

Crisp, brown leaf margins are characteristic of squash bug damage. Scout cucurbits for egg

masses and time pesticide applications once nymphs hatch.

PAGE 1



Downy mildew isn't always a cool season disease in Cole crops. Infections of DM in broccoli

ecological impacts. Do NOT



touch this plant!

Wild parsnip is a biennial or perennial herbaceous plan with human health and



Powdery mildew is managed with resistant varieties and fungicides. Learn more about how to effectively

control this foliar, fungal disease in cucurbits.



PAGE 8



uly 20, 2016

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Cooperative Extension Cornell Vegetable Program

Squash Bug on Zucchini and Summer Squash

Judson Reid, CCE Cornell Vegetable Program

Hot, dry conditions often favor insect pest outbreaks, and 2016 is proving to be a year of heavy squash bug damage. The adult of this pest overwinters in crop debris, then lays copper colored eggs in triangular clusters (Fig. 2) of susceptible crops including zucchini, squash, pumpkins, melons and cucumbers. Freshly hatched nymphs do not resemble adults, rather are grey-to-green with black appendages (Fig. 3). Feeding damage from the adults results in a blight condition where plants yellow and wilt (Fig. 1). Crisp, brown leaf margins are characteristic.

Management begins with rotation away from cucurbits. Adults thrive in the lower canopy; underneath plastic mulch, and are difficult to target. Instead, scout eggs masses and time pesticide applications





Cornell University

were reported this week. Learn how to recognize it and control it. PAGE 4



VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension regional agriculture team, serving 12 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.

We're interested in your comments. Contact us at: CCE Cornell Vegetable Program 480 North Main Street, Canandaigua, NY 14224 Email: cce-cvp@cornell.edu

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Help us serve you better by telling us what you think. Email us at *cce-cvp@cornell.edu* or write to us at Cornell Vegetable Program, 480 North Main Street, Canandaigua, NY 14424.



Cornell University Cooperative Extension Cornell Vegetable Program

Contents

Contact Us

Cornell Vegetable Program	12
Crops	
Crop Insights	06
Cole Crops: Downy Mildew in Broccoli in this Heat?	04
Cucurbits: Managing Cucurbit Powdery Mildew in 2016	08
Potato/Tomato: Late Blight Risk	05
Sweet Corn Trap Network Report, 7/19/16	05
General	
Squash Bugs on Zucchini and Summer Squash	01
Online Resources for Farm Food Safety Education	03
Weed of the Week: Wild Parsnip	07
Upcoming Events	
Vegetable Pest and Cultural Management Field Meetings	10
High Tunnel Pest and Disease Management: Organic Control Strategies	10
2016 Elba Muck Onion Twilight Meeting	10
Organic Dry Bean Discussion Group Meeting	10
Vegetable Walk and Cut Flowers	10
Finger Lakes Soil Health Discussion Group Meeting	10
Weather Charts	11

The next issue of VegEdge will be produced on July 27, 2016.



National Onion Association Annual Summer Meeting was held in Niagara Falls last week with a tour to the Elba muck lands last Friday of over 100 people from across the United States, Canada, United Kingdom, Netherlands, Australia and New Zealand. Cornell on-farm research was featured. Christy Hoepting (in red) shares results of ragweed herbicide trial. *Photo: Howard B. Owens, The Batavian*

once nymphs have hatched. Destroy zucchini plantings once done harvesting and practice deep tillage and cover cropping.



Material PHI REI **Organic?** 12 Assail (acetamiprid) 0 no 12 Pounce (permethrin) 0 no 3 12 Asana no



Figure 2. Squash bug egg mass on zucchini leaf. Eggs are copper colored in triangular clusters. *Photo: J. Reid, CVP*

Figure 3. Squash bug nymphs are grey-to-green with black appendages. Photo: J. Reid, CVP **Q**

Online Resources for Farm Food Safety Education

Ginger Nickerson, University of Vermont

SANITIZER RESOURCES

Now that harvesting is going strong, here is reminder <u>factsheet on how to</u> <u>use sanitizers</u> in produce dunk tanks (although it was written for growers seeking GAPs certification it contains links that are useful for any grower using sanitizer in their dunk tanks). Chris Callahan, Ag Engineer UVM, has designed a <u>doser</u> for small volumes of sanitizer and a calculator sheet for determining how much sanitizer to use for your dunk tank. **The link to the calculator** is in the first paragraph of the doser sheet. More information on sanitizers can be found <u>here</u>.

NEW PACKSHED DESIGN RESOURCES! (ADD INFO RE: LOAN PROGRAM)

Thinking about making improvements to your wash/packshed? Seven Vermont growers generously shared the lessons they learned building new packsheds or making old barns more efficient and easier to clean. You can check their seven case studies out <u>here</u> (scroll past the videos to <u>Vermont</u> <u>Case Studies on Packshed Design</u>) Don't forget The USDA Farm Service Agency has a loan program focused on

Agency has a loan program focused on storage and processing facilities, more info <u>here</u>.

