



Veg Edge Weekly

## Update on Spotted Wing Drosophila in Tomatoes

by Judson Reid, Cornell Vegetable Program

**Spotted Wing Drosophila (SWD) has gained notoriety for its impact on berry crops. We are including an update here as it has also been documented to infest tomatoes.**

As a brief recap, SWD is a new invasive fruit fly with the unique ability to lay eggs in unripe fruit. The eggs and larvae become crop contaminants, unfortunately often not apparent until post-harvest and sometimes post-sale. So far in 2013 SWD has been confirmed in the Hudson Valley (Ulster and Orange Counties); Northern New York (St. Lawrence Co.), Long Island (Suffolk Co.) and the Finger Lakes (Ontario Co.). These specimens were all caught in traps near berry plantings. From the wide range of geography and macro-climates of these confirmed findings we can infer that SWD is present throughout NYS.



Harvest tomatoes ASAP to prevent Spotted Wing Drosophila.  
Photo: Judson Reid, Cornell Vegetable Program

**How much of a threat is SWD to tomato growers?** We don't know for sure yet. Initial reports of SWD in tomatoes focused on high tunnels. This may be due to the popularity of heirloom varieties with tunnel growers, as heirlooms are more crack-prone, and thus more attractive to fruit flies such as SWD. The tunnel itself is actually an effective management tool as we'll see below.

Important work by Marion Zuefle of NYS IPM demonstrated that SWD can lay eggs in healthy tomato fruit under laboratory settings when given no other choice. However, field sampling showed SWD emergence only from damaged fruit. Tunnel tomatoes in this study had *no* SWD emergence.

What are the implications? Tunnels will likely reduce SWD risk as fruit cracking is much less than in the field. Cherry and grape tomatoes, which tend to have more unharvested, over-

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mature fruit represent higher risk. Heirlooms, which are often marketed with cracks, are also higher risk than tomatoes with intact skin. Any tomato with cracks, regardless of inside or outside, is at higher risk for SWD.

#### Management steps for SWD in tomatoes:

- If possible locate tomatoes away from soft fruits such as blueberries or brambles.
- Harvest tomatoes thoroughly and removed all ripe fruit regularly.
- Manage irrigation water to reduce cracks.
- Consider tunnels/greenhouses to increase fruit quality.
- If the market allows, shift to thicker skinned, less crack prone varieties.

The Cornell Vegetable Program is not at this time recommending the use of insecticides for SWD in tomatoes (unlike berries). A number of the materials berry growers are now deploying against SWD are labeled for other insect pests in tomatoes. But, given the wide range of hosts that SWD appears to prefer above healthy tomatoes, insecticide applications are not merited. An exception maybe in field production of heirlooms, where despite our best efforts, there will be many cracked fruit.

This story will continue to develop as we learn more each season. Contact Judson if you have questions.

Cornell has an excellent set of SWD resources online at: <http://www.fruit.cornell.edu/spottedwing/> ■



Spotted Wing Drosophila on a tomato.  
Photo courtesy of Eric Sideman, Maine Organic Farmers and Gardeners Association

## Reduce Weeds and Improve Soils with Summer Cover Crops

Thomas Bjorkman, Cornell (ed. C. MacNeil, CVP)

Join us July 11 for a Soil Health and Cover Crops Field Day at Pit Farms in Clyde. See Dates section, pg 10.

Once you've caught up on planting and field work after the rain delays, and if you have a field where peas or early beans were harvested, consider putting in a summer cover crop. Summer provides excellent conditions to get a lot of plant growth. In a harvested field it is easy to get a lot of weed growth. It's better to avoid producing a lot of weed seed, and get some soil building to boot. Buckwheat and sudangrass are two options for planting from June through the first of August. Minimal tillage to incorporate existing plant residues is necessary. Be sure your seeding technique results in good seed to soil contact for rapid emergence, essential for suppressing weeds.

A buckwheat cover crop can be managed grown without much time or money. We recently concluded a research project designed to figure out how to get a buckwheat crop planted with the least amount of work and the greatest chance of success. We found that the safest and most cost-effective way to plant buckwheat is to incorporate harvested vegetable residue quickly after harvest, and then to wait a week, with no further tillage. Drill the

buckwheat at 50 lb/ac, 1/2 to 1 in. deep, or broadcast 70 lb/ac and use very shallow tillage, rolling, to incorporate. [No fertilizer is needed.] We found that planting after just a week is possible because immature residues decompose very rapidly. We also found that with the one-week wait, the drill disturbed any recently emerged weed seedlings enough that the buckwheat got a head start. Waiting longer actually resulted in poorer buckwheat stands. In wet years the time can be cut even closer to get ahead of weeds. Be sure to mow the buckwheat 40 days after planting to avoid seed production! The residues decompose rapidly and have a beneficial effect in reducing surface soil compaction. An additional benefit with buckwheat is that the flowers provide food for beneficial insects.



