, and size might be a touch on the small size on average (thought this can change with perfect weather over the next few weeks). As we head into the home stretch, there are a few things you can do to prepare for a better harvest.

1) **Weed control:** it seems counterproductive to worry about weeds in these last two weeks to some people, but this is a critical time to keep up weed control if you have been vigilant through the season or to kill as many weeds as you can leading to harvest. There are two main reasons this is true. One, weeds compete aggressively for water, and water is what will give you size at this point. The garlic has all the cells it's going to make, and it's currently expanding them like thousands of tiny water balloons. You want the plant to have access to all the water it can get.

Two, weed pressure at harvest is a serious pain. It makes it harder to find and harvest the garlic. It's amazing how much garlic people leave in weedy fields just because they can't see it. At a bare minimum, go mow the weeds down low between the rows. Do it for the garlic!

2) **Field culling:** Hopefully you did a good field culling when removing scapes. This is one last opportunity to remove any garlic showing damage from disease or insects. Walk the fields and pull anything that looks stunted, yellow, or sickly (Fig. 1). Doing so now when you can see the whole plant is much more accurate than bringing it into the drying area, where damaged bulbs can start to look ok, despite harboring problems which could spread to your other garlic.



**Figure 1.** Flagging garlic should be removed from the field prior to harvest.

Photo: Crystal Stewart, CCE ENY Commercial Hort Program

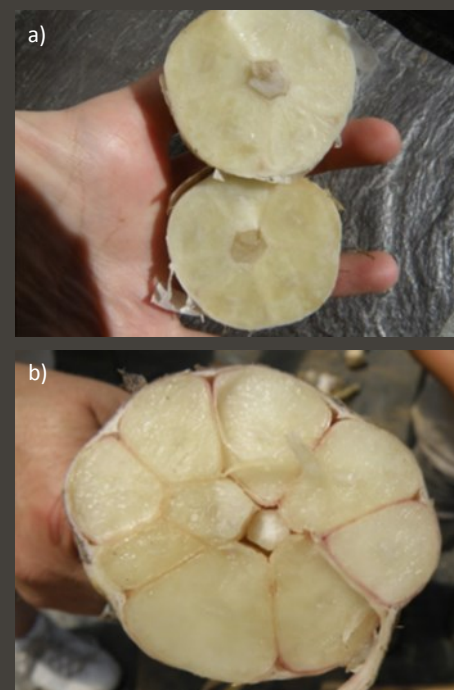
## Save your sickly garlic for us!

While you are pulling up sickly garlic, if you could keep a bunch (10-15) heads which look like they will not break down in storage and dry them somewhere isolated from the rest, we would be very, very grateful! We are working hard to get a Fusarium study funded, looking at what kinds of Fusarium we are battling every year and what the best controls are. We'll be asking for samples later in the season, but this is the best time to collect them. If you pull a sample, just let us know and we can come get it when it's dry. Or if you don't want to dry it, we will do so for you. Contact Robert Hadad ([rgh26@cornell.edu](mailto:rgh26@cornell.edu); 585-739-4065) or Christy Hoepting ([cah59@cornell.edu](mailto:cah59@cornell.edu); 585-721-6953) ed. C. Hoepting, CVP

3) **Irrigate:** IF we have a dry spell (no concerns so far) in these last couple weeks, make sure you provide your garlic with adequate moisture. See above water balloon reference. IF possible, letting garlic dry out for a few days before harvest is better for the soil and for getting the dirt off the bulbs. We are not always luck in this regard, but looking at the forecast, shooting for a few dry days prior to harvest is always best. ●

## Judging When Garlic is Ready to Harvest

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. 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 we have another wet year. 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.



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 top (a) is not quite ready, while the one on the bottom (b) is.

Photos: Crystal Stewart, CCE ENY Commercial Horticulture Program

# CROP INSIGHTS



## GENERAL COMMENTS

For many locations, this season is another unmanageable mess. Fungal and bacterial issues abound. The notorious big three being late blight, downy mildew, and powdery are scattered across the region.

## COLE CROPS

Swede midge is active, especially on organic farms and is causing blindness and other damage. Diamondback moths are pupating in several locations. A second round of imported cabbageworm butterflies are out, so keep scouting to determine when to treat. Fresh market cabbage looks good where the plants had sufficient drainage.

