Cornell Cooperative Extension

Eastern NY Commercial Horticulture Program

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Vegetable New

Black Rot in Crucifer Crops Teresa Rusinek, CCE ENYCHP

Black rot has been seen in some fields in the region. This disease is caused by the bacteria Xanthomonas *campestris*. Infections can be systemic in seedlings or localized in more mature plants. Seed can be infested with the bacteria on and within the seed coat and a source for infecting young seedlings. Infected seedlings may not show symptoms for some time, so it's easy to transplant seemingly healthy plants into the field and symptoms to show up later. Bacteria from infected plants (including cruciferous weeds such as wild radish and



Typical V shaped necrotic areas form at the leaf edge where bacteria enter through pores in the tissue.

mustard) and other sources such as equipment, debris in soil can also enter plants through openings on the leaf margin. These localized infections produce the classic Vshaped lesion. Insect feeding can be another route of entry for the bacteria which may produce a more irregularly shaped lesion. When you cut through the leaves or stems of infected tissue you may see that black discoloration the bacteria produce in the vascular tissue. Warm, wet conditions favor black rot development and expression of symptoms. Rain and heavy fogs or dews and day temperatures of 75° to 95°F are most favorable. Under cool, wet conditions infection can occur without development of symptoms. Consequently, transplants grown at low temperatures may be infected but remain symptomless. The bacteria do not spread below 50°F or during dry weather.

Once plants are infected it is difficult to control this disease especially under wet conditions. Copper compound sprays under dry conditions can provide some control. All crucifer crops are susceptible to this disease, but kale and radish are less easily affected. Many cabbage varieties have some level of tolerance to black rot, while most broccoli and cauliflower varieties tend to be susceptible.

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Given limited chemical control options and the susceptibility of crucifers to black rot, "prevention is the best line of defense" according to Christine D. Smart & Holly W. Lange of Cornell University who coauthored the following piece excerpted from the July 18, 2013 eXtension article <u>Managing Black Rot of Cabbage and other Crucifer Crops in</u> <u>Organic Farming Systems</u> found at <u>http://www.extension.org/pages/29925/managing-black-rot-of-cabbage-and-other-crucifer-crops-in-organic-farming-systems#.Ui8pRsZQHpU</u>

There are three preventative measures that can reduce the risk of a black rot outbreak:

Start with clean seed – It is known that the bacterium that causes black rot can survive on and in seed. Hot water treatment can be used to destroy the bacteria that may be infesting your seed. If you have purchased seed that NOT been hot water treated, you can treat the seed yourself, but it is critical to do it correctly.

Use clean transplants – If you are growing your own transplants, make sure that the greenhouse has been cleaned well prior to starting transplants—even if you had no disease last year! Bacteria have a remarkable way of surviving on weeds, organic matter, or nooks and crannies. Get rid of all weeds, use new or disinfected flats, and disinfect benches and tools prior to the start of a new season. Keep foliage as dry as possible, and do not brush or trim wet plants. Use pathogen-free growing media. Compost added to growing media can be a source of inoculum if diseased plant matter was added to the pile.

Rotate with non-crucifers – Because the black rot bacterium can survive in debris in the soil, it is important to rotate away from crucifer crops for a minimum of three years.

Phytopthora Blight Chuck Bornt, CCE ENYCHP

Phytophthora capsici (Pcap), more commonly known as Phytophthora blight, has shown up in vine crops (Figure 1) this week and in peppers and I suspected it in tomatoes as well. In tomatoes it's referred to as Buckeye Rot and can be caused by either *Phytophthora parasitica*, or *Phytophthora capsici* and in this case I'm sure it is capsici because both farms have a history of Pcap (Figure 2). Buckeye rot can also easily be confused with Late Blight which is also a Phytophthora species. The main difference in my mind is Pcap tends to go to the fruit and not the plant where late blight usually also attacks the foliage and stem.

Phytophthora blight is a water loving pathogen that can affect all parts of the plant, especially the fruit. To complicate the matter, fruit can be infected but show no symptoms until you place it in a bin or out for display and they literally melt. The first symptoms you will see is a dark circular, sunken, water logged spot on the fruit, particularly on the side contacting the soil. From there, a white, yeasty like growth will form. Orondis Ultra would be the preferred fungicide choice rotated with others found in Table 1. See next page for Table 1.



Figure 1: Phytophthora capsici infected fruit – note the white yeasty growth.



Figure 2: *Phytophthora capsici* or Buckeye Rot lesion on a green tomato fruit. Note the similarity to Late Blight.

