



PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

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Pennsylvania Vegetable IPM Weekly Update

August 3, 2022

These are cooperative projects involving Penn State University researchers, Penn State Cooperative Extension educators, growers, the Pennsylvania Department of Agriculture, the Pennsylvania Vegetable Marketing and Research Program and the Pennsylvania Vegetable Growers Association.

Pest Watch Report

Karly Regan, Penn State Extension Educator

MOTH CATCH INCREASING ACROSS PENNSYLVANIA

Corn earworm numbers caught in traps reporting data this week were increasing at many sites this week. Sites in Bucks, Centre, Franklin, Lancaster, Montgomery, Montour and Washington Counties experienced average catch per night of 2-4 moths which means a spray interval of 5-6 days would be suggested for corn that's tasseling or silking. Blair and Mifflin Counties experienced average catch per night of 5-6 moths which means a spray interval of 4-5 days would be suggested. Bedford and Lehigh Counties experienced average catch per night of 10-19 moths, which means a spray interval of 3-4 days would be suggested. All other sites could reduce spray intervals to every 7 days, based on moth catch. As a reminder, corn that is tasseling or silking is very attractive to corn earworm, as eggs are laid on silks, and control must be achieved while larvae are recently hatched before they've entered the ear.

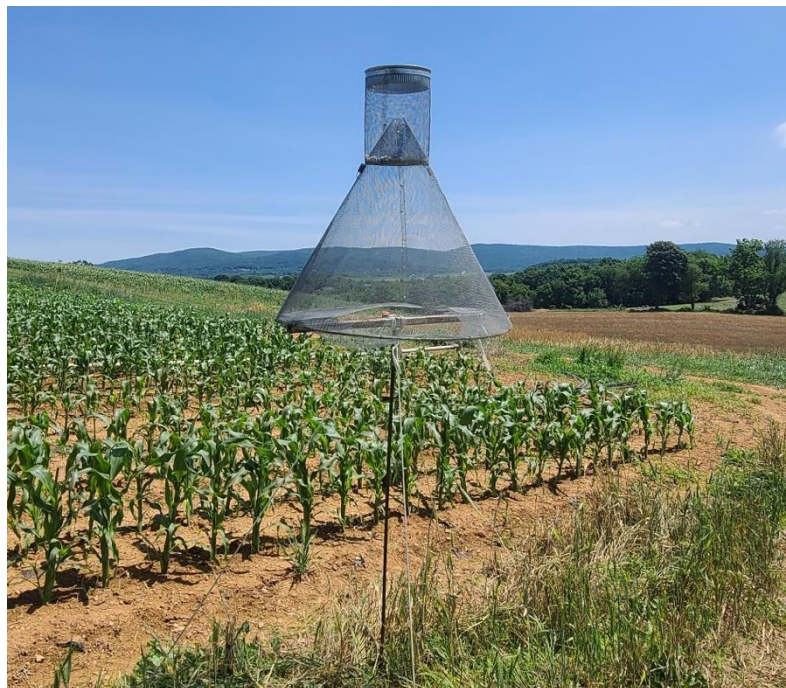


Fig 1. A metal trap used to deploy pheromone and monitor corn earworm

Once the spray threshold is reached, you can consider products from the pyrethroid class, diamide class, or spinosyn class for effective control. We tend to see the best efficacy from non-pyrethroid products such as Coragen, Verimark, Blackhawk, and Radiant, as pyrethroid resistance has increased in migrating corn earworm populations. However, we tend to see more resistance later in the season than now, as moths migrate from further south in the United States up to our region. Diamides and spinosyns do not provide effective control of other pests such as sap beetles, brown marmorated stink bug, Japanese beetles, or adult corn rootworms. If you're seeing these pests as you scout your corn, consider adding a pyrethroid, or the premix Besiege to control those.

Fall armyworm catch remains low this week with 15 or fewer moths caught in Bedford, Lycoming, and Mifflin Counties. By managing for corn earworm, fall



armyworm should be adequately controlled, as well. Fall armyworm damage can occur on the ear, as well as on the foliage. Foliage feeding will leave ragged edges and waste that resembles sawdust.

Fig. 2. A larval fall armyworm on an ear of corn

Average weekly catch – 7-day moving average. The average catch per night (total catch, divided by the number of nights trapping), divided by the number of nights where data exist, multiplied by 7. If no data exist for that week, null is reported.