ON-LINE GAPS COURSES

Cornell Cooperative Extension will run their on-line GAPs course on the follow-ing dates:

July 13 - August 02, 2016 September 07 - September 27, 2016 October 05 - October 25, 2016

For more information go here



PREVENTIVE CONTROLS AND HACCP COURSES

UVM Extension Preventive Control for Human Foods

Date: September 28, 2016 8:00am -Friday, September 30, 2016 5:00pm

Location: Vermont Department of Health, 108 Cherry Street, Room 2B, Burlington, VT 05402

Registration: Early reg: \$400 until September 1, 2016; Regular fee: \$500 starts September 1, 2016 For more info or to register go <u>here</u>

Penn State Preventive Controls for Human Foods (FDA FSMA HARPC/ HACCP)

Malvern, PA July 26 - 28 LINK University Park August 30 - Sept 1 LINK (limited seating still available) Pittsburgh Sept 26 to 28 LINK

Penn State HACCP – USDA Malvern, PA Sept 13 to 15 LINK

NEW RESEARCH ON TESTING IRRIGA-TION WATER

The Food Safety and Modernization Act requires testing of surface waters that are used for overhead irrigation for levels of E.coli. E.coli is an indicator of the presence of fecal matter which may or may not include pathogenic organisms. A researcher in Georgia is investigating a new method using high volume ultrafiltration that may be able to sample 50 liters of water at a time for specific pathogens that cause food borne illnesses. A longer description is available <u>here</u> at the Center for Produce Safety website.

Downy Mildew in Broccoli in this Heat?

Christy Hoepting, CCE Cornell Vegetable Program

Although we think of downy mildew (DM) as a cool season disease that is favored by cooler temperatures and long periods of leaf wetness, which typically occurs in the fall, new infections of DM were reported on broccoli this week. When the canopy is full, the crop is being irrigated, and it is in an area where DM has occurred previously, the night time temperatures could be cool enough to drive this disease.

Know how to recognize downy mildew. On older leaves, DM causes irregular, yellow to brown spots on the upper side of the leaves (Fig. 1) with a grayish, white mildew on the underside of the leaves (Fig. 2) during cool, moist conditions. As soon as lesions are evident on older leaves, spores can spread to marketable portions of the crop. Late season infections can cause losses in cauliflower and broccoli by internal discoloration of the heads (Fig. 3). It also leaves the heads more susceptible to soft rot bacteria and other storage rots, especially in cabbage and broccoli, and especially when it is so hot.

Is spraying necessary in this hot weather? If you have broccoli that is heading, especially if the dome of the head is not smooth and water can pool (Fig. 4), and the disease is actively sporulating as in Fig. 2 in the crop that is heading or in a nearby planting, then it may be worthwhile to consider spraying a preventative fungicide treatment to prevent infection from spreading to the marketable portions.

Several fungicide options. Use of fungicides can alleviate development and spread of downy mildew, although most plants will still be infected, at least at low levels. In addition to Bravo, Quadris, Quadris Top and Cabrio, which are also labeled for Alternaria leaf spot, several other fungicides are labeled for DM including Ridomil Gold Bravo, Reason, Presidio, Ranman, Phostrol/Prophyt, mancozeb, Forum, Alliette, copper compounds (several OMRI approved) and Actigard.

In Cornell and other university studies, **Presidio has consistently provided best control of downy mildew.** Bravo and mancozeb also provided good control of DM, while Actigard did not work. In 2014, Presdio, Cabrio and Champ (a copper) all provided significantly better control of DM than Bravo in cabbage (Fig. 5). For resistance management, Presidio must be used in a tank mix with another fungicide for DM with a different mode of action, such as Bravo. Some growers also use a copper based bactericide in addition to fungicide to help to prevent secondary bacterial rots.

To prevent inoculum buildup in the soil, destroy crop debris as soon as possible after harvest. Rotate ground away from crucifers for at least 3 years.

Amount of Downy Mildew Control Using Different Products in Cabbage



Figure 5. Control of cabbage downy mildew using four different control products. Cabbage plants were sprayed 5 times on a 7 day interval beginning in August and into September. The results shown are the area under the disease progress curve (AUDPC = amount of disease over time). Bars with different letters are significantly different from each other.



Figure 1. Downy mildew causes irregular, yellow (a – early infection) to brown spots (b – older infection) on the upper leaf surface, which shows up on lower frame leaves first. *Photos: C. Hoepting*



Figure 2. On the underside of the leaf, the lesions of downy mildew have a grayish, white mildew. *Photo: C. Hoepting, CVP*



Figure 3. Internal discoloration caused by downy mildew in broccoli. *Photo: C. Hoepting, CVP*



Figure 4. Water beading on head of broccoli, which can increase risk of downy mildew infection. *Photo: C. Hoepting, CVP*

Late Blight Risk

Carol MacNeil and John Gibbons, CCE Cornell Vegetable Program

No late blight (LB) has been detected in NYS, the Northeast, or most of the rest of the country in the past week. However, note: From ONvegetables, 7/19: While no LB has been observed on tomatoes or potatoes in the region, LB spores were found in spore traps in Ontario, Canada (trap data from Eugenia Banks and the Ontario Potato Board).

