

# Cucurbit Downy Mildew Confirmed in Orange County, NY Ethan Grundberg, CCE Eastern NY Commercial Horticulture

Cucurbit downy mildew (CDM), caused by the fungus-like oomycete pathogen *Pseudoperonospora cubensis*, was found on field-grown cucumbers in Orange County, NY on Monday, August 12th. The disease causes blocky yellow lesions that are bound by leaf veins that appear on the top side of leaves. If you flip those leaves over when humidity is high or early in the morning after a heavy dew, it is often possible to see the dark purplish colored "sporangia," which are a type of spore produced by the oomycete. The symptoms that are visible on the top side of the leaves can be easily confused with other common foliar diseases of cucurbits, especially angular leaf spot and powdery mildew. See the image below from Dr. Beth Gugino of Penn State for help differentiating CDM from angular leaf spot. If you



Cucumber leaf showing symptoms of both angular leaf spot and downy mildew. Downy Mildew lesions have purplish-grey sporulation on the underside of the leaves (upper right), while those infected with angular leaf spot do not (lower right). Photos: Beth K. Gugino



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have any doubts whether you are seeing CDM in your fields, please contact one of the regional vegetable specialists on the ENYCHP team for support.

Cooler, overcast weather with prolonged periods of leaf wetness are ideal for CDM to spread in the region. Given the weather we experienced on Tuesday, August 13th, it is fair to assume that CDM has likely spread further north into the Eastern New York region. A more detailed an up-to-date CDM forecast can be found at <u>http:// cdm.ipmpipe.org/current-forecast</u>. Growers in the region who have been planning a fungicide program to protect cucurbits, especially cucumbers, cantaloupe, and butternut squashes, should initiate those programs now. It is too late for this year, but there are a number of CDM resistant cucumber varieties that are on the market; Dr. Meg McGrath evaluated several of them in 2017 and published her results here:

### http://vegetablemdonline.ppath.cornell.edu/NewsArticles/DMR% 20Cucumber%202017%20Evaluation Report%20with%

<u>20Photos McGrath.pdf</u>. The variety DMR 401 exhibited particularly strong resistance to CDM in her trials, as well as in trials conducted at the University of Massachusetts. Several farms in the region are electing to plant traditional cucumber varieties for harvest through mid-July, then switching to DMR 401 for the last one or two successions of the summer when CDM pressure is highest.

We've been carefully tracking the progression of CDM up the east coast for the last several weeks and have tried to prepare you for its inevitable arrival. Chuck Bornt included a comprehensive table of fungicide recommendations for CDM management in the July 31st issue of the newsletter, but I'll include that table for reference here as well (pages 2-3). Just remember that some of the conventional fungicide options for CDM management are not labeled for use on cucurbits with an edible rind, like cucumbers, so be sure to check the labels for restrictions.



CDM symptoms on the top of a cucumber leaf (left) and on the underside (right(; note the greyish purple sporangia on the underside that correspond to the yellowing on the top of the leaf. Photos: Ethan Grundberg

 Table 1: Fungicides labeled for Cucurbit Downy Mildew and Phytophthora Blight Control in cucurbits.

 Products in RED are labeled for organic use but you should check with your certifying agency to be sure.

Fungicide	FRAC Code	Recommended Rate/Acre	REI	РНІ	Seasonal Limits	Adjuvant Recommendations
Ranman 400 SC <sup>1</sup> (cyazofamid)	21	2.75 fluid ounces	12 hours	0 days	6 sprays	Organosilicone or non-ionic surfactant
Orondis Ultra <sup>1</sup> (oxathiapiptplin + mandipropamid)	49 + 40	5.5 – 8.0 fluid ounces	4 hours	0 days	See label for special notes	non-ionic or organosilicone surfactant. Should also be mixed with a copper fungicide. 4 sprays or 33% of applications
Orondis Opti (oxathiapiptplin + chlorothalonil)	49+M5	1.75 – 2.5 pt	12 hours	0 days		4 sprays or 33% of total fungicide applications