Table 1: Fungicides labeled for Phytophthora Blight Control in cucurbits, tomatoes and peppers.							
Fungicide	FRAC Code	Recommended Rate/Acre	REI	РНІ	Seasonal Limits	Adjuvant Recommendations	
Ranman ¹	21	2.75 fluid ounces	12 hours	0 days	6 sprays	Organosilicone or non-ionic sur- factant	
Orondis Ultra	U15 + 40	5.5 – 8.0 fluid ounces	4 hours	0 days	See label for spe- cial notes	non-ionic or organosilicone sur- factant Should also be mixed with a cop- per fungicide	
Tanos ¹	27 + 11	8 ounces	12 hours	3 days	4 sprays		
Zampro ¹	40 + 45	14 fluid ounces	12 hours	0 days	3 sprays		
Zing!	22 + M	36 fluid ounces	12 hours	0 days	8 sprays		
Phostrol, ProPhyt, Fosphite or other phosphorus acid containing products	33	2.5-5.0 pints (vary depending on product used)	4 hours	0 days	7 sprays		
Organic fungicides	Organic fungicides labeled for Phytopthora Blight in cucurbits.						
Copper—Various fo	rmulations	please see labels for	more inform	nation			
Regalia Biofungi- cide	NA	1—4 quarts	4 hours	0 days	NA	Should be applied with copper fungicide	
Serenade ASO Ba- cillus subtilis str QST 713)	NA	2—6 quarts – see label for rates.	4 hours	0 days	NA	Only labeled for <i>Phytophthora</i> <i>parasitica</i> so knowing which species you have is im- portant!	
Actinovate AG (Streptomyces lydi- cus WYEC 108)	NA	3 –12 fluid ounces	1 hour or until dry	0 days	NA		

¹ Should mix with a protectant partner such as chlorothalonil.

None of the above fungicides will control Powdery Mildew with the exception of Regalia Biofungicide, Serenade ASO and Actinovate AG.

ENYCHP Now Offering Text Alerts! Sign-up Today!

This season, CCE ENYCHP will be offering text updates straight to your phone! Being informed is the first step in the success of your farm! Our texts will get you the information you need in the fastest



and most concise way possible!

Only the most important crop alerts will be sent ("Late Blight found in N.Columbia County", for example), and you can choose to receive updates on whichever commodities you wish- Vegetables, Berries, Grapes, or Ag. Business.

CLICK HERE TO SIGN UP FOR OUR CCE ENYCHP TEXT ALERTS!

Managing Alternaria Leaf Spot on Brassicas Ethan Grundberg, CCE ENYCHP

The regular rainfall in the lower half of the Eastern NY region that we experienced in late July and so far in August has created ideal conditions for alternaria leaf spot and head rot (sometimes called pin rot) of broccoli, to develop and spread. For fall plantings of broccoli and cauliflower, early management of alternaria is critical to prevent the diseases from colonizing the head.

Alternaria leaf spot and head rot of broccoli are caused by two very closely related fungi, *Alternaria brassicae* and *Alternaria brassicicola*. These two pathogens can survive a wide temperature range (40°F to 90°F), but as mentioned above, require high relative humidity and the maintenance of a water film on the leaf surface for at least nine hours to produce spores and colonize new plant tissue. The spores spread on clothing and equipment, but primarily by wind and splashing water from either rainfall or overhead irrigation. Both pathogens can also be seedborne, but more often survives on cruciferous weeds and plant residues from other cole crops.

Conventional growers can use a number of labeled fungicides for alternaria management. Christy Hoepting of the Cornell Vegetable Program produced the table below summarizing results from Cornell field trials over the last six years. While research by Scheufele, Dillard, and Strauss showed no



Advanced alternaria head rot, or pin rot, on broccoli

statistically significant impact of labeled organic fungicides like Serenade and Double Nickel 55, it did show that using straw mulch DID significantly decrease the incidence of alternaria leaf spot in kale.

There is plenty that you can do in addition to using fungicides to reduce your risk of infection in the future. First, incorporate infected residue as quickly as possible after harvest to limit the ability of the pathogen to continue to produce spores. Plants should be thoroughly destroyed (such as by a flail mower) and incorporated well in the soil. If you have later broccoli successions that have not developed crowns yet, but are showing alternaria leaf spot symptoms, try to avoid overhead irrigation or, at very least, try to irrigate early in the morning to avoid the excessive periods of leaf wetness that are necessary to spread the disease. Since wild mustards and other brassica

Performance of	ALS			
Fungicide	Fungicide	FRAC ¹ code		
Best	Endura	7		
	Quadris Top	3, 11		
	Quadris	11		
	Switch	9, 12 11		
	Cabrio			
	Inspire Super	3, 9		
Good	Bravo	M5		
	Presidio	43		

weeds are also hosts, be sure to clean up field edges and spent fields that may be harboring those weeds species. Finally, a minimum of a two-year rotation out of cole crops is recommended.