Only a few weather station sites have reached the 30 blight unit (BU) threshold for a fungicide spray in the past week. However, most of the other sites are at, or will soon reach, the spray threshold due to the accumulation of fungicide (loss) units (FU) in the past week. The larger potato canopies at this time of year increases the relative humidity (RH) around the lower leaves. In a dry year that is where LB is often first found. You don't need rain for LB development.

Late Blight Risk Chart, 7/19/16¹

Location ¹	Blight Units ² 7/13-7/19	Blight Units ³ 7/20-7/22	Location ¹	Blight Units ² 7/13-7/19	Blight Units ³ 7/20-7/23
Appleton	6	1	Lodi	7	13
Baldwinsville	17	6	Lyndonville	11	11
Bergen	5	0	Medina	16	2
Buffalo	1	0	Niagara Falls	5	1
Ceres	28	9	Penn Yan	7	11
Elba	5	0	Rochester	10	10
Fairville	5	5	Sodus	10	11
Farmington	6	5	Versailles	6	6
Gainesville	40	9	Wellsville	21	2
Geneva	5	5	Williamson	6	6
Kendall	6	4	Wolcott	6	15

Assuming: last fungicide spray 1 week ago; residual like chlorothalonil; susceptible variety

Past week's Simcast Blight Units (BU) (Threshold = 30 BUs) Three day predicted Simcast Blight Units

WNY Sweet Corn Trap Network Report, 7/19/16

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

Twenty sites reported this week for Western NY. European corn borer ECB-E was caught at six sites with Batavia and Kirkville again having high trap counts. ECB-Z was caught at five sites and remains in the single digits. Corn earworm (CEW) reported at four sites with the Kirkville and Williamson sites high enough to require a 6 day spray schedule (see table at end). Both Fall armyworm (FAW) and Western bean cutworm (WBC) are increasing with FAW caught at eight sites and WBC caught at thirteen sites this week.

Degree day accumulations for sweet corn trap sites range from 897-1344 (base 50F starting May 1st) with an average of 1144. WBC emergence is predicted to be at 25% when degree day accumulations reach 1319 (see chart below). We are currently still below 25% moth emergence for most of the sites. WBC threshold for fresh market sweet corn is only 1%. It is important to scout late whorl and early tasselemergence fields as these are most at risk. After hatching larvae will spend a few days feeding on the tassel before moving down to the ear.

Degree-day accumulations emergence (beginni	in relation to percent moth ng May 1, base 50°F)	Percent WBC moth emergence based		
Accumulated Degree-days	% Moth Emergence	on degree day accumulation, data from University of		
1319	25%			
1422	50%	Nebraska		
1536	75%			



Fall armyworm.



Fall armyworm feeding damage and frass



Fall armyworm larva. Note the prominent inverted 'Y' on head

WNY	Pheromone	Trap	Catches:	Julv	/ 19.	2016
			outomoon	••••	,,	

			, _• .•			
Location	ECB-E	ECB-Z	CEW	FAW	WBC	DD to Date
Baldwinsville (Onondaga)	0	1	0	0	13	1199
Batavia (Genesee)	104	0	1	0	29	897
Belfast	NA	NA	NA	NA	NA	1017
Bellona (Yates)	1	0	0	0	1	1274
Eden (Erie)	0	0	1	24	38	1090
Farmington (Ontario)	0	0	0	0	0	1116
Hamlin (Monroe)	NA	NA	NA	NA	NA	1274
LeRoy (Genesee)	NA	NA	NA	NA	NA	1108
Pavilion	0	0	0	0	13	903
Penn Yan (Yates)	1	0	0	1	2	1238
Ransomville (Niagara)	0	0	0	1	9	1239
Seneca Castle (Ontario)	0	0	0	7	0	1162
Spencerport (Monroe)	0	5	0	0	1	1257
Waterport (Orleans)	NA	NA	NA	NA	NA	1137
Williamson (Wayne)	0	0	2	0	0	1074
ECB - European Corn Borer	WBC - Western Bean Cutworm					
CEW - Corn Earworm	NA -	not availa	able			

FAW - Fall Armyworm

DD -Degree Day (modified base 50F) accumulation

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.



Water or lack thereof continues to be a concern in many areas. Irrigation ponds and creeks are starting to dry up. Heat and drought stresses still dominate most of the problems around the region. Growers have begun to walk away from crop plantings that cannot handle the heat stress or lack of water.

COLE CROPS - Fresh Market

Broccoli – downy mildew has been found in spots under irrigation (see article, pg 4). Cauliflower and Cabbage - issues with flea beetle and in areas under drought conditions. Even with these dry condition active white mold has been seen in cabbage, drip lines are providing enough moisture under the canopy for this disease to take hold.

CUCURBITS

Downy mildew has now been confirmed in Lancaster County, PA. Be on the lookout and if you suspect downy mildew please contact us to verify. Powdery mildew continues to increase in cucumber and squash planting around the region (see Dr. McGrath's article, pg 8). Cucumber beetles are still hanging around.