Buckwheat summer cover crop.  
Photo: Carol MacNeil, Cornell Vegetable Program

Sudangrass can produce a huge amount of organic matter in a relatively short period of time, and if incorporated green before frost has biofumigant action against some soil-borne diseases and nematodes. Seed 30 lb/ac for biomass and nematode control; 50 lb/ac for weed control. It needs about 40 lbs/acre of nitrogen. The plant crowns take time to decompose, however, so only use it where a large seed crop will be planted next, or if you know your transplanter can handle the residues. Mow sudangrass at 40 days from planting to keep the crop manageable. Flail mowing spreads the residue more evenly. Mow it no shorter than 8 inches so top and root growth promptly resume to shade out weeds. Mow it again in September and immediately incorporate for biofumigation and to speed the breakdown of the stems and crowns overwinter.

For more details on buckwheat, sudangrass, and many other cover crops, including seed sources, seeding rates, tips for getting a good stand, etc. go to <http://www.covercrop.net> ■

# WNY Pheromone Trap Network Report, 6/25/13

Marion Zeufle and Abby Seaman, NYS IPM Program

This week 17 of the 24 sites reported trap catch counts. Numbers for ECB-E remain very low with only Farmington and LeRoy reporting one ECB-E each. Hamlin, LeRoy, Owego, and Penn Yan are all reporting ECB-Z. Still no FAW or WBC caught this season. CEW was once again caught at 4 locations. Three of the CEW sites are the same as last week, Batavia, Eden, and Williamson, and one new site, Avoca. Only Eden had CEW numbers high enough to indicate the need for a six day spray interval. Please refer to the table below for spray intervals based on weekly trap catches.

The first flight of ECB is tapering off. The second generation of ECB-E will begin to emerge at about 1400 modified base 50 degree days. Pin holes from ECB have been seen in the whorl of some sweet corn. Scouting of bare ground sweet corn should begin when the tassel starts to emerge. When scouting focus on the emerging tassel. Separate the leaves and look down into the tassel for any signs of feeding, frass or larvae. The threshold for ECB and FAW is 15% infested plants at tassel emergence. The feeding damage differs between FAW and ECB, the FAW damage is more ragged than ECB (see photos). ■



European corn borer (ECB) frass in emerging tassel.



European corn borer (ECB) larva on tassel.



Fall armyworm (FAW) feeding damage.

## WNY Pheromone Trap Catches: June, 25, 2013

Location	ECB-E	ECB-Z	CEW	FAW	WBC
Baldwinsville (Onondaga)	0	0	0	0	NA
Batavia (Genesee)	0	0	2	0	0
Bellona (Yates)	NA	NA	NA	0	NA
Eden (Erie)	0	0	3	0	0
Farmington (Ontario)	1	0	0	0	0
Hamlin (Monroe)	0	4	0	0	0
LeRoy (Genesee)	1	3	0	0	0
Lockport (Niagara)	0	0	0	0	0
Penn Yan (Yates)	0	1	0	0	NA
Spencerport (Monroe)	0	0	0	0	0
Waterport (Orleans)	0	0	0	0	0
Williamson (Wayne)	0	0	2	0	0

ECB - European corn borer  
CEW - corn earworm  
FAW - fall armyworm

WBC - western bean cutworm  
NA - not available

Average corn earworm catch			
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.

## Farmers Market Federation Joins Empire State Producers Expo

Jeanette Marvin, NYS Vegetable Growers Association (ed. C. MacNeil, CVP)

The Farmers Market Federation of NY will be joining the Empire State Producers Expo in 2014! The Federation will be offering a full day of grower-focused marketing seminars. The Empire State Producers Expo runs January 21 - 23, 2014 at the OnCenter in Syracuse. The Expo includes a three-day Trade Show with over 160 companies offering equipment, production inputs, mar-

keting supplies, services and much more. There will be three days of current educational sessions, with both NYS DEC Recertification credits and Certified Crop Adviser credits for related content. Contributing organizations include: the NYS Vegetable Growers Assoc., Cornell Cooperative Extension, Empire State Potato Growers Inc., Farmers Market Federation of NY, NYS

Berry Growers Assoc., NYS Flower Industries, Inc., NYS Horticultural Society, Farmers' Direct Marketing Committee, and Cornell University. Watch for Expo updates at [www.nysvga.org](http://www.nysvga.org) ■

# CROPS Tidbits & Insights

## CABBAGE & COLE CROPS

The break in weather allowed for several new plantings to go into the ground this week. Growth has been very good, except in wet spots. Diamondback moth and cabbage looper pressure really increased over the past week in the warmer weather and more fields need to be sprayed (Fig. 1). See last week's issue for scouting for worm pests in Cole crops.



**Figure 1.** Diamondback moth feeding in broccoli. Tiny holes and window-paning can sometimes be seen from the top (left). Look at the undersides of the leaves and you should be able to find the worms feeding (right).

Photos: Christy Hoepting, CVP

## DRY BEANS

Planting of black beans has progressed rapidly in Western NY where fields were dry enough, with some growers finishing. Planting of red kidneys is progressing where soil moisture permits. Rain continues to delay planting in some areas.