Tanos 50 DF <sup>1</sup> (cymoxanil + famoxadone)	27 + 11	8 ounces	12 hours	3 days	4 sprays	
Omega 500 SC <sup>1</sup> (fluazinam)	29	0.75 – 1.5 pt	12 hours	See notes	See label	PHI – 7 days pumpkins, cucumbers, squash; 30 days melons and watermelons
Curzate 60 DF <sup>1</sup> (cymoxanil)	27	5 ounces	12 hours	3 days	9 sprays	Include with one of the other materials listed if DM is detected because this product has a very short residual but has exhibited some burnout activity.
Zampro <sup>1</sup> (ametoctradin + dimethomorph)	40 + 45	14 fluid ounces	12 hours	0 days	3 sprays	
Zing! (zoxamide + chlorothalonil)	22 + M5	36 fluid ounces	12 hours	0 days	8 sprays	Actual rate of chlorothalonil is below the recommended rate to control DM or PM. Additional chlorothalonil should be added for optimal control (0.43 – 1.43 pints Bravo WeatherStik)
Phostrol, ProPhyt, Fosphite (phosphorus acid containing products)	33	2.5-5.0 pints*	4 hours	0 days	7 sprays	*Rates vary depending on product used. Please review the label for the correct rates.

Copper—Various formulations please see labels for more information

Regalia Biofungicide	NA	1—4 quarts	4 hours	0 days	NA	Should be applied with copper fungicide
Serenade ASO Bacillus subtilis str QST 713)	NA	2—6 quarts – see label for rates.	4 hours	0 days	NA	Only labeled for <i>Phytophthora parasitica</i> so knowing which species you have is important!
Actinovate AG (Streptomyces lydicus WYEC 108)	NA	3–12 fluid ounces	1 hour or until dry	0 days	NA	

<sup>1</sup>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.

## **Corn Trap Counts**

County	CEW	ECB-Z	ECB-E	FAW	WBC
Albany	5	0	0	0	1
Clinton 1	0	2	0	0	226
Clinton 2	0	0	0	0	10
Columbia	40	0	0	18	10
Dutchess	0	0	0	0	1
Orange	3	2	1	1	3
Rensselaer	3	0	0	1	0
Ulster 1	11	0	1	x	x
Ulster 2	0	0	0	0	2
Ulster 3	2	0	0	0	0
Washington	2	0	2	0	23

## Sweet Corn Pest Update Teresa Rusinek, CCE Eastern NY Commercial Horticulture

If you take a look at our sweet corn traps counts, you will see that 226 Western Bean Cutworm (WBC) moths were caught in just one of the traps over the past week. WBC is native to North America and a long time pest in the high plains region of western US in corn and dry bean production. It has now established itself as a pest of sweet corn in regions of New York. Usually, once we got through the first European Corn borer (ECB) flight we had a little bit of a lull until Corn Earworms (CEW) arrived, but that's not the case anymore. WBC seem



Newly hatched western bean cutworm and whorl leaf damage. Photo: <u>https://extension.entm.purdue.edu/</u> <u>pestcrop/2015/issue18/</u>

to emerge and start laying eggs right after that first generation of ECB's. Similar to ECB, WBC moths typically lay eggs on corn while the tassel is just developing in the whorl. When the WBC eggs hatch, the larvae quickly move into the whorl to feed on the developing tassel, where they are protected. They are exposed when the

tassel emerges and start to move down to the leaf axils and ultimately the silks to feed. Once on the silks, they soon move into the ear and are again protected. Just like ECB, the WBC are exposed and susceptible to insecticide sprays when tassels emerge. If adults are detected in traps in your area, scout late whorl or early tassel stage corn for egg masses on the upper leaf surface of the top 3 leaves. The action threshold for fresh market sweet corn is 1%. WBC damage to corn leaves very much resembles ECB damage. It's likely that in most cases you will control WBC with the same sprays you are putting out at tassel for ECB. However, if you have very low ECB pressure and are not putting out tassel sprays, there is a chance you can get caught with WBC if they are in your fields. Also be aware that only the Bt varieties with the Vip3A protein control WBC.