Alternaria leaf spot lesions on broccoli. Note both the larger concentric circle spots as well as the smaller black dots across the leaf.

Winter Spinach Planting Dates: What a Difference a Week Makes Amy Ivy, CCE ENYCHP

There are many ways to grow fall-winter-spring spinach in high tunnels and it's already time to have your plans in place. When to plant is a common question with no strict answers. Try out a couple of systems and keep notes on what works well over the years for your particular operation. It's always a good idea to try out at least a couple of planting dates.

Here's an example of what a difference a week, well two weeks really, can make from the trial we ran last fall. The trial was looking at fertility levels from different nitrogen sources, but for this article I just want to look at the planting dates and yields.

We had two plantings: the first was sown into plug trays on August 25th and transplanted to an unheated high tunnel on September 20th. The second planting was just 2 weeks later; sown into plug trays on September 5th and transplanted on October 6th. Everything else was the same. There was no heat but the crop was covered with 2 layers of row cover during the coldest months.

The fall of '17 was exceptionally warm so these results will vary each year, which is why it's so important to keep your own detailed records and look back over them. The graph below tells the story.

The solid lines are the first planting, the dashed lines are the second planting. The dates are the harvest dates. Overall the later planting yielded more than the early planting although most growers would have pulled the crop by mid-April to get their summer crops in.

Notice the difference in the fall harvest. If you want a fall crop, waiting just 2 weeks can have a big effect on the yield. If you main crop will be late winter then waiting just 2 weeks will help since the younger plants get through the winter better and really take off in late February once the days get longer.

(note on the chart: this trial was looking at different nitrogen sources. The abbreviations are: Alf – alfalfa meal; Blood – blood meal; Ctrl – control (no nitrogen); Urea – urea. More on these results in future newsletters)



Plectosporium Blight Affecting Zucchini Crystal Stewart, CCE ENYCHP



Plectosporium is a relatively uncommon but significant disease of cucurbits in New York. Zucchini are most susceptible, but an outbreak can be very damaging to pumpkins or even cucumbers. On harder rinded cucurbits such as pumpkins, the lesions are more of a problem on stems and the handle, making them so brittle they snap. On the more delicate cucurbits, lesions are also found on fruit, and have a very unique star or diamond shape with cracked corners. Lesions are generally not found on the middles of leaves, but may be found on the leaf veins. Often, we see a mix of diseases, so wading through the multiple symptoms can be challenging. It can help to look for any symptoms which are unique to a certain disease, like the stem/fruit lesions in this case.

Plectosporium is favored by rainy weather which we've had plenty of. If you are dealing with plectosporium, protectants such as chlorothalonil on a 7 day schedule during rainy weather has generally proven effective. In addition to chlorothalonil (PHI 0 Days),

strobilurins also known as QoI funcigides (FRAC group 11) such as Flint Extra (PHI 7 Days) and Cabrio (PHI 0 days) are also effective. Note that these QoI fungicides are no longer effective for powdery mildew control. It's not clear if any organic controls such as copper or biologicals are effective on this disease.



Plectosporium lesions on stems can be mistaken to be cucumber beetle damage

Powdery Mildew Biofungicide Trial

Cornell Cooperative Extension Eastern NY Commercial Horticulture Program

Date & Location

August 29th 4-6 PM with light refreshments after

Korona Farms 1953 County Highway 107, Amsterdam, NY 12010 Follow signs to the high tunnel Join Cornell Cooperative Extension Vegetable Specialist Crystal Stewart and New York State Integrated Pest Management Biocontrol Specialist Dr. Amara Dunn for a field walk through the biocontrol trial field, cover powdery mildew control trials with biopesticides, and discuss how biopesticides fit into a regular integrated pest management program.

The meeting is free through the generous sponsorship of New York Farm Viability Institute but preregistration is greatly appreciated.

DEC pesticides credits are available!

TO PRE REGISTER: go to https://enych.cce.cornell.edu/ event.php?id=985 or contact Abby at (518) 746-2560

We hope to see you there!

For information about other Cornell Cooperative extension programs, please visit: enyech.cce.cornell.edu

Mysterious Spots on Your Vegetables? Look for Tarnished Plant Bugs Teresa Rusinek, Crystal Stewart, CCE ENYCHP



Tarnished plant bug (TPB) populations continue to be high this season and are causing damage to crops ranging from eggplant to lettuce. If you are seeing spots, distorted

fruit, or other symptoms which don't quite look like disease, search for these insects; they may be the culprit.

TPB nymphs are very good at hiding in foliage and flowers, so search carefully to determine if they are present. You can tap flowers or leaf bunches upside down over white paper to catch them. Because TPB prefer to fed on buds, flowers and young developing fruit, these are the places to focus your scouting.