## ONIONS

The break from rain every other day this week finally allowed fields to dry out. Growers were able to get caught up with spraying, cultivate and side-dress nitrogen. There was a lot of growth this week with improved and warmer weather. Unfortunately, the high rainfall of the past month has taken its toll on the crop and caused significant irreversible water damage, which will result in reduced yields. Most direct seeded onions are in the 6-7 leaf stage and transplants have 8 to 12 leaves with earliest varieties having 2 inch bulbs. Botrytis leaf blight (BLB) only continues to increase in fields that have not been sprayed, while fungicide programs including Bravo, Scala and iprodione (Rovral) have kept this disease in check. With rain events forecasted daily and night-time temps in the 60s this coming week, it would be prudent to include mancozeb for protection against downy mildew in fungicide tank mixes. Also, include fungicides for protection against Purple Blotch in onions with 8 leaves or more (e.g. transplants) – see last week's VEW for fungicide suggestions. This week, we saw onion thrips pressure increase in certain direct seeded fields in Wayne County and Potter where they are approaching the spray threshold of 1.0 thrips per leaf. In Elba, thrips pressure was very low in direct seeded onions. Timely first applications of Movento (when thrips were 0.5 to 0.7 OT per leaf) to transplanted onions crashed onion thrips populations and will not need to be sprayed this week. Due to the systemic nature of Movento, timely applications early in the season can sometimes provide control for 2-3 weeks, and growers are strongly encouraged to start their insecticide spray program with Movento – see "Momentum of Movento" in last week's issue of VEW. **Mark your calendars – Elba Onion Twilight Meeting – Thursday, August 8<sup>th</sup>. Note: in VEW June 12<sup>th</sup> issue, rate of Actigard should be 0.75 oz not lb.**

## POTATOES

Heavy rains over the weekend re-flooded fields, or left soils saturated, in some areas. Potatoes in higher and/or drier areas are looking very good, with lush growth. Planting, re-planting of late fields has continued. Growers are trying to catch up on spray applications and on cultivation and hilling. Because of rain delays potatoes are very large in some fields being hilled. Most potatoes up to 8-10 inches tall would benefit from a nitrogen (N) sidedress of 30 – 40 lbs./acre to make up for at-planting N that's been lost. Sidedressing N on large potatoes could delay maturity and make them more susceptible to bruise at harvest and subsequent infection with Pythium leak. Most plots in the Cornell fresh market muck variety trial on Williams' Farm have survived. *From Don Halseth, Cornell, on water-stunted potato plants: "If the field dried out right now [last week] and had optimal growing conditions for the rest of the season growers could get perhaps one-third of a normal yield, but most if not all will be small tubers. If the soil is truly saturated (with water, no oxygen able to get to the roots) for more than 2 - 3 days there will be very significant damage."*

With the heat this past week Colorado potato beetle (CPB) egg-laying and hatch have moved right along, with small, humpbacked, reddish CPB larvae plentiful on volunteers and in fields not treated with an at-planting systemic insecticide or seed treatment. If you need to treat be sure to use insecticides from different Chemical Classes for each separate generation of CPB. There are many choices for CPB management when eggs are hatching and larvae are small. In this hot weather, however, it will only take a few days for larvae to grow from small to medium, or medium to large size. Cryolite, Radiant and Rimon are effective on small to medium larvae but are less effective against large larvae. See the comprehensive article about "CPB Management," including both conventional and organic production, in the June 5<sup>th</sup> *Veg Edge Weekly*, available by logging in at the CVP website: <http://cvp.cce.cornell.edu/> The article separates all the alternatives for CPB management based on Chemical Classes. See more details in the 2013 *Cornell Veg Guidelines* at: <http://www.nysaes.cals.cornell.edu/recommends/24frameset.html>

Adult potato leafhoppers (PLH) may begin to show up soon as they've been spotted on alfalfa.

## SWEET CORN

Early planted sweet corn has silking well underway, most won't make the 4<sup>th</sup> of July harvest but should be close. Growth has jumped with the heat and sun after a real slow start to the season.

*continued on next page*

# CROPS Tidbits & Insights *(continued)*

## VINE CROPS

Several sites have started harvesting cucumbers and the quality looks pretty good considering a real rough start. Cucumber beetle numbers have dropped in many locations. Aphids are still being found at numerous sites on cucumbers and squash. Wet conditions last week has set back many plantings and widespread reports of little or no germination of winter squash and pumpkins. Transplants may be needed if fields remain in poor shape. Weeds have taken off with the rain and now a week of sun. Saturated fields are turning into hard crusted parking lots that will make rescuing earlier planted crops difficult.

Downy mildew has started its march up the East coast with Delaware and Maryland reporting confirmation of the disease in the past week. See article on downy mildew, pg 8-9.

## All Those Little Beetles

*Rick Weinzierl, from Illinois Fruit and Vegetable News, June 6, 2013*

Among the many small beetles in gardens and fields around Illinois in the spring are the bean leaf beetle, striped cucumber beetle, and spotted cucumber beetle. Later in the summer they're joined by the adults of the western rootworm and northern corn rootworm. Although these beetles are somewhat similar in appearance, distinguishing among them is important. The cucumber beetles are vectors of the pathogen that causes bacterial wilt of cucumbers and muskmelons; the others are not. Bean leaf beetles are more likely to cause serious damage to beans than the other species (although spotted cucumber beetle will feed on bean foliage and pods). Here are the key characters that help in identifying these species.