Fall Army Worm- Growers in ENY are reporting more damage this past week in pre-tassel corn. Keep an eye on trap counts in your region and scout your corn to determine if a spray is needed. Rutgers' Extension Weekly IPM Update from 8/7/19 reports "FAW is even more consistently resistant to pyrethroid insecticides. For this reason, the same insecticides classes now recommended for CEW control should be utilized for FAW management."

Corn Ear Worm (CEW) counts have increased in several locations over the past week. Still CEW pressure varies widely in trap locations throughout Eastern New York with a range of 0-40 moths caught per week. If you are using trap counts to manage CEW you should have the traps set up on your farm, in your sweet corn fields. I've seen traps within 10 miles of each other suggesting very different spray intervals. Remember that **fresh silking corn** is the most susceptible to CEW, so be sure you are maintaining cover on those plantings until silks are dried down. These moths lay their eggs directly on the silks as the eggs hatch the larvae make their way into the tip of the ear. Pyrethroids are less effective when temperatures are in the mid to upper 80's, so consider using other materials like Lannate, Coragen, Beseige (premix of Coragen and Warrior) or the spinosids (Radiant, Blackhawk etc.) when temps pick up. 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! CEW pressure is likely to increase in our region through the remainder of the season.

# Sweet Corn Pheromone Trap Catches: What Do They Mean? How Do I Use Them? <u>http://sweetcorn.nysipm.cornell.edu/</u>

The New York State Integrated Pest Management Program, along with many collaborators, operates a network of pheromone traps NY. But what do these numbers mean and how are they used when making a decision to spray or not to spray a field?

We trap for European corn borer, fall armyworm, western bean cutworm, and corn earworm. Only the corn earworm trap catches are used directly to make a spray decision. Scouting and thresholds are the primary means of deciding if and when to spray.

European corn borer and fall armyworm: Trap catches are useful as a backup to scouting. If you scout a field and find it's under threshold, and the trap counts are low, you can feel pretty sure that a spray is not needed. If trap catches are high and you're not finding anything, maybe you need a scouting refresher course to be sure you're able to see egg masses and damage. Remember that damage may be caused by larvae hatching earlier in the season when trap catches were high, even though they are not currently high. Another thing we've observed is that in hot, dry seasons moths may not lay as many eggs as we would expect because they don't have access to water, so high trap catches are not always an indicator of what's happening in the field. That's why scouting is more reliable.

Western bean cutworm: trap catches are used as an indicator of when to scout for egg masses. Western bean cutworm only has one generation per year, so when the flight has peaked, fields in the late whorl – green silk stage should be scouted for egg masses, and if over threshold, sprays should be timed to prevent larvae from tunneling into ears.

Corn earworm: Because corn earworm moths lay their eggs directly on silks and they are difficult to reliable scout for, we use trap numbers to determine how often to spray green silk stage corn. The higher the trap catches, the more frequently the field needs to be sprayed.

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.							

## **Curious Caterpillar Pests** *Elisabeth Hodgdon, CCE Eastern NY Commercial Horticulture*

Production of many vegetables can be plagued by well-known caterpillar or "worm" pests--European corn borer in sweet corn, hornworms in tomatoes, imported cabbage worms in brassicas, and the list goes on. Sometimes though, we're surprised by some pests that are either lesser-known or sporadic, or have curious life history habits. From time to time, generalist insects that feed on multiple species will feed on small portions of a crop while also utilizing noncrop hosts in the wild.

### Salt marsh caterpillar



Figure 1: Salt marsh caterpillar feeding on onion. Photo: Amy Ivy



(Estigmene acrea) damage shows up in Eastern New York from time to time across a range of different crops. This species gets its common name from settlers in New England that noticed this caterpillar feeding on salt grass hay. This year we've heard reports of the caterpillars in onions in multiple locations in the Northeast (Fig. 1), but the caterpillars can feed on most vegetable crops (Fig. 2). While feeding damage can seem alarming, control measures are usually not warranted and are often limited to small portions of the field. However, when infestations become severe, insecticide applications can be worthwhile.