TPB feed by sucking sap from plants and inject a toxic substance that breaks down plant tissue. TPB feeding

Tarnished plant
bug (TPB)causes abortion of young fruit and buds. Fruit feeding
causes blemishes and dimples and deformed vegetative
growth. Feeding on leaves and stems can lead to dark
spots which may become distorted as well.

TPB may move into crops from weedy borders as well as neighboring alfalfa fields especially at cutting. One way to reduce TPB pressure is to eliminate weedy habitats at field edges. Some conventional materials labeled for TPB are Baythriod XL, Hero, Sevin XLR, and Warrior II w/Zeon. For Organic Production Pyrethrum and Neem based products have shown to give limited control. Important: When using pyrethrins, it is recommended that the final

spray mix be buffered to a pH of 5.5-7.0. Outside of this range pyrethrins can degrade and the product will lose effectiveness. Carefully read labels for rates, labeled crops as well as other important application directions.



Sweet Corn Pests Chuck Bornt, CCE ENYCHP

The number of corn earworms we are finding is remaining fairly consistent with 5 -10 moths per week being reported. These trap catches indicate that we should be on a 4-5 day spray schedule according to the table below. Remember that **fresh silking corn** is the most susceptible to CEW, so be sure you are maintaining cover age on those plantings throughout until silks are dried down. These moths lay their eggs direly on the silks as the eggs hatch the larvae make their way into the tip of the ear. Remember that pyrethroids are less effective when temperatures are in the mid to upper 80's which is exactly what the forecast is calling for the rest of this week into the weekend. Consider using other materials like Lannate, Coragen, Beseige (pre-mix of Coragen and Warrior) or the spinosids (Radiant, Blackhawk etc.). Also keep in mind that aphids are not controlled with Coragen so if this is the only material you are using, you may see these populations building! I would suggest not only for aphid control but for resistance management that you rotate in Lannate or Mustang Maxx or a specific aphid material such as Assail. This week was the first that I noticed a few aphids in the corn that I was scouting and with more growers using Coragen alone, aphids can build quickly.

This week we are also seeing the second generation of European corn borers emerge so continue to also scout corn that is in late whorl and treat when 50 - 60% of tassels have emerged and again when the remaining tassels emerge.

 Table 1: Average CEW pheromone trap catches during silk stage.

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 o	lay to the recomm	ended spray	interval if daily maximum			

Corn Trap Counts

County	Date		CEW	ECB-Z	ECB-E	FAW	WBC
Albany	8/13/2018		6	2	0	0	5
Clinton 1	8/13/2018		0	0	0	0	73
Clinton 2	8/13/2018		0	0	2	0	43
Columbia	8/13/2018		0	0	0	0	20
Dutchess	8/13/2018		1	1	0	x	х
Greene	8/13/2018		5	3	0	0	4
Orange	8/14/2018		18	1	0	9	8
Rensselaer 1	8/14/2018		1	0	0	0	0
Ulster 1	8/13/2018		0	33	24	0	0
Ulster 2	8/13/2018		1	0	0	x	1
Ulster 3	8/13/2018		9	7	1	x	x
Washington	8/14/2018		0	6	5	0	0
Upcoming Events	Ag Manager s run from 12:00-12:30pm go to <u>https://tinyurl.com/y9gfqbmx</u> .						

August o 8/21 Flood Insurance and Other Disaster Programs

August 21, 2018—Fresh Market Vegetable Grading & Packing Workshop

Broome County in partnership with the CCE Cornell Vegetable Program and the Cornell Baskets to Pallets program is offering a hands-on, on-farm experience designed to prepare farms in NY, both beginning and experienced, to enter new markets. earn how to grade vegetables and package for different markets. This will be a hands-on training with peppers, summer squash, sweet corn, tomatoes, potatoes, cabbage, and kale. The field day is open to 25 participants; preference given to active or retired NYS military veterans on a first-come, first-served basis. Fee is \$15/person or \$20/farm. Veterans may apply for a stipend to cover the cost of attending. For more information or to apply, contact Laura Biasillo, CCE Broome County at 607-584-5007 or email Laura.

Event registration is available at https://reg.cce.cornell.edu/veggradingpacking2018_203

August 29, 2018—Biopesticide for Powdery Mildew Field Evaluation

Join Cornell Cooperative Extension Vegetable Specialist Crystal Stewart and New York State Integrated Pest Management Biocontrol Specialist Dr. Amara Dunn for a field walk through the biocontrol trial field, cover powdery mildew control trials with biopesticides, and discuss how biopesticides fit into a regular integrated pest management program. DEC pesticides credits are available! Free event, registration: https:// enych.cce.cornell.edu/event.php?id=985



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