Left to right: bean leaf beetles, spotted cucumber beetle, striped cucumber beetle

**Bean leaf beetles** vary in color and marking, some with black spots or bars on the elytra (shell-like forewings), and some without these marks. All are marked with a black wedge immediately behind the prothorax. **Spotted cucumber beetles** resemble bean leaf beetles but always have 12 distinct spots on the wings. The front, center spots are distinct and do not form a triangle as they do on the bean leaf beetle. **Striped cucumber beetles** have distinct black stripes along the inner and outer edges of the wings, and the stripes run all the way to the ends of the wings. The underside of the abdomen is black. All of these insects overwinter as adults and move into fields and gardens in April through May, as soon as temperatures warm up and their food plants become available. They lay eggs at the base of their host plants, and larvae develop below ground, feeding on the roots. One or two summer generations of adults of these species emerge and feed, mate, and lay eggs; adults of the latter of these summer generations overwinter.

**Western corn rootworm** beetles resemble striped cucumber beetles because of the stripes on their wings. The edges of these stripes tend blur or fade on the western corn rootworm, and they do not extend all the way to ends of the wings. The underside of the abdomen of the western corn rootworm is yellowish. **Northern corn rootworm** beetles have no stripes and no spots ... they're uniformly yellowish green. These two species overwinter as eggs in the soil. Larvae that hatch in the spring feed on the roots of corn, then eventually pupate and emerge as adults, usually beginning in July. Western and northern corn rootworm adults undergo just one generation per year. The adults present in later summer and fall mate, and females lay eggs in the soil; those eggs overwinter to start the cycle again the next spring. ■



Western (left) and northern (right) corn rootworm beetles.

# Effects of Saturated Soils

*Excerpts from the Illinois Fruit & Vegetable News, June 6 and June 20, 2013; Authors: Mike Roegge, Kyle Cecil, James Theuri, University of Illinois (ed. J. Kikkert, CVP)*

Heavy rains in late May and early June have saturated the soils in many regions, and created several concerns. More than likely, symptoms we will see this year are going to be varied and complicated. What we might diagnose in the field as one issue may well be another. Plant stresses, such as excessive soil moisture, make themselves evident in a number of ways. There is always more than meets the eye.

Here are some of the concerns with saturated soils:

**Nitrogen fate.** Nitrogen can be lost in two different ways, but it has to be in the nitrate form to be lost. Nitrate is lost via tile lines (as water flows out so does nitrate); or in oxygen limited environments (saturated soils) it is converted to a gas and lost. Nitrogen is converted to nitrate by soil bacteria, and several factors contribute to nitrate conversion. Time and temperature are the most critical - the warmer the soil temperature, the quicker that conversion occurs. And the longer the nitrogen is out there, the more concern we have. Anhydrous ammonia converts to nitrate more slowly than urea or UAN. These last two N sources can convert as quickly as a couple of weeks after application.

Four-inch bare soil temperatures from the Orr Center in Pike County, IL show temperatures ranging from the high 50s to the low 70s for the last 10 days in May. At these soil temperatures, research has shown that up to 3-4% of soil nitrate can be lost per day under oxygen limiting environments (saturated soils). These losses only occur to nitrate, not the total amount of nitrogen. So to know loss, you need to know how much nitrogen is in the nitrate form. And that depends upon what form of nitrogen was used, when it was applied and if a stabilizer was used. Fall-applied is at more risk than spring-applied. Using a nitrogen stabilizer offers more protection than not using one. All we can do is offer a best

guess as to how much nitrogen is converted over to nitrate. Dr. Emerson Nafziger provided information on a field in eastern IL that had fall-applied anhydrous ammonia (November) using N-Serve. Approximately 80% of the nitrogen had been converted to nitrate. If we used that as an example, and assume that in those areas that had heavy rains since May 20 (the soils have been saturated at least 8 days) and that we're losing 3% of our nitrate per day of saturation, we could have potentially lost about 20% of our total nitrogen applied on those soils. This is an educated guess. It will be higher from fall applied without N-Serve and lower for spring applied. Urea and UAN convert much quicker to nitrate as compared to anhydrous ammonia.

**Compaction** is another concern with heavy rain on saturated soils. We're already seeing that impact on emerged field corn. These fields are a light green color and very irregular in growth. The roots of those plants are suffering from a lack of oxygen.



Leaf yellowing (chlorosis) of tomato resulting from excess soil moisture.  
Photos: James Theuri

**Blossom end rot.** In general, most soils have sufficient calcium to support proper plant growth. While proper liming will insure there is adequate calcium, it is not the lack of calcium in the soil that causes blossom end rot in most cases. It is the inadequate movement of calcium into plants that is the common culprit. Anything that impacts root activity or effectiveness will limit calcium uptake. This includes saturated soils (low oxygen limits root function). Nutrient and water adsorption and their translocation are impacted; consequently, wilting, yellowing, stunting, and nutrient deficiencies are the most common symptoms associated with flooded soils with most vegetables.

**Hormonal imbalances** often occur when roots are in saturated soils, especially at cool temperatures, as production declines in the root-made hormones while stress/aging hormone production increases in other parts of the plant. These shifts create serious imbalances in the levels, ratios, and timing of hormones, which results in abnormal plant development.