DRY BEANS

Early beans are in flower. High levels of potato leafhoppers (PLH) and hopperburn are likely on untreated dry beans. On beans from Cruiser-treated seed the sign of the loss of control is the presence of tiny pale green PLH nymphs on the undersides of leaves.

A high number of Western bean cutworm (WBC) moths were caught this past week in a field in Riga. WBC egg masses were easy to find in adjacent field corn. Counts at other traps were still relatively low. Peak emergence could occur in a week, however. Growers will be alerted when dry bean scouting should begin. A single insecticide spray, if needed, isn't recommended until a week or more after peak moth emergence.



EGGPLANT

There aren't many pests on eggplant, but it is susceptible to Verticillium wilt and we've begun to see this disease appear sporadically around the region. The soilborne fungus, Verticillium alboatrum, infects the root and moves into the stems, but the symptoms first appear in the leaves where they develop pale yellow blotches and necrotic, V-shaped lesions at the tips or along one side of the leaf. Generally, symptoms do not develop until the plant is bearing flowers or fruit or after periods of stressful hot, dry weather. When the stem is cut open there is a distinctive brown discoloration of the vascular tissue while the pith remains white.





Classic Verticillium wilt symptom on eggplant leaf. Photo: D. Telenko

ONIONS

What a difference a week makes! Last week early transplants that were just beginning to lodge were all the way down this week, thanks to the high winds of last week. The crop is racking up heat units and some growers are concerned that some fields won't make as much size, especially where they haven't been able to irrigate and pink root is setting in. Nonetheless, there are some gorgeous fields of onions out there, including some that have been grown with only the first fungicide applied last week, because the spring was so unfavorable for Botrytis leaf blight. Now, as onions are bulbing, which results in tipburn and outer leaf dieback, fungicides for Stemphylium leaf blight (SLB) are recommended: for best control, use a fungicide belonging to FRAC 3 or 7 every week, or Scala + Rovral/mancozeb in areas with less pressure – see July 6th issue of VegEdge for more info on SLB fungicides. The Cornell Cheat Sheet for Onion Fungicides is also available at http://rvpadmin.cce.cornell.edu/uploads/doc 462.pdf. Onion thrips continues to be a battle in this heat with some growers doing better than others, and with valiant efforts to delay use of Radiant as long as possible to preserve the useful life of this product (see last week's VegEdge). There have been mixed results with tank mixes of Agri-Mek + Warrior and Lannate + Warrior with greatest successes occurring where thrips populations were less than 3.0 per leaf. Some growers tried Exirel for the first time last week, and it also performed better when thrips were at lower pressures.

PEPPERS

Watch for thrips - we've found a few in the blossoms.

POTATOES

Three fields on two farms in the CVP area have been confirmed positive for bacterial blackleg Dickeya or Dickeya dianthicola, by Keith Perry, Plant Pathology, Cornell, and NYS Foundation Seed Potato Program. Seed came from Maine. The varieties were Reba and Superior. At the time of sampling stems showed dark discoloration near the soil line, and wilting/death of the stems above. This disease has been confirmed in many Mid-Atlantic and Eastern states in seed from Maine, New Brunswick or Wisconsin. Varieties affected this year have been: Superior, Reba, Norwis, Vivialdi, Snowden, Waneta and Yukon Gold. If you have similar symptoms on a significant percentage of plants please contact Carol MacNeil at crm6@cornell.edu or 585-313-8796 (cell/text).

Insect and mite pests tend to be worse in hot, dry years. Hopperburn caused by a high population of potato leafhoppers (PLH) has been observed on an untreated potato planting. Potatoes have a very low tolerance for PLH feeding. Dimethoate can work well even at lower than the labeled rate. Do not combine with copper fungicides. According to Sandy Menasha, CCE Suffolk County mites are present on Marcy and NY140 potatoes on Long Island (they could be seen in the CVP region this year). Mites cause yellowing and death of foliage, often

continued - CROP Insights

near dusty farm lanes. The mites and their very fine webs can be seen on leaf undersides when a hand lens is used. ABBA/Agri-mek is recommended as it has translaminar activity (moves from upper leaf surface to lower). A non-ionic surfactant should be included. Control must be started before a high level of infestation occurs. <u>Colorado potato beetle (CPB)</u> summer adults are present in untreated fields. With the hot weather the time from egg hatch to small, to medium, to large larvae will be shortened. <u>Early blight (EB)</u> is present on potatoes in untreated fields. <u>Late blight (LB)</u> spores were found in spore traps in Ontario, Canada, though no disease was observed in potatoes or tomatoes. See more in the *Late Blight Risk* article, pg 5.

SWEET CORN

Active feeding of army worm have been seen in mature ears corresponding to trap counts from previous weeks. A high number of European corn borer moths were caught in the Batavia trap and numbers of fall army worm and western bean cutworms continue to accumulate. (see Marion's report). Wildlife continue to plague sweet corn as corn begins to ripen. We have heard of high numbers of raccoons causing extensive damage in areas. Birds have also moved in – we are in our second year of evaluating mechanical (air-dancer and scare-eye balloons), and chemical (Avian Control) control options. In 2015 trials, Avian Control applied twice starting two weeks prior to maturity at 32 oz/A had positive results along with both mechanical options. Avian Control needs to be in place prior to crop maturity for the birds to learn to avoid the field.