## DRY BEANS

Earlier planted dry beans are growing well where water hasn't ponded and some are flowering. Many areas will have had the 10 days of soil moisture needed for growth of the tiny mushroom-like, spore producing apothecia of Sclerotinia white mold (WM). Begin the first fungicide sprays when 10-30% of plants have their first open blossom. A second application in high risk fields is recommended. (History of WM, legume/vegetable in the past 3 years). Note that resistance to Topsin was confirmed in some Western NY dry bean fields last fall by Sarah Pethybridge, Plant Pathologist, Cornell – Geneva. Endura, Proline, Omega and Switch are other fungicides labeled for WM control. Some of the latest dry beans got crusted in and emergence is erratic. Pythium root rot is causing collapse and darkening on roots and wilting of some recently emerged plants. Weeds are emerging and growing. It may be difficult to get post-emergence herbicides on at the best time due to frequent rains. Bean damage from herbicides is more likely if the weather has just turned sunny and temperatures are 85°F or higher. Cultivation may be needed, but keep it shallow as bean roots are shallow.

## LETTUCE

Downy mildew of lettuce has been found in a number of locations – see *Pest Patrol* article, pg 9.

## ONIONS

**Thrips pressure is on!** Although onion thrips (OT) pressure is variable from field to field and from farm to farm, there was a general increase across the region this week. At some untreated sites, thrips counts increased 2-fold to 5-fold and have reached over 200 thrips per plant and can now be found along the leaves, not just tucked in the leaf axils, as is common with early OT infestations. Last week, several direct seeded fields reached the spray threshold of 1 OT per leaf and received their first application of Movento. This week, the remainder of direct seeded fields including in Wayne and Potter muck areas, reached the spray threshold and will be sprayed with Movento.

Our goal is to achieve an average of 3.0 OT per leaf across the spray season in order for thrips feeding to not reduce bulb size and yield. Keep in mind that it takes at least 7 days after Movento is applied to see its effect. Although it is our general rule that if after 7 days since the last spray, OT counts are higher than before the insecticide was applied, to switch to another insecticide with a different mode of action, and specifically to Radiant if counts are greater than 3.0 OT per leaf; the caveat to this rule is with Movento. Our experience has shown that when thrips numbers are above 1.0 per leaf 7 days after the first spray and a second application of Movento is made at that time that the population will be significantly knocked down 7 days after that second spray. Unless thrips counts are much higher than 3.0 per leaf, and/or you are spraying plants with 2" bulbs, give the second app of Movento a chance before you abandon this mode of action. Several transplant fields and some direct seeded fields that have already had their second application of Movento, as well as fields where it has been more than 3 weeks since the first application of Movento, will need to switch to a different mode of action. If OT counts are 1.0 ± 0.3 per leaf, your options include Agri-Mek, Lannate + Warrior or Exirel. If OT counts are 3.0 or greater, consider Radiant. See the article, pg 4, on how to make strategic decisions for managing onion thrips.

### New OT recs in 2015:

- 1) We now have a **new insecticide, Exirel** to add to our roster. The active ingredient is cyantraniliprole, which belongs to mode of action group 28, the diamides, which is completely different than all of the other insecticides labeled in onions for OT control. In Cornell research trials, Exirel (also trialed as Benevia) has been a top performer along with Radiant and Movento providing excellent control of onion thrips. At this time, we are recommending to use it at the low **rate of 13.5 fl oz** (labeled up to 20 fl oz in onions) with a **1.0 OT per leaf threshold**, and it can fit into your spray sequence in several different positions (see table). In 2015, its use at different thresholds is being trialed. It has a maximum of 61.5 fl oz per season and is recommended to **use with a surfactant**.
- 2) 2014 research results from Brian Nault showed Lannate and Warrior provided mediocre to poor control when each were used alone; however, when they were used together in a tank mix, control was good (about 72%). Therefore, **instead of using Lannate by itself, we now recommend Lannate + Warrior**. Even though this tank mix includes two modes of action, they are both different from the modes of action of Movento, Agri-Mek, Radiant and Exirel.
- 3) Nault's 2014 research results showed that **some surfactants worked better than others**. Particularly, MSO did not perform quite as well as non-ionic surfactants like Induce and mineral oils like JMS Stylet Oil. M-Pede also worked very well in a surfactant-type role to improve insecticide efficacy against onion thrips. M-Pede is not a surfactant, rather it is an OMRI-approved insecticide-miticide-fungicide with an active ingredient of potassium salts of fatty acids. Although M-Pede provides poor control of onion thrips on its own, co-applications of M-Pede with insecticides like Movento, Agri-Mek and Radiant provided the same high level of thrips control as co-applications of these same insecticides with Induce.