County	Site	CEW			FAW		
		July 18	July 25	Aug 1	July 18	July 25	Aug 1
Bedford	Curryville	2	2.9	10.5	0	3.1	0.8
Blair	Sinking Valley	2.1	Null	5.8	0	0	0
Bucks	Doylestown	2.1	1.9	3.9	0	0	0
Butler	Cabot	0	Null	Null	0	0	0
Centre	State College	1.5	3.7	2.1	0	0	0
Centre	Rock Springs	1	2.1	3.2	0	0	0
Clinton	Loganton	0	0.9	0.4	0	0	0
Franklin	Shippensburg	3.9	4.3	3.1	0	0	0
Franklin	Waynesboro	1.1	0.9	1.7	0	0	0
Indiana	Indiana	2	1.6	1.1	0	0	0
Juniata	Port Royal	1	0.7	0.7	0.3	0.3	0
Lancaster	Landisville	2.1	4.4	4.2	0	0	0
Lancaster	New Danville	0.4	0.7	2	0	0	0
Lancaster	Neffsville	0.3	1.9	2.4	0	0	0
Lehigh	Germansville	1.1	10.3	19	0	0	0
Lycoming	Linden	1.7	1	0	0	0.3	0
Lycoming	Montoursville	0.3	0.6	0.4	0.3	0.3	2.1
Mifflin	Belleville	0.7	3.4	5.4	0	0.1	0.7
Montgomery	Souderton	3	3.4	4.3	0	0	0
Montour	Washingtonville	Null	3.9	3.9	No trap	No trap	No trap
Northampton	Easton	Null	0	0.4	Null	0	0
Washington	Venetia	8.3	Null	2.9	0	0	0
York	York	0.3	Null	1.5	0	0	0

THRESHOLDS Reproductive (tassel/silk) and late vegetative corn attract moths. Shorten spray schedules when populations increase.

Threshold based on CEW	Catch per week	Spray Frequency
Almost Absent	1-13	7+
Very low	14-35	5-6
Low	36-70	4-5
Moderate	71-349	3-4
High	>350	2-3

PA Vegetable and Berry Current Issues for August 2, 2022

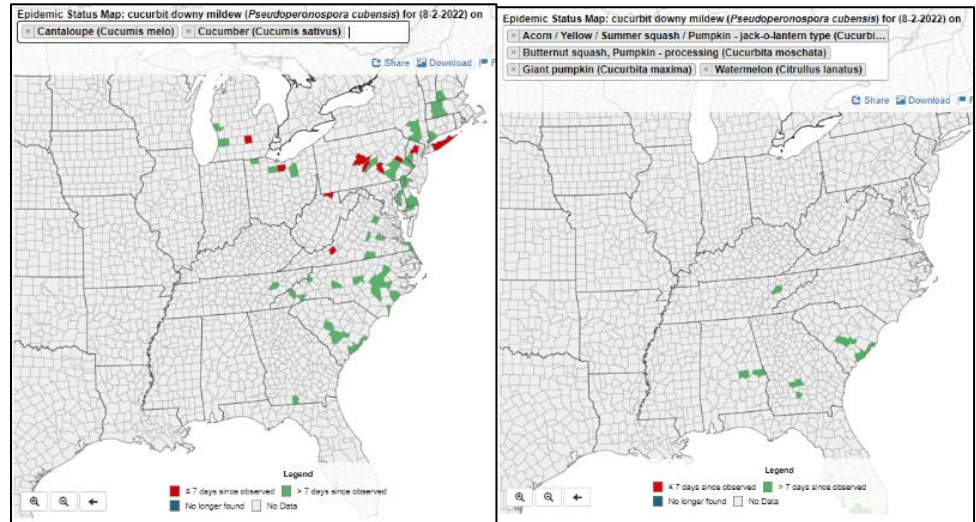
Beth Gugino and Kathy Demchak, Penn State

GENERAL CONDITIONS

Rains remains variable across the state so crops receiving either adequate rain or regular irrigation are looking good. As we start to turn the corner towards fall, keep in mind that longer periods of dew can lead to more favorable conditions for disease even if the daytime temperatures are in the upper 80's and 90's. Diseases can continue to progress at night with the cooler temperatures and longer periods of leaf wetness.