**Soilborne diseases** can be a major limitation to crop production, particularly for vegetables. They are often difficult to control. Fungal and bacterial pathogens are the most common pathogens that cause soilborne diseases. Soilborne bacterial pathogens usually persist in the soil for only a short time. Soilborne viruses that affect vegetables are few in number and generally survive only in the living tissues of the host plant or in the nematode or fungal vectors that transmit them. Soilborne pathogens often survive for long periods on host plant debris, soil organic matter, or as free-living organisms. Many soil factors including soil type, texture, pH, moisture, temperature, nutrient levels, and ecology affect the activity of soilborne pathogens. ■

# Late Blight Risk

C. MacNeil, CVP: Weather has been extremely favorable for late blight (LB) this year, when wet weather has made it difficult or impossible for growers to maintain a regular fungicide spray schedule. Scout your fields, especially near woods, in low spots, where airplanes can't get good coverage. Check cull piles to be sure that potato sprouts aren't re-emerging and kill any that are. For photos of LB go to Cornell plant pathologist Meg McGrath's photo index at: <http://www.longislandhort.cornell.edu/vegpath/photos/index.htm> If you think you might have LB contact Carol MacNeil at 585-313-8796, John Gibbons at 585-394-3977 x405, or other CVP staff so we can confirm whether it's LB and get a sample to Bill Fry to determine the LB strain. Mefenoxam fungicides (Ridomil, etc.) are extremely effective against LB stain US-23, which NY had last year, but is ineffective against some other strains. The following states are now confirming LB at <http://usablight.org/> - FL, LA, MD, TN, WV. All report LB on tomato, with FL also having it on potato. The few reports on strain indicate US-23.

New LB forecast information is included in the chart. Cornell plant pathologist Bill Fry's LB Decision Support System (DSS) forecast uses Simcast blight units (BU) to time sprays after the first one. BUs for the past week are listed. Predicted BUs for the next 3 days, based on the National Weather Service (NWS) forecast, are also listed. *Warning! Forecast BUs can change day by day, just like the weather!* For a susceptible variety the threshold for applying the next spray is 30 BUs.

REVISED Late Blight Risk Chart, 6/26/13

Location <sup>1</sup>	Blight Units <sup>2</sup> 6/19-6/25	Blight Units <sup>3</sup> 6/26-6/28 NOTE: This is only 3 days into future!	Location <sup>1</sup>	Blight Units <sup>2</sup> 6/19-6/25	Blight Units <sup>3</sup> 6/26-6/28 NOTE: This is only 3 days into future!
Albion	7	11	Medina	2	13
Appleton	6	13	Penn Yan	15	18
Baldwinsville	21	18	Ransomville	NA	12
Buffalo	4	14	Rochester	18	18
Ceres	26	20	Romulus	16	17
Elba	2	13	Silver Creek	0	14
Gainesville	NA	NA	Sodus	8	12
Geneva (Bejo)	2	18	Versailles	NA	13
Kendall	10	11	Williamson	15	13
Lodi	0	12	Wolcott	13	13

- 1 Weather stations. For more sites: <http://newa.cornell.edu/>
- 2 Passed Week Simcast Blight Units (BUs)
- 3 Predicted Simcast Blight Units (BUs)

## FOR GROWERS USING THE LB DSS FORECAST SYSTEM

It is essential that you input your first fungicide application to your DSS field files, so the DSS switches to the much more accurate Simcast forecast, based on your field location and your variety, etc!

**Having trouble finding the DSS online?** The DSS works best on the Mozilla browser rather than Internet Explorer. Download Mozilla free: <http://www.mozilla.org/en-US/firefox/fx/#desktop>

**Forgot your password or having trouble inputting your first fungicides?** Contact Carol MacNeil at [crm6@cornell.edu](mailto:crm6@cornell.edu) or 595-313-8796, Ian Small at [ims56@cornell.edu](mailto:ims56@cornell.edu), or Laura Joseph at [lje5@cornell.edu](mailto:lje5@cornell.edu).

If your 2013 season field/crop files are set up on the DSS website you can input your fungicides by smart phone/mobile device at <http://blight.eas.cornell.edu/blight/mobile> or do it online at <http://blight.eas.cornell.edu/blight/> ■

## Muck Donut Hour Every Tuesday

Meet with Cornell Vegetable Program Specialist Christy Hoepfing on the corner of Transit and Spoilbank in the Elba muck every Tuesday from 8:30 am to 9:30 am for candid discussions about *everything ONIONS*

# 2013 Cucurbit Downy and Powdery Mildew Management Guidelines

by Margaret McGrath, Beth Gugino, Kate Everts, Steve Rideout, Nathan Kleczewski, and Andy Wyenandt, Cornell

Producing a high-quality cucurbit crop necessitates effectively managing downy mildew. This foliar disease is common in the mid-Atlantic and north-east because the pathogen produces a large quantity of asexual spores that are easily dispersed long distances by wind, which enables it to spread widely. Although the pathogen cannot survive between growing seasons where winter temperatures kill cucurbit crops, it moves throughout the eastern USA each year via its asexual spores. The pathogen does not affect fruit directly; however, affected leaves die prematurely which results in fewer fruit and/or fruit of low quality (poor flavor, sunscald, poor storability).