*continued on next page*

**PEPPER**

Wet weather continues to favor the spread of bacterial spot in pepper throughout the region. Spraying should continue where possible on a 5-day schedule.

*From Meg McGrath, Long Island Fruit and Vegetable Update: [Bacterial Diseases Continuing to Develop in Tomato and Pepper](#)*

Bacterial speck and spot are increasing in crops on LI. These diseases are best managed preventively. Copper plus mancozeb is the standard recommendation, but is not inherently highly effective and resistance to copper is thought to be common in bacteria. Actigard can be applied to tomato and non-bell type pepper. This plant activator needs to be applied before disease onset for maximum benefit.

**POTATO**

**See the “Late Blight Risk” section of this issue regarding [late blight](#) found in Wayne County.** Some fields were in flower last week while late fields were just emerging. There are “holes” in parts of fields where soils remained saturated or water sat. The driest parts of fields have good top growth and good tuber set (earlier plantings). On the edge of wet “holes” there are stunted plants, some with tubers set, which aren’t likely to size up. Some large plants in marginal areas have a low tuber set along with some decaying roots. There are yellowing, dying vines showing up in some fields. The vines are soft and slimy from bacterial infection. Blackleg and aerial blackleg/aerial stem rot have been seen in a few fields. Blackleg originates in infected seed and spreads up the sprout, sometimes killing it before emergence and reducing stand. Aerial blackleg originates from crop debris in the soil and appears on aboveground portions of the stem, often getting started on wounds from hilling, or from insect feeding. Both blackleg and aerial blackleg are favored by wet weather. Both may first be observed as yellowing and wilting stems when the canopy is well developed and plants are flowering. The severity of blackleg can be reduced by using certified seed, frequent cleaning and disinfecting seed cutters and other equipment, especially between seed lots, and suberizing cut seed pieces before planting. Crop rotation can reduce the rate of aerial blackleg infection. There is nothing that can be done once the infection is observed in the field. Blackleg was reported on Long Island in mid-June by S. Menasha, CCE – Suffolk Co.

**TOMATO**

Early blight and bacterial speck continue to spread in a number of locations. Soilborne pathogens are quite active, including Sclerotinia white mold and Verticillium. There are no fungicides available to manage these diseases in the tomato canopy. Keep good records of where these are found to limit spread to uninfested areas and also for planning rotations to non-host crops. There is a biological control available for white mold, but it is active only on the overwintering structures – sclerotia - of white mold. Fall applications on infected debris can aid in reducing this inoculum in future seasons.

*From Meg McGrath, Long Island Fruit and Vegetable Update: [Quintec for Managing Bacterial Spot In Tomato](#)*

There is now a 2(ee) label for using Quintec to suppress bacterial spot. It may also have activity for bacterial speck, the most common of the bacterial diseases on LI, when both diseases are present in tomato.

Please scout for late blight and practice good cultural/preventative management. Even simple things help - mowing off weeds, trellising, or otherwise increasing airflow (which decreases leaf wetness) reduces your risk.

Seeing an uptick in high tunnel tomato botrytis (gray mold) and powdery mildew. These can both be challenging, so keep an eye out while you harvest. The plant pathologists are looking for brown leaf mold samples, please contact us if you think you have some.