Bird damage to tip of ear and raccoon damage in sweet corn. *Photos: D. Telenko*

Weed of the Week: Wild Parsnip

Darcy Telenko, CCE Cornell Vegetable Program

Wild parsnip (*Pastinaca sativa*) is a biennial or perennial herbaceous plant with human health and ecological impacts. **Do NOT Touch This Plant!**

The sap of wild parsnip contains chemicals called furanocoumarins which make skin more vulnerable to ultraviolet light. Skin contact with the sap in combination with sunlight can cause a severe burn that will appear within 24 to 48 hours. This reaction is called phytophotodermititis and can cause discoloration of the skin and increased sensitivity to sunlight for many years. Contact with the sap can occur either through brushing bristles on the stem or breaking stem and leaves. Immediately wash affected area with soap and water and keep area away from sunlight for 48 hours to prevent reaction. If reaction occurs, keep affected area out of sunlight to prevent further burning and see your physician.

Protect yourself by learning to identify wild parsnip at the different life stages. **DO NOT** touch any parts of the plant with bare skin. Wear gloves, longsleeved shirts, pants, boots and eye protection if working near wild parsnip to prevent skin contact with sap. Synthetic, water resistant materials are recommended.

Wild parsnip can grow up to five feet tall. It has hollow, grooved stems that are hairless. Leaves look very similar to celery leaves, they are yellow-green, coarsely toothed and compound (see photo). Flowers are small yellow clusters similar to Queen Ann's lace but yellow in color. Flowering can start in May or June and last 1-2 months – they are currently in bloom along many western NY roadsides. Seeds are flat and brown (similar to domesticated parsnip). Wild parsnip is located throughout western NY.

Wild parsnip can be mistaken for a number of similar species including cow parsnip, Angelica, poison hemlock, and Giant Hogweed which also causes phytophotodermititis. See the following website which contains information on how to identify these species including giant hogweed and distinguish them from each other. <u>http://www.dec.ny.gov/</u> animals/72766.html



- 1. Try to make a positive identification.
- 2. Prevent establishment and spread remove new infestations while they are small and not well established. Clean equipment before moving to a non-infested area.
- 3. Manual removal while wearing protective gear can be effective in small areas. Cut roots 1-2 inches below soil or pulling plants by hand wear long-sleeves and gloves! This should be done before letting it go to seed. Leave bags in sun for one week to kill the seed heads before disposal.
- 4. Mowing after flowering but before seed have developed can kill the plants. Regrowth may occur, so it may be necessary to mow more than once.
- 5. General herbicides (glyphosate) can be applied as spot treatment to the new growth and rosettes.
- 6. Report an infestation take a photo of the entire plant including leaf, flower and/or seed, note location and report to iMapInvasives at <u>www.NYiMapInvasives.org</u>

For further information, contact DEC Forest Health or your local Partnership for Regional Invasive Species Management (PRISM) by visiting <u>www.nyis.info</u>.



Wild parsnip growing in corn field (above). *Photo: Darcy Telenko, CVP*

Wild parsnip leaf (left). Source: Wild Parsnip Brochure

Managing Cucurbit Powdery Mildew in 2016

Margaret McGrath, Plant Pathology and Plant-Microbe Biology, Cornell, Long Island Research & Extension Center

Effectively managing powdery mildew is essential for producing a high-quality cucurbit crop. This foliar, fungal disease is common wherever cucurbits are grown, including in the northeastern U.S. This is because the pathogen produces an abundance of asexual spores (the powdery growth) easily dispersed by wind, thus it can spread widely, and the pathogen can produce a sexual spore in fall that enables it to survive over winter. Leaves affected by powdery mildew die prematurely which results in fewer fruit and/or fruit of low quality (poor flavor, sunscald, poor storability).

Powdery mildew is managed with resistant varieties and fungicides. An integrated program with both management tools is the best approach for achieving effective control because the pathogen is adept at evolving new strains resistant to individual tools such as resistant varieties or a specific fungicide. It is more difficult for new pathogen strains to develop when an integrated program is used, and effective control is more likely. Powdery mildew management program often needs adjustments as the pathogen and management tools change.

When to apply fungicides. The action threshold for starting applications is one leaf with symptoms out of 50 older leaves examined. Examine both surfaces of leaves. Starting treatment after this point will compromise control and promotes resistance development. Powdery mildew usually begins to develop around the start of fruit production. Protectant fungicides applied before detection will slow initial development. After detection, continue applying fungicides weekly. Conditions are favorable for powdery mildew throughout the growing season.

Recommended targeted fungicides.

Alternate among targeted, mobile fungicides in the following five chemical groups (principally the first two), and apply with protectant fungicide to manage resistance development and avoid control failure if resistance occurs, and also to comply with label use restrictions. The first two products are the newest and thus are the most important ones to have in a fungicide program. The pathogen population has been subjected to more pressure to develop resistance to the other three fungicide groups, which are listed in order based on product efficacy in recent fungicide evaluations. The first three fungicides are the only ones in these chemical groups available in the USA. See "Mobile Fungicides for Mildews and Phytophthora Blight" for more information (Mobile Fungicides for Mildews and Phytophthora Blight (2016)).