The most important component of an effective management program for downy mildew is an effective, properly-timed fungicide program. The key is to apply mobile fungicides targeted to the pathogen starting when there is a risk of the pathogen being present in your area. Mobile (or translaminar) fungicides are needed to manage the disease on the underside of leaves. Because these fungicides have targeted activity towards oomycete pathogens like downy mildew and *Phytophthora* blight, different fungicides must be used to manage other diseases such as powdery mildew.

## Resistant Varieties: Another Tool for Managing Downy Mildew

Resistance was the main tool for cucumbers until a new strain of the pathogen developed. Since 2004, varieties with this resistance, which include most hybrids, have provided some suppression of the new pathogen strains present, but substantially less than the excellent suppression that was achieved against strains present before 2004. However, these resistant varie-

ties are still considered a worthwhile component of an integrated program. Fortunately, a new source of resistance has been found and cucumber varieties with these new genes for resistance are being developed. Two newly released varieties that have an intermediate level of resistance include SV3462CS and SV4719CS from Seminis.



Angular, necrotic, downy mildew spots on cucumber leaf.  
Photo: Margaret McGrath, Cornell

## Fungicide Program

[http://plant-pest-advisory.rutgers.edu/wp-content/uploads/2013/06/2013-FRAC-guidelines-for-CDM-and-PM\\_FINAL-mtm.pdf](http://plant-pest-advisory.rutgers.edu/wp-content/uploads/2013/06/2013-FRAC-guidelines-for-CDM-and-PM_FINAL-mtm.pdf) is a cite listing available fungicides: 2013 Fungicide Resistance Management Guidelines for Cucurbit Downy Mildew and Powdery Mildew Control in the Mid-Atlantic & Northeast regions of the United States from Rutgers Vegetable Program.

Alternate among targeted, mobile fungicides from different FRAC groups and apply with protectant fungicide to manage resistance development and to help avoid control failure if resistance occurs. Remember to comply with label use restrictions. The pathogen has demonstrated the ability to develop resistance to fungicides, thus a diversified fungicide program applied to resistant varieties when possible is critical for success.

## When to Apply Fungicides

An important resource for determining when fungicide applications are warranted is the NCSU Cucurbit Downy Mildew Forecasting (CDM ipmPIPE) website at <http://cdm.ipmpipe.org>. The forecasting program monitors where downy mildew is currently active and predicts where the pathogen likely will

be successfully spread and cause disease based on the current and forecasted weather conditions. The risk of downy mildew occurring throughout the eastern USA is forecast and posted three times a week (Mon, Wed, and Fri). Forecasts enable timely fungicide applications based on the risk of disease development. Growers can subscribe to receive customizable alerts by e-mail or text message. Information on the cucurbit hosts affected is also available. This is important because the pathogen exists as pathotypes that differ in

their ability to infect different cucurbits. All pathotypes can infect cucumber; while only some can also infect melons and squashes. Success of the forecast system depends on knowledge of where downy mildew is occurring; therefore prompt reporting of outbreaks by growers is critical.

## Recommended Targeted Fungicides

Use in alternation and tank mixed with a protectant fungicide. Label directions for some products state to begin use before infection or disease development. The forecasting program helps ensure this is accomplished and lets you know when your crops are at risk.

Ranman (FRAC code 21). Use organosilicone surfactant when water volumes are less than 60 gallons per acre. REI is 12 hr. PHI is 0 day. Apply no more than 6 times in a season with no more than 3 consecutive applications.

Previcur Flex (28). This fungicide is more systemic than others and has



good activity for downy mildew, but it is not effective for Phytophthora blight, which usually is also a concern in cucurbit crops. REI is 12 hr. PHI is 2 days. Apply no more than 5 times in a season.

Zampro (40 + 45) and Revus (40). While in the same fungicide chemical group, these products may have a slightly different mode of action, thus there may be benefit to using one early in a season-long fungicide program and then switching to the other product later in the program. REI is 12 hr. PHI is 0 day. Apply no more than 3 times (4 for Revus) in a season with no more than 2 consecutive applications (none with Revus). Revus must be applied with a spreading/penetrating type adjuvant. Revus has exhibited differential activity among cucurbit types. It is very effective for downy mildew in pumpkin but not in cucumber and therefore it is not recommended for use in cucumber.

Curzate (27) or Tanos (11 + 27). These have some curative activity (up to 2 days under cool temperatures) but limited residual activity (about 3-5 days). They can be a good choice when a fungicide application is not possible at the start of a high risk period when temperature is below 80 F. Apply another targeted fungicide 3-5 days later. Both must be tank-mixed with a protectant. REI is 12 hr. PHI is 3 days. Apply no more than 4 times in a season (6-9 for Curzate depending on rate); no consecutive applications of Tanos are permitted. Curzate is not labeled for Phytophthora blight.

Gavel (22). This is the only product that consists of a targeted fungicide (zoxamide) and a protectant fungicide (mancozeb). REI is 48 hr. PHI is 5 days. Apply no more than 8 times in a season. Some cantaloupe varieties are sensitive to Gavel. Workers must be notified that a dermal sensitizer was applied both orally and by posting at entrance to treated area for 4 days.