**VINE CROPS**

Cucurbit downy mildew continues to spread through western New York. Positive sites in Genesee, Monroe, Niagara, and Wayne Counties were confirmed this week. The national forecast for Cucurbit Downy Mildew (based on occurrence and weather conditions) continues to predict moderate risk for all of western NY. Keep up the treatments

to dry down the lesions and kill the spores. Wet soils will slow up the treatments but vine crops can be saved if booms can reach across from grassy roadways. Field plots should be designed with vegetative roadways which allows for sprayers to be pulled into place. The vine crop plantings should be narrow enough for booms to be able to reach across.

Hot spots of Powdery mildew continue to grow in areas in western NY. Proactive management fungicide applications will help limit the spread and severity of these diseases in a field. Remember to rotate resistance groups and apply with protectant fungicides like chlorothalonil, copper, or mancozeb.

Angular leaf spot and anthracnose slowed down with the warm weather, but have not gone away. Expect a resurgence following the mild weather and rain this week. You can tank mix appropriate materials with your preventative downy mildew applications.

Just beginning to see vine borer damage in some locations, and squash bug eggs should hatch soon. While harvesting zucchini, keep an eye on leaf bottoms for the clusters of small, gray, leggy first instar squash bugs. Right after they hatch is the best window you have for controlling them.

Fungicide Options for Downy Mildew, their Resistance Group Number and Pre Harvest Interval (PHI) for Planning Spray Programs.

Trade Name (active ingredient)	Resistance Group Number	PHI
Bravo WS (chlorothalonil)	M5	0
Champ (copper)	M1	0
ManKocide (copper hydroxide+mancozeb)	M1+M3	5
Ranman 400 SC (cyazofamid)	21	0
Curzate 60 DF (cymoxanil)	27	3
Tanos (cymoxanil+famoxadone)	27+11	3
Forum SC (dimethomorph)	40	0
Presidio (fluopicolide)	43	2
Dithane/Manzate (mancozeb)	M3	5
Revus (mandipropamid)	40	0
Phostrol (phosphorus acid)	33	0
Previcur Flex (propamocarb hydrochloride)	28	2
Gavel (zoxamide+mancozeb)	22+M3	5



# Impatiens Necrotic Spot Virus in Peppers – A Virus Teaching Story

Elizabeth Buck, CCE Cornell Vegetable Program

Every now and again I come across some strange looking produce and end up with a mystery case on my hands. It was peppers this year, young transplants showing irregular necrotic streaks and spots. They even had ring-spots, a telltale sign of virus, yet repeatedly tested negative for common viruses. Now, not every mystery can be solved, but just this week we managed to identify the culprit - Impatiens Necrotic Spot Virus (INSV).

So, what's INSV look like and why was it so hard to figure out? Well, for starters, viruses are different than bacteria or fungus. They can hide in a plant for a long time, and sometimes only show symptoms when the plant is stressed. Symptoms can be very different in different crops, or even within the same crop depending on factors like plant age, environmental stress, and the severity of the infection (aka *titer*). It can be tricky to pinpoint the cause since symptoms can mimic other problems. While ringspots are the quintessential viral symptom, viruses can also cause: stunting, wilting, necrosis, disfigured foliage, twisting, mottling, and cankers. Twisting and leaf disfiguration, for example, have other invisible causes like herbicide drift, environmental ethylene and microscopic mites. Once more common causes are ruled out, virus is the remaining option.

Virus management is all about sanitation and preventing transmission to healthy plants. You can't treat a virus after it is in a plant – fungicides are worthless. Viruses are transmitted in three main ways: mechanically (by touch, knives, etc), insect vectors, and occasionally seeds. Some viruses can persist in the environment, while others over winter on weedy hosts or in the mouths and guts of insect pests. *Virus control requires good sanitation, proper identification, and transmission elimination.*

Common viruses like Tomato Mosaic (TMV), Cucumber Mosaic (CMV), and Tomato Spotted Wilt (TSWV) can be detected with quick, 20 minutes test

kits, *IF* the virus load (titer) in the plant is high enough. It only took a little bit of virus to cause a lot of symptoms in the stressed young pepper transplants, but the titer was not high enough to give a positive test result and identification. As the plants got older and less stressed, the symptoms went away but the titer continued to increase. Unfortunately, as the titer goes up so does the risk of transmission and infection from a sick plant to surrounding healthy plants. Eventually we were able to get a positive ID on the virus and the transmission method.