Figure 2: Salt marsh caterpillar on broccoli in Ontario. Photo: Elisabeth Hodgdon

## **Climbing cutworms**

While most are familiar with cutworms, particularly those that destroy plants by chewing them off at the base, "climbing" cutworms can be a little more tricky to identify. Climbing cutworms, such as the variegated cutworm (*Peridroma saucia*), will crawl up plants to eat foliage and burrow into fruit. Climbing cutworms will feed on many different vegetables. It's not uncommon for growers to walk out into

their field or high tunnel in the morning and notice that overnight, something caused serious damage to their plants. Because the caterpillars are nocturnal, it can be difficult to diagnose the problem because during the day no pests may be

present on the

plant. Finding the



Figure 3: Variegated cutworms found in soil during the day at the base of defoliated tomato plants. Photo: Clinton Co. grower

culprits requires digging in the soil at the base of the plant to find inactive caterpillars during the day (Fig. 3), or scouting at night to see them in action on the plants. Applying insecticides in the evening to target the nighttime feeding caterpillars is usually effective.

### Eastern black swallowtail caterpillar

While swallowtail butterflies are usually admired for their natural

beauty as a part of the landscape, when their larvae (caterpillars) feed on crops, they're considered a nuisance. Eastern black swallowtail (Papilio polyxenes) caterpillars feed on crops in the Apiaceae family, which includes dill, parsley, fennel, and celery. A flush of emergence resulting in lots of feeding caterpillars at



Figure 4: Eastern black swallowtail caterpillar feeding on dill. Photo: Matthew Orwat, Univ. of Florida Extension

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once can cause defoliation of plants. Because these herbs are usually grown at a small scale, and because there typically aren't many caterpillars, growers usually resort to hand picking. Other plants in the landscape, including Queen Anne's lace and poison parsnip, also serve as swallowtail caterpillar hosts.

### Western Bean Cutworm

While western bean cutworm (Striacosta albicosta) isn't necessarily a sporadic or uncommon pest in Northeastern NY in recent years, integrated pest management recommendations for this pest are not yet well defined. In our region, very large trap counts of hundreds of moths per week are not uncommon in August. However, many moths in the traps doesn't always correlate with high levels of plant damage in the field. The reason for this is because the moths will lay their eggs on many hosts in the farm landscape, ranging from corn and beans to ground cherries and wild plants in related families. It is not always clear where the moths are laying their eggs within a farm landscape. Once moths are found in the traps, it's recommended to scout for egg masses and larvae in corn (Fig. 5). Because of extremely low tolerance levels for caterpillars and damage in fresh market sweet corn, the recommended threshold for spraying is only 1 or more egg masses per 100 plants that have started to tassel. Spray applications should be timed when eggs have hatched into small larvae, but before larvae have entered the ear. Thus, high trap numbers are typically an indication that control measures are in the near future.



Figure 5: Western bean cutworm eggs are purple when ready to hatch within the next 24 hours. Eggs are cream colored (not shown) when younger. Photo: Eilsabeth Hodgdon

## Stressed? You Aren't Alone Crystal Stewart-Courtens, CCE Eastern NY Commercial Horticulture

The August burnout is real. We are seeing a lot of farmers hitting that annual wall right now. What we tend to tell folks is that many farmers are sharing the same feelings, and that we can see how hard everyone is working to keep the trains driving forward into fall. If you haven't



heard us saying this, I'm saying it now. As always, it's an impressive and beautiful effort you are making.

The plants are feeling a bit burnt out, too. We are seeing some interesting nutrient deficiencies in a variety of crops from winter squash to tomatoes. Some of this is from the wet spring washing early fertilizer out (if you got fertilizer on early). Some of it is because the root systems of plants didn't develop fully in many cases with the cool wet soils and quick warmup that followed. Sensitive crops like melons are definitely benefitting from diligent watering and spoon-feeding of nutrients. Quite often, the nutrient deficiencies are not because of a lack of nutrients, but from a lack of ability of the plant to move the nutrients. Sometimes it's from soils being a little too dry in hot weather; sometimes the roots are just too small. We are trying not to make assumptions this year. Check the soil moisture regularly, and if things just don't add up, dig up a plant or two to see what's going on below ground. High value crops like tomatoes, which are holding value pretty well even in the field, benefit from a foliar test to make sure they get what they need to make fruit all the way to the frost (or beyond, in the tunnels).