Presidio (43). This had been the most effective fungicide in several university

fungicide evaluations\* until recently. Control was moderate to poor in several fungicide efficacy trials conducted in the eastern USA (FL to NJ) in 2011 and especially in 2012 suggesting that resistance likely has developed. In sharp contrast, Presidio was highly effective in trials conducted in OH and MI in 2012, providing 91-100% control versus 12-43% control in trials in the eastern USA. This finding indicates the pathogen population in the mid-west differs from that in the east. Until resistance develops in the mid-west, in production areas where the pathogen could come from the south or the mid-west, such as western to central NY and PA, growers will want to use the CDM ipmPIPE forecast website to determine where the pathogen is originating as this will dictate the utility of including Presidio in the fungicide program. \*Presidio and other fungicides were tested alone in these experiments, which is neither a labeled nor recommended commercial use pattern for these fungicides; it is done in efficacy evaluations to determine if resistance affects control.

It is prudent where Presidio is included in the fungicide program to use it judiciously with limited applications in a good rotation program. Presidio has a long rotational interval of 18 months for non-labeled crops, which can be a constraint on production. The label has been expanded and now includes all cucurbits, fruiting vegetables, leafy vegetables, brassica (head and stem), bulb vegetables, sweet potatoes and root vegetables (except carrot, sugar beet, potato). REI is 12 hr. PHI is 2 days. Apply no more than 4 times in a season with no more than 2 consecutive applications. Presidio must be applied with another fungicide.

#### **Recommended Protectant Fungicides**

Chlorothalonil and mancozeb are the main protectant fungicides for downy mildew. Copper is not as effective. Dithane has a supplemental label that includes pumpkin, winter squash and gourd.

#### **No Longer Recommended**

Resistance to mefenoxam and metalaxyl and to strobilurins is sufficiently common that fungicides with these active ingredients (e.g. Ridomil and Cabrio), which used to be highly effective, are now ineffective and should not be applied for managing downy mildew.

#### **Manage Downy Mildew Effectively in Cucurbit Crops**

In summary, to manage downy mildew effectively in cucurbit crops:

1. select resistant cucumber varieties
2. sign-up to receive alerts about downy mildew occurrence and routinely check the forecast web site to know where the disease is occurring and what crops are affected,
3. inspect crops routinely for symptoms beginning at the start of crop development, and
4. apply targeted fungicides tank-mixed with protectant fungicides weekly and alternate among available chemistries based on FRAC code, starting when there is a risk of downy mildew for the specific crop based on the forecasting program. Add new fungicides to the program when they become available; substitute new for older product if they are in the same FRAC group.

**Please Note: The specific directions on fungicide labels must be adhered to — they supersede these recommendations, if there is a conflict. Note that some products mentioned are not yet registered for use on cucurbits. Check labels for use restrictions. Any reference to commercial products, trade or brand names is for information only; no endorsement is intended. ■**

## Dates...visit our [website](#) for a complete list of upcoming events

### **JULY 11 - SOIL HEALTH FIELD DAY**

9:30 am - 2:00 pm, Roger and Scott Arliss' Pit Farms, 895 Lockpit Rd, Clyde 14433. Soil health is never more important, nor more obvious, than in a very wet year. At this field day, learn about options for improving crop and soil performance through rainfall extremes. Observe the dramatically different effect of simulated rainfall on a soil with good health vs one that's been overworked. See soil layers, compaction and crop root growth in a soil pit. On-farm trial results with a wide range of grass, legume and crucifer cover crops will be presented, including information on winter triticale and winter malting barley. Reduced tillage equipment, including planters, will be demonstrated. There will time for you to discuss your experiences with other growers, as well as to ask questions of Roger and Scott Arliss, and the speakers. Registration is at 9:30 am at the field and costs \$5. A picnic lunch is included. For more information, contact Ron Thorn at 315-946-9912 or [rdtswcd@rochester.rr.com](mailto:rdtswcd@rochester.rr.com). Additional information can also be found on our website, <http://cvp.cce.cornell.edu/event.php?id=99>. Sponsored by Wayne County Farm Bureau, USDA NRCS, Wayne County SWCD, and Cornell Cooperative Extension.

### **JULY 15 - SELLING YOUR FARM PRODUCTS TO LOCAL BUSINESSES AND INSTITUTIONS**

9:00 am - 12:00 noon, Foodlink Distribution Center, 1999 Mt Read Blvd, Rochester 14615. One important way to boost your farm revenue and improve cash flow for your farm is larger-scale direct marketing to nearby food hubs, restaurants, institutions, auctions, and other bulk buyers. Cornell Cooperative Extension and Foodlink are hosting this new workshop and tour to give you the practical facts about how to plan for marketing relationships with businesses and institutions, maintain the supply contacts, and other important factors, like risk and profitability. Tour Foodlink's new food hub distribution center and learn their role as a potential marketing partner and hear from an institutional purchaser looking to local farms as a source of food. Cost: \$10.00 per person includes lunch. REGISTER or MORE INFORMATION: Nancy Anderson at CCE Ontario County at 585-394-3977 x427 or [nea8@cornell.edu](mailto:nea8@cornell.edu). Supported by Farm-to-Institution New York State (FINYS).