INSV is a ringspot virus that causes symptoms ranging from stunting and necrosis to stem cankers, irregular yellowing, one-sided plant spotting/dieback, and ring spots. Vegetable crops susceptible to INSV include tomato, pepper, lettuce, cucumber, endive, basil, and potato. It is only transmitted by thrips, specifically western flower thrips, which naturally infest vegetable fields. Western flower thrips are exceedingly common in ornamental flower production, where they can pick up the virus from a long list of flowers, including impatiens and New Guineas. Once a thrips has fed on an infected plant, it carries INSV for life, potentially infecting every new susceptible plant on which it feeds. It only overwinters in infected plants (including weedy hosts) and thrips.

We've seen INSV in the CVP region a handful of times, in tomato and occasionally in peppers. It is occurring more frequently, especially on early transplants used in high tunnels. To date, the cases have always occurred when bedding plants were raised alongside vegetables, suggesting that the ornamentals had the virus. Thrips either came in with the flower starts or moved into them from where they overwintered in the greenhouse, and passed the virus on to the produce. We've seen other virus, disease, and pest problems move from ornamentals into vegetables in starter houses, so cross-contamination isn't just an INSV problem.

Transmission is efficient in young, dense transplant flats, and can lead to exceptionally high infection rates (47 – 70% symptomatic plants in two cases this year). Symptoms are more likely to be exhibited under stress, like after a late transplanting or during fruiting. Common symptoms on pepper are ringspots, chevron markings, and stem cankers/lesions (see photos). INSV can directly attack fruit, leaving ugly ringspots and sometimes streaked cankers on the stem. The fruit isn't always ruined – it seems to depend on the titer and overall crop stress level.



Stem cankers/ringspot lesions. These were also observed where the stem meets the fruit, though the fruit was still marketable.  
Photo: Elizabeth Buck, CVP



Classic ringspot markings.  
Photo: Elizabeth Buck, CVP



Stunted high tunnel plant with necrotic chevron markings. This plant finally had enough virus to test positive for INSV.  
Photo: Elizabeth Buck, CVP

continued on  
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In short, in virus situations knowing which virus, how it is transmitted, what it infects, what damage it causes allows you to assess your risk level, manage proactively/preventatively, and make crop management decisions should you experience an outbreak. Here's some suggestions for INSV in particular:

- 1) Learn to recognize INSV and other viral symptoms, and keep them in mind when scouting.
- 2) Don't raise your vegetable transplants with ornamentals. It increases your risk of many problems. Ask your supplier if they raise ornamentals alongside their vegetable starts.
- 3) If you do raise them in the same house:
  - Keep highly susceptible ornamentals as physically separate as possible (ie impatiens and peppers, tomatoes)
  - Use sticky cards to monitor for thrips. Isolate and treat thrip traps.
  - Quickly and aggressively treat thrips problems, and rotate control chemistries
  - Do NOT overwinter plants in a house used for vegetable starts. This includes weeds.
  - Get suspect plants tested, then get rid of them (call CCE to get them checked out first)
- 4) Inspect all plant material entering the farm for thrips and disease, including ringspots and necrosis. Isolate and treat thrip traps, reject anything coming in with ringspots or chevron markings. This includes ornamentals you bring on-farm.
- 5) If you suspect you have INSV:
  - Contact us
  - Proactively apply thrips materials to all tomatoes and peppers
  - Rouge out symptomatic plants
  - Reduce crop stress by providing excellent fertility and adequate water
  - Periodically assess whether it makes sense to keep and continue to invest in the infected section or planting, especially if you have multiple plantings. ●

## Lettuce Downy Mildew in New York

Darcy Telenko, CCE Cornell Vegetable Program

Downy mildew of lettuce, caused by *Bremia lactucae*, can be a major disease on lettuce in the field and greenhouse. Cool conditions and leaf moisture are required for this pathogen to infect lettuce. These conditions have led to the development of lettuce downy mildew on susceptible cultivars in western NY



Lettuce downy mildew in the field – bottom leaves yellowing in color.  
Photo: Darcy Telenko, CVP

fields. Unfortunately, lettuce plants are susceptible at all stages of growth. Initial symptoms are light green or chlorotic lesion, which turns yellow or brown with age and onset of sporulation. Sporulation occurs generally on the underside of leaves. Spores are short-lived but are easily dispersed by wind during periods of high moisture. This disease will continue to persist and infect new plantings as long as major rain events continue to occur this season.