Vivando (FRAC Code U8) is a new fungicide with a new mode of action. Cucurbits are on a supplemental label. It has exhibited excellent control in fungicide evaluations conducted recently. Activity is limited to powdery mildew. Do not mix with horticultural oils. It can be applied three times per year with no more than two consecutive applications. REI is 12 hr. PHI is 0 days. 365 day plant back restriction for nonlabeled crops.

Torino (FRAC Code U6) is a new fungicide with a new mode of action. It has exhibited excellent control in fungicide evaluations conducted recently. Activity is limited to powdery mildew. It can only be applied twice to a field in a 12mo period. Consecutive applications are not recommended. REI is 4 hr. PHI is 0 days.

Quintec (FRAC Code 13) has been consistently effective in fungicide evaluations. However, insensitivity to a high concentration of Quintec (similar to the dose when applied in the field) was detected in several of the pathogen isolates collected from fungicidetreated research and commercial fields at the end of the 2015 growing season. Therefore Quintec is now recommended used less than the label permits, which is a crop maximum of four applications. Aerial applications are not permitted and no more than two consecutive applications. Activity is limited to powdery mildew. It is the only mobile fungicide that does not move into leaves: it redistributes to foliage where spray was not directly deposited, including the underside of leaves, through diffusion and a continual process of absorption and desorption in the cuticular waxes of foliage. REI is 12 hr. PHI is 3 days.

DMI fungicides (FRAC Code 3) include Proline, Procure, Rally, and Inspire Super. Additional products are registered for use outside NY. Resistance is quantitative. Highest label rate is recommended because the pathogen has become less sensitive to this chemistry. Efficacy has varied in fungicide evaluations. Proline is thought to have the greatest inherent activity and Inspire Super the least. Procure applied at its highest label rate provides a higher dose of active ingredient than the other Code 3 fungicides. Five applications can be made at this rate. REI is 12 hr. PHI is 0 days, 7 days for Proline and Inspire Super. Powdery mildew is the only labeled cucurbit disease for Procure and Rally. Proline is also labeled for Fusarium blight and gummy stem blight. Inspire Super, which contains another active ingredient (Code 9), is also labeled for Alternaria blight, anthracnose, gummy stem blight, Plectosporium blight, and Septoria leaf spot.

Carboxamide fungicides (FRAC Code 7) registered in NY are Pristine and Merivon. Both also contain the same Qol fungicide (Code 11), which is no longer effective for powdery mildew. Only Pristine is permitted used on Long Island. Strains of the powdery mildew pathogen resistant to Pristine have been detected and likely are the reason its efficacy has varied. REI for Pristine is 12 hr and PHI is 0 days. Cross resistance was documented between Pristine and Merivon, but not Luna. Therefore, Luna will be the best choice if registered in NY.

Fungicide evaluations conducted each year on pumpkin at LIHREC include fungicides at risk for resistance tested

alone (this is neither a labeled nor recommended commercial use pattern for these fungicides; it is done in efficacy evaluations to determine if resistance affects control). In 2015 Quintec, Pristine, and Vivando were as effective as an alternation program (69-78% control on lower leaf surfaces). Quintec and Vivando were the most effective of the targeted fungicides evaluated in 2014 (96 and 98% control); Pristine was moderately effective (54%); Procure was slightly but not significantly better (70%). In 2013 Quintec, Pristine, and Procure provided excellent control (93-99% control). In 2012 Pristine and Fontelis (FRAC Code 7) were ineffective (albeit treated pumpkins were numerically less severely affected by powdery mildew than the non-treated plots) while Quintec was very effective (96%) and Procure was moderately effective (57%). These experiments have documented year-to-year variation in the pathogen population. See also table of results from these and previous experiments at LIHREC and experiments at other universities.

No longer recommended. Resistant pathogen strains are sufficiently common to render the following fungicides ineffective: Topsin M (FRAC Group 1; MBC fungicide) and QoI fungicides (Group 11), which include Quadris, Cabrio and Flint. Resistant strains continue to be detected commonly every year on Long Island where monitoring is being conducted.

Recommended protectant fungicides.

Many fungicides have contact activity for powdery mildew; mancozeb is an exception. They include chlorothalonil, sulfur, copper, oils (mineral and botanical), potassium bicarbonate, and biologicals. Many of these products are approved for organic production (see list below). Sulfur is one of the most effective and least expensive products. Its activity is limited to powdery mildew, thus it is especially useful early in disease development when other diseases are not a concern, including as a preventive application. Melons are sensitive to sulfur especially when hot; there are tolerant varieties.