### **JULY 16 - MECHANICAL WEED MANAGEMENT - ROLLING HILLS DISCUSSION GROUP**

4:00 - 7:00 pm, Clearview Farm, 243 Faas Rd, Palmyra 14522. Kurt Forman of Clearview Farm and the Cornell Vegetable Program staff will show and explain a cultivation timing demonstration for weed management. Dr. Chuck Mohler will return for this follow up to last fall's Cultivation Equipment workshop to discuss the results of the demonstration and answer weed management questions. This event is free. The Rolling Hills Discussion Group is for new and beginning farmers in the Upper Finger Lakes and is free to join. Contact Elizabeth Buck at 607-425-3494 or Robert Hadad at 585-739-4065 for more details.

### **JULY 17 - SENECA COUNTY - VEGETABLE PEST AND CULTURAL MANAGEMENT FIELD MEETING**

### **JULY 25 - ORLEANS COUNTY - VEGETABLE PEST AND CULTURAL MANAGEMENT FIELD MEETING**

### **AUGUST 2 - YATES COUNTY - VEGETABLE PEST AND CULTURAL MANAGEMENT FIELD MEETING**

### **AUGUST 8 - CHAUTAUQUA COUNTY - VEGETABLE PEST AND CULTURAL MANAGEMENT FIELD MEETING**

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 will instruct participants and facilitate peer-based learning. Cooperating farms will be selected to host the meetings as the season progresses. Details on each topic will focus on field observations at these farms. Addresses to be provided soon. General agenda can be found at [cvp.cce.cornell.edu](http://cvp.cce.cornell.edu). Call Jud at 585-313-8912 for more information.

### **NOVEMBER 7 - TOMATO SCHOOL**

SAVE THE DATE! Jordan Hall, NYSAES, Geneva 14456. A thorough school for tomato growers of all experience levels and farm management systems, this program will begin with the basics and move through advanced topics. Speakers from across NYS and Pennsylvania will discuss pest and disease management, hot water treatment of seeds, post-harvest handling, precision nutrition management, and more. Growers will share their tips and experience in raising transplants and field production. DEC credits will be available. Pre-registration will be required as space will be limited. More information on this event will be available later this summer.

### **NOVEMBER 8 - SQUASH SCHOOL**

SAVE THE DATE! CCE Monroe County, 249 Highland Ave, Rochester 14620. This school will cover pest, disease, and weed management, fertility management, post-harvest handling, and more. For squash growers of all sizes. Summer squash will be discussed, with a heavier focus on winter squash production. DEC credits will be available. Pre-registration will be required as space will be limited. More information on this event will be available later this summer.

# Weather Charts

J. Gibbons, CVP:

## Weekly Weather Summary: 6/18 - 6/24

Location	Rainfall (inch)		Temp (°F)	
	Week	Month June	Max	Min
Albion	0.08	4.34	87	43
Appleton, North	0.09	4.92	87	42
Baldwinsville	0.63	5.85	87	45
Buffalo*	0.60	5.50	85	50
Ceres	0.00	3.17	86	41
Elba	0.04	5.27	85	42
Farmington	0.47	5.82	86	41
Gainesville	NA	NA	NA	NA
Geneva	NA	NA	90	46
Kendall	0.14	5.34	89	44
Lodi	0.12	1.98	90	44
Penn Yan*	0.22	3.19	89	49
Ransomville	0.41	4.73	86	43
Rochester*	0.03	5.53	89	46
Romulus	0.18	2.05	88	45
Silver Creek	0.00	4.70	85	48
Sodus	0.20	7.61	88	39
Versailles	NA	NA	86	44
Williamson	0.17	5.03	88	45
Wolcott	0.04	5.22	86	43

## Accumulated Growing Degree Days (AGDD) Base 50°F: Jan. 1 — June 24, 2013

Location	2013	2012	2011
Albion	749	913	708
Appleton, North	618	785	514
Baldwinsville	740	1002	905
Buffalo	830	1033	758
Ceres	625	804	746
Elba	678	NA	646
Farmington	681	914	738
Gainesville	NA	913	735
Geneva	792	984	824
Kendall	792	NA	NA
Lodi	769	1032	727
Penn Yan	785	1009	842
Ransomville	654	911	701
Rochester	845	1039	784
Romulus	767	NA	NA
Silver Creek	781	940	NA
Sodus	669	868	711
Versailles	802	956	NA
Williamson	718	957	716
Wolcott	695	NA	NA

\* 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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**Veg Edge Weekly** is a seasonal weekly publication of the **Cornell Vegetable Program** providing information about crop development, pest activity and management, pesticide updates, local weather conditions, meetings and resources.

**Veg Edge** is published 28 times annually, monthly from October-May and weekly from May-September. If you have any questions about this publication, contact Julie Kikkert at 585-394-3977 x404 or [jrk2@cornell.edu](mailto:jrk2@cornell.edu). Visit the **Cornell Vegetable Program website** at <http://cvp.cce.cornell.edu/> for information on our research, upcoming events and enrolling in our program.

*Cornell Cooperative Extension provides equal program and employment opportunities.*

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This publication contains pesticide recommendations. Changes in pesticide regulations occur constantly and human errors are possible. Some materials may no longer be available and some uses may no longer be legal. All pesticides distributed, sold or applied in New York State must be registered with the New York State Department of Environmental Conservation (DEC). Questions concerning the legality and/or registration status for pesticide usage in New York State should be directed to the appropriate Cornell Cooperative Extension specialist or your regional DEC office.

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