Breeding of resistant varieties is a continuous task as this fungus readily produces new races that can easily overcome resistance. Apply targeted fungicides seven to ten days after disease appears and remember to rotate mode of action for fungicide resistance management. This fungus has already developed insensitivity to the systemic fungicide metalaxyl (mefenoxam). See table for a general guideline to assist in identifying fungicide group and pre-harvest intervals. Consult fungicide label for application rates and other restrictions with regard to number of applications that can be applied per season. ●

Fungicides with activity against lettuce downy mildew, fungicide group and pre-harvest interval.

Trade name	Active Ingredient	Fungicide Group	PHI
Actigard 50WG	acibenzolar-S-methyl	P1	7
Quadris	azoxystrobin	11	0
Badge X <sub>2</sub>	copper	M1	0
ManKocide	copper hydroxide+mancozeb	M1+M3	10
Forum SC	dimethomorph	40	0
Tanos 50 DF	famoxadone+cymoxanil	11+27	3
Reason 500 SC	fenamidone	11	2
Presidio	fluopicolide	43	2
Aliette WDG	fosetyl-AI	33	3
Penncozeb 75 DF	mancozeb	M3	10
Previcor Flex	propamocarb	28	2
Cabrio EG	pyraclostrobin	11	0



Downy mildew lesions on lettuce. Initial bleaching lesion on upper surface (left) and sporulation on underside of the leaf (right).  
Photos: Darcy Telenko, Cornell Vegetable Program

# WNY Sweet Corn Trap Network Report, 7/14/15

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

Nineteen sites reporting this week statewide. Four sites reporting European corn borer (ECB)-E with Batavia as high as 12 moths. ECB-Z was also caught at 3 sites this week in WNY. Corn earworm (CEW) were caught at four sites statewide with Preble high enough to require a 6 day spray interval. Fall armyworm (FAW) numbers are beginning to pick up with five sites reporting and with Pavilion and Penn Yan having 13 and 20 moth respectively. Western bean cutworm (WBC) was caught at 7 sites this week.

Fall army worm numbers are up this week. When scouting sweet corn look for FAW egg masses on the leaves. Egg masses consist of 50-150 eggs and can be distinguished from ECB by the fine hairs covering the egg mass. Feeding damage is also very different from ECB. FAW will cause ragged feeding damage on leaves with large amounts of frass below the feeding site. The larva has a distinct inverted 'Y' on the front of the head.

Degree-day accumulations in relation to percent moth emergence (beginning May 1, base 50°F)	
Accumulated	% Moth
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 14, 2015

Location	ECB-E	ECB-Z	CEW	FAW	WBC	DD to Date
Baldwinsville (Onondaga)	0	0	1	0	1	1158
Batavia (Genesee)	12	0	0	0	1	860
Belfast	NA	NA	NA	NA	NA	1001
Bellona (Yates)	NA	NA	NA	NA	NA	1193
Eden (Erie)	0	0	0	0	2	1040
Farmington (Ontario)	1	0	0	0	0	1063
Hamlin (Monroe)	2	1	0	0	0	1036
LeRoy (Genesee)	2	1	1	0	0	1023
Lockport (Niagara)	0	0	0	0	0	1060
Pavilion	0	0	1	13	2	1023
Penn Yan (Yates)	0	3	0	20	1	1153
Seneca Castle (Ontario)	0	0	0	0	0	1087
Spencerport (Monroe)	0	0	0	0	0	1168
Waterport (Orleans)	0	0	0	0	0	1036
Williamson (Wayne)	NA	NA	NA	NA	NA	998

ECB - European Corn Borer

CEW - Corn Earworm

FAW - Fall Armyworm

WBC - Western Bean Cutworm

NA - not available

DD - Degree Day (modified base 50F) accumulation

WBC emergence is forecast to be at 25% when 1319 degree days (base 50°F) have accumulated beginning on May 1st (see table below). The degree day accumulation (May 1st, base 50°F) for sweet corn trap network sites ranges from 860-1193 with an average of 1064. Degree day forecasts pertain only to local populations, the migrant population is much more unpredictable. ●