Many growers are pushing the envelope a bit on fall planted crops in order to recover from the poor spring. This is generally a gamble worth making; just make sure when double cropping to optimize soil nutrients (again) and prepare yourself for the fall weather changes as you get the time. This way you won't be scrambling to set hoops or move row-cover to protect against a random frost.

Sunflowers at a farm stand in Greenwich, NY. Photo: Chelsea Truehart

Vegetable Team Haiku

I'll blurb about corn The skyscraper for larva Whorls, tassels, and ears - Teresa Rusinek

Western bean cutworm So many moths in the traps Time to spray the corn - Efisabeth Hodgdon

Training your workers Not to harass each other Feels like Kindergarten - Liz Higgins Hemp growing is fun But it's not a vegetable Or marijuana - Crystal Stewart-Courtens

I'll take CDM But I need 8 page like Chuck Orondis-opti Ethan Grundberg

# **Upcoming Events**

### Summer 2019, 20-minute Ag Manager Lunchtime Webinar Series

Focused Business Topics for Busy Managers 12:30pm—1:00pm on alternating Tuesdays, June through August

June 18—Making Capital Investment Decisions July 2—Understanding Financial Statements 1 (Balance Sheets) July 16—Understanding Financial Statements 2 (Income Statement) July 30—Understanding Financial Statements 3 (Budgets and Analysis) August 13—Ag Tax Topics - the Schedule F August 27—Ag Tax Topics - Sales Tax and Property Tax Issues for Ag in NYS

To register, visit: <a href="https://disabult.com">bit.ly/AgManagerWebSeries</a>

### Hemp Field Meetings August 15, 2019

1:00pm—3:00pm: Hudson Valley Research Lan 3357 Rt 9W, Highland, NY 12528

6:00pm—8:00pm: Fields of Brian Pawelski and Bruce Ludovicy 736 Pulaski Highway, Goshen, NY 10924

Register at http://weblink.donorperfect.com/hempfieldmeeting

# IPM in Tomato Production August 19, 2019 - Davenport Farms, 3072 US Route 209, Stone Ridge, NY 12401

Dr. Margaret McGrath and ENYCHP Vegetable production Specialist Teresa Rusinek will lead a one-hour workshop for growers to discuss and learn how to integrate techniques in managing tomato diseases. The meeting is taking place in the field at Davenport Farms where a disease resistant tomato variety trial is hosted. Growers will have an opportunity to tour the trial, taste fruit, and provide feedback for plant breeders. 1 DEC recertification credit in categories 10, 1a, and 23 will be available to those who attend for the entire duration of the meeting.

## **Biocontrol Trial and IPM Field Meeting**

## August 20, 2019 - Eli Martin's Farm, 388 Brookman Corners Rd, Fort Plain, NY 13339

4-5 pm: Dr's Amara Dunn and Meg McGrath will discuss powdery mildew control using biocontrols and organic and conventional fungicides. Crystal Stewart from the ENYCHP will provide a tour of the biocontrol trial and additional squash and pumpkin mini-variety trial.

5-6pm: Walk the farm fields with Dr's Dunn and McGrath and with CVP specialist Elizabeth Buck to talk about integrated strategies to control pests, diseases, and weeds on the vegetables farm. Bring samples and questions! 2 DEC credits have been applied for in categories 1a and 23.

### Willsboro Farm High Tunnel Twilight Meeting August 27, 2019 - 5:00pm-7:00pm

# Cornell Willsboro Research Farm, 48 Sayward Lane, Willsboro

Join vegetable specialists Elisabeth Hodgdon, Jud Reid, and farm manager Mike Davis for a high tunnel and field tour at Cornell's Willsboro Research Farm, where they will share research results for the following projects:

- Striped cucumber beetle management using netting and row cover
- Varietal differences in cucumber susceptibility to striped cucumber beetle
- Ground cherry and goldenberry production in field and high tunnel environments
- Overwintered high tunnel spinach nitrogen fertility

Depending on availability, a taste-testing of the different cucumber, ground cherry, and goldenberry varieties will be held. This free program is made possible through funding by the Northern NY Agricultural Development Program.

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