Organic fungicides. Products labeled for cucurbit powdery mildew, in addition to several formulations of copper and sulfur, include:

- Actinovate AG. 0.0371% Streptomyces lydicus strain WYEC 108. For best results with applications to foliage, label indicates to use a non-ionic spreader-sticker. OMRI-listed. EPA Reg. No. 73314-1. Monsanto BioAg.
- BacStop. 2.0% thyme, 2.0% clove & clove oil, 1.5% cinnamon, 1.0% peppermint & peppermint oil, and 1.0% garlic oil. Recommended used with EF400. Exempt from EPA registration. USAgriTech, Inc.
- Companion. 0.03% Bacillus subtilis strain GB03. EPA Reg. No. 71065-3. Growth Products, Ltd.
- Double Nickel 55 LC and WDG. Bacillus amyloliquefacinens strain D747, 98.8% and 25%, respectively. OMRI-listed. EPA Reg No. 70051-107 and 108, respectively. Certis USA, LLC.
- EF400. 8.2% clove, 8.1% rosemary, and 6.7% peppermint. Exempt from EPA registration. No Ag Label. USAgriTech, Inc.
- JMS Stylet-oil. 97.1% paraffinic oil. OMRI-listed. EPA Reg. No. 65564-1. JMS Flower Farms, Inc.
- Kaligreen. 82% potassium bicarbonate. OMRI-listed. EPA Reg. No. 11581-2. Arysta LifeScience North America LLC.
- KeyPlex 350 OR. 0.063% yeast extract hydrolysate from Saccharomyces cerevisiae. Combination of defensive proteins (alpha-keto acids) and secondary and micronutrients. Elicits systemic acquired resistance in plants against fungal and bacterial pathogens. Labeled for general disease control in vegetables with specific mention of bacterial leaf spot in tomato. EPA approval for organic production. EPA Reg. No. 73512-4. KeyPlex.
- Mildew Cure (formerly GC-3 Organic fungicide). 30% cottonseed oil, 30% corn oil, 23% garlic extract. OMRI-listed. Exempt from EPA registration. JH Biotech, Inc.
- MilStop. 85% potassium bicarbonate. OMRI-listed. EPA Reg. No. 70870-1-68539. Bio-Works, Inc.
- Organocide. 5% sesame oil. OMRI-listed. Exempt from EPA registration. Organic Laboratories, Inc.
- OxiDate. 27% hydrogen dioxide. OMRI-listed. EPA Reg. No. 70299-2. BioSafe Systems, LLC.
- Procidic. 3.5% Citric acid. NOP compliant; registered for use in organic agriculture with Washington State Dept of Ag. Exempt from EPA registration. Greenspire Global, Inc.
- Promax. 3.5% Thyme oil. OMRI-listed. Exempt from EPA registration. Bio Huma Netics, Inc.
- Regalia. 5% Extract of Reynoutria sachalinensis. OMRI-listed. EPA Reg. No. 84059-2. Marrone Bio Innovations, Inc.
- Serenade Max and Serenade ASO. 14.6% Bacillus subtilis strain QST 713. OMRI-listed. EPA Reg. No. 69592-11 and -12, respectively. Bayer CropScience.
- Serenade Opti. 26.2% Bacillus subtilis strain QST 713. New formulation; see above products. OMRI-listed. EPA Reg. No. 264-1160. Bayer CropScience.
- Sonata. 1.38% Bacillus pumilus strain QST 2808. OMRI-listed. EPA Reg. No. 69592-13. Bayer CropScience.
- Sporatec AG. 18% rosemary oil, 10% clove oil, and 10% thyme oil. OMRI-listed. Exempt from EPA registration. Brandt Consolidated, Inc.
- Trilogy. 70% clarified hydrophobic extract of neem oil. OMRI-listed. EPA Reg. No. 70051-2. Certis USA, LLC.
- TriTek. 80% mineral oil. OMRI-listed. EPA Reg. No. 48813-1. Brandt Consolidated, Inc.

Before purchase for organic production, confirm product is acceptable for agricultural use with your certifier or your NYS DEC regional office. Please Note: The specific directions on fungicide labels must be adhered to -- they supersede these recommendations. Note that some products mentioned are not yet registered for use on cucurbits in NY.

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

Vegetable Pest and Cultural Management Field Meeting

July 27, 2016 | 7:00 PM - 9:00 PM Seneca County, David K Stoltzfus farm, 4844 Rt 414, Romulus, NY 14541

July 29, 2016 | 6:00 PM - 8:00 PM Ontario County, David Fox farm, 3269 Lake-to-Lake Rd, Stanley, NY 14561

This course 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. This event is FREE! 1.75 DEC recertification credits available. For more information, contact Judson Reid at 585-313-8912.

High Tunnel Pest and Disease Management: Organic Control Strategies August 2, 2016 | 4:30 PM - 7:30 PM Fellenz Family Farm, 1919 Lester Rd, Phelps, NY 14532

How can you manage your tunnel to limit losses due to pests and disease? This field day will start with identification of common high tunnel pests and diseases and effective organic control strategies, including spraying. Andy Fellenz, with support from NE-SARE, has developed and will demonstrate a boom-style high tunnel sprayer, as well as discuss the proper use of backpack and other relatively low pressure, low flow single-tip sprayers. Variety selection, rotation, cultural practices and spraying all have a place in the overall farm strategy. Cost: FREE! Email Angela Parr at aep63@cornell.edu to register or call 585-394-3977 x426. This event is sponsored by NE-SARE through a Farmer Grant. The Cornell Vegetable Program is cooperating with Fellenz Family Farm to bring you this event.