## UPCOMING EVENTS *view all Cornell Vegetable Program upcoming events at [cvp.cce.cornell.edu](http://cvp.cce.cornell.edu)*

### Vegetable Pest and Cultural Management Field Meetings

July 21, 2015 | 6:00 PM - 8:00 PM

Allegany County – Ernest Giroud farm, 10431 County Rd 23, Fillmore, NY 14735

July 22, 2015 | 6:30 PM - 8:30 PM

Orleans County – Stephen Martin farm, 2352 Oak Orchard River Rd, Medina, NY 14103

July 24, 2015 | 6:00 PM - 8:00 PM

Yates County – Howard Hoover farm, 2845 Swarthout Rd, Penn Yan, NY 14527

August 12, 2015 | 7:00 PM - 9:00 PM

Seneca County – Jesse Stoltzfus farm, 5907 Rt 414, Romulus, NY 14541

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 Darcy Telenko, Robert Hadad and Elizabeth Buck will instruct participants and facilitate peer-based learning. Details on each topic will focus on field observations at these farms. DEC recertification credits will be offered. No cost to attend. Contact Judson Reid at 585-313-8912 for more information.



### Managing Swede Midge in Organic Systems – twilight research trial tour and results

July 23, 2015 | 6:30 PM - 8:00 PM

Quest Farm Produce, Baker Field - 376 Karr Valley Rd, Almond, NY 14804



Join Cornell Vegetable Program Educator Christy Hoepting and CVP Swede Midge Project Manager Cordelia Hall for an evening exploring options for organic management of Swede Midge, a devastating invasive pest of brassica crops. Brand new research on this topic could help you better manage this pest in your brassica plantings this season and beyond. We will look at several different mulch and exclusion netting combinations in an on-farm research trial and discuss the efficacy of each treatment. You'll also learn about the Swede Midge life cycle, how to identify all stages of Swede Midge damage and see the pest and larvae. Don't let Swede Midge leave you with a field full of blind heads! This event is FREE and pre-registration is not required. Contact Cordelia Hall at [ch776@cornell.edu](mailto:ch776@cornell.edu) with any questions.

## Weather Charts

John Gibbons, CCE Cornell Vegetable Program

### Weekly Weather Summary: 7/07 – 7/13/15

Location	Rainfall (inch)		Temp (°F)	
	Week	Month July	Max	Min
Albion	0.44	0.60	86	56
Appleton, North	0.28	0.33	84	53
Baldwinsville	0.38	0.91	87	58
Buffalo*	0.75	1.27	87	58
Butler	0.32	0.70	87	55
Ceres	1.00	1.19	84	55
Elba	0.49	0.86	83	52
Farmington	0.65	0.92	85	56
Gainesville	0.92	1.40	84	51
Geneva	1.49	1.89	87	57
Lockport	NA	NA	NA	NA
Lodi	1.15	1.15	86	54
Penn Yan*	0.69	1.15	86	58
Rochester*	0.46	0.71	87	58
Romulus	NA	NA	86	54
Silver Creek	2.29	2.38	85	56
Sodus	0.41	0.99	88	53
Versailles	NA	NA	86	51
Williamson	0.06	0.07	85	56

### Accumulated Growing Degree Days (AGDD) Base 50°F: April 1 – July 13, 2015

Location	2015	2014	2013
Albion	1142	1092	1136
Appleton, North	929	932	985
Baldwinsville	1158	1194	1189
Buffalo	1161	1126	1231
Butler	1177	1160	1194
Ceres	1032	994	986
Elba	882	892	1046
Farmington	1108	1101	1086
Gainesville	919	885	NA
Geneva	1128	1127	1147
Lockport	NA	1023	NA
Lodi	1254	1240	1305
Penn Yan	1206	1196	1225
Rochester	1229	1204	1272
Romulus	1147	1149	NA
Silver Creek	1047	1052	1154
Sodus	1012	1053	NA
Versailles	1076	1073	1169
Williamson	1031	1043	1112

\* 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

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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