2016 Elba Muck Onion Twilight Meeting

August 4, 2016 | 5:30 PM dinner; educational program begins at 6:00 PM Mortellaro's Red Shop in the Elba muck land, Elba, NY 14058

Cornell Vegetable Program Specialist Christy Hoepting and Cornell Entomologist Brian Nault will be sharing preliminary research results from current season on-farm onion research trials. This year, attendees will see several herbicide trials, fungicide trials targeting Botrytis leaf blight and Stemphylium leaf blight diseases, as well as trialing several approaches geared to improved onion thrips and onion maggot control. This event is FREE! Contact Christy Hoepting at 585-721-6953 for more information.

Vegetable Pest and Cultural Management Field Meeting - Niagara County

August 8, 2016 | 6:00 PM - 8:00 PM Robinson Farms, 3681 North Ridge Rd, Lockport, NY 14094

A hands-on demonstration of weed, insect and disease identification in fresh market vegetables including management options such as inter-row cover crops, grafting and, where appropriate, spray options. FREE! Contact Darcy Telenko for more info at 716-697-4965.

Organic Dry Bean Discussion Group Meeting

August 12, 2016 | 1:00 PM - 4:00 PM Klaas, Mary-Howell and Peter Martens farm, 1443 Ridge Rd, Penn Yan, NY 14527

There will be viewing and discussion of the dry bean crop, cultivation for dry beans, the benefits of certain cover crops ahead of dry beans, and the potential for organic reduced tillage. There will be ample time for open discussion regarding organic dry beans. Preregister by August 9 by contacting Carol MacNeil at crm6@cornell.edu or 585-313-8796. Cold juice, water and soda will be available.

Vegetable Walk and Cut Flowers

August 15, 2016 | 5:30 PM Werner's Farm, 8427 West Henrietta Rd, Rush, NY 14543

A discussion and field walk for cut flower growers. Topics will be production considerations, and disease and insect management. The vegetable field walk will be conducted by Cornell Vegetable Program Specialists Judson Reid and Robert Hadad and will cover identification and management of insects, diseases, and weeds. FREE! Contact Robert Hadad for more information at 585-739-4065.

Finger Lakes Soil Health Discussion Group Meeting August 18, 2016 | 5:00 PM - 8:15 PM Hemdale Farms, 2800 Orleans Rd, Seneca Castle, NY 14547

Why Hemdale Farms switched to zone tillage, and how they've been successful doing it for field crops and vegetables will be described. Equipment will be available for viewing. The many niches available for cover crop planting, and the benefits of different cover crops will be covered by Thomas Bjorkman, Cornell. There will be ample time for open group discussion on reduced tillage, cover crops, and all aspects of improving soil health. This event is FREE! DEC credits will be available. Preregistration by NOON on August 15 required. Contact Carol MacNeil at crm6@cornell.edu or 585-313-8796. A light supper will be provided.









Weather Charts

John Gibbons, CCE Cornell Vegetable Program

Weekly Weather Summary: 7/12 - 7/18/16

	Rainfall (inch)		Tem	p (°F)
Location	Week	Month	Мах	Min
Albion	0.04	0.33	93	54
Appleton, North	0.02	0.08	89	53
Baldwinsville	0.36	0.42	92	56
Buffalo*	0.01	0.76	89	60
Butler	0.68	1.01	90	57
Ceres	0.34	1.05	87	53
Elba	0.71	1.54	87	49
Farmington	0.81	1.32	91	54
Gainesville	NA	NA	87	50
Geneva	0.41	0.43	92	56
Lodi	0.26	0.69	92	58
Niagara Falls*	0.19	0.32	93	59
Penn Yan*	0.50	0.82	93	58
Rochester*	0.10	0.92	94	56
Romulus	0.47	0.50	92	58
Silver Creek	0.80	1.06	84	61
Sodus	NA	NA	90	52
Versailles	0.39	0.55	90	53
Williamson	0.04	0.07	91	53

Accumulated Growing Degree Days (AGDD) Base 50°F: April 1 – July 18, 2016

Location	2016	2015	2014
Albion	1256	1233	1170
Appleton, North	1073	1012	1001
Baldwinsville	1238	1248	1287
Buffalo	1285	1257	1211
Butler	1200	1263	1247
Ceres	977	1119	1064
Elba	912	953	956
Farmington	1149	1191	1185
Gainesville	919	991	947
Geneva	1198	1212	1213
Lodi	1325	1344	1333
Niagara Falls	1371	1161	1154
Penn Yan	1282	1293	1290
Rochester	1296	1324	1291
Romulus	1201	1236	1237
Silver Creek	1149	1143	1138
Sodus	1074	1088	1134
Versailles	1129	1165	1150
Williamson	1093	1191	1123

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

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

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Cornell University Cooperative Extension Cornell Vegetable Program

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