FIELD PRODUCTION

Reports of **downy mildew on cucumber** continue to increase with new reports in Centre, Mifflin, Dauphin and Lehigh Co. Regionally there have been new reports in Michigan, West Virginia, Virginia, and northern New Jersey again, all on cucumber. As of today, the majority of reports this season have been on cucumber with a few on cantaloupe (clade 2; see map on left) while reports on other hosts (clade 1) are only from as far



north as Tennessee. **Powdery mildew** continues to be reported on **pumpkin and zucchini**. **Ozone damage** is being reported in some cucurbit crops although it can also damage other crops such as snap bean. It can cause small white spots on the leaves where stomates were open allowing entry into the leaf. It is most common under hot and humid conditions with limited air movement. See this article titled '[Ozone damage to cucurbit foliage common in Maryland](#)' from Jerry Brust at the University of Maryland for more information.



Ozone damage on pumpkin (Photo: PA crop consultant).

Phytophthora blight is being confirmed on pepper and in cucurbit crops on several farms across all major growing regions in the state. If the pathogen is present, it does not take much water for infection to occur especially on fruit that are in contact with the ground. In areas where *Phytophthora* is known to be a problem be careful when sharing equipment between fields even under dry conditions. The pathogen can survive in the soil in the absence of a host and can easily be moved between fields and farms.

Significant wildlife damage especially from deer is being reported across many regions of the state. Exclusion fencing is a recommended best practice especially as the cost of crop establishment increases. One recommended system is a two-tiered fence system. Growers could start with a one-tier system and bait with peanut butter and aluminum foil before deciding on establishing a two-tier system. The concept is to have two single-line electric fences that are separated by 5 ft with the outer line at approx. 2 ft off the ground and the inner line 5 to 10 ft from the ground. See this article titled '[Managing deer damage using a two-tiered fence system](#)' from Zack Snipes at Clemson which includes the estimated cost of fencing an acre. The Agricultural Deer Control (Red Tag) Program may be another option which allows for a special permit for deer control related to agricultural depredation. For more information see the [PA Game Commission website](#).

BERRY CROPS

Spotted wing drosophila is the main berry problem right now. We do have some good news on this front, which is that limited initial releases of a parasitoid wasp will be taking place this week and into the fall in PA (and other states). Many thanks to Xingeng Wang, Kim Hoelmer, and Amanda Stout at the USDA Beneficial Insects Introduction Research Unit in Delaware for raising the wasps and sending them to us, Kelly Hamby at the University of Maryland for her advice and getting us off the ground, and Kent Daane at the Univ. of California for handling the paperwork so we could get a permit for release. None of this would be happening without their hard work and efforts. We do not yet know whether the wasp will successfully establish and overwinter here, and it will likely only provide partial control if it does, but at least this is a step in the right direction towards making SWD less problematic than it currently is.

This is the time of year when rednecked cane borer damage may be seen on raspberry plants – look low on the cane for a swelling about a foot from the ground. If you see canes with this type of damage, remove the entire cane at ground level and destroy it. Raspberry cane borer is another common pest where damage can be seen now. With this pest, at first you will see wilted tips with two lines of puncture marks just below the wilted area, and a hole between the two lines. The tip then dies and often breaks off, and then the cane will send out lateral branches later. If this pest is present, remove the cane well below the damaged area, making sure that you do not see a hole from the borer tunneling downwards. If you do, cut the cane lower to be sure that you remove the borer, and again, destroy the pruned-out canes so the borer adults do not simply hatch out somewhere else nearby.

There are also other types of borers, some of which are generalist feeders, but it is important not to confuse damage from borers with holes made in tipped raspberry or blackberry canes by solitary bees laying eggs. These bees are attracted to the soft pith in the center of the cane. Their tunnels only extend into the cane for a couple of inches below the tip, unlike those of other borers which extend throughout much more of the cane.

Yellow-necked caterpillar is out and about defoliating blueberry plants once again. If leaves seem to disappear from your bushes overnight, this could be the culprit. Because the caterpillars are located together, physical removal is relatively easy and is the best control method, but by the time you notice the damage, they have usually moved on to different plants – so take a look around if you don't spot them at first.



Raspberry cane borer punctures: an egg is laid between the two lines of punctures. (Photo: K. Demchak).



This hole made in the pith of a tipped cane is from a solitary bee that had hatched. (Photo: K. Demchak).



Yellow-necked caterpillar assuming a defensive posture. (Photo: K. Demchak).

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Where trade names appear, no discrimination is intended, and no endorsement by Penn State Extension is implied.

Vegetable Disease Updates

Beth Gugino, Penn State Extension Vegetable Pathologist

GENERAL UPDATES:

- Based on the USAblight map, there continue to be **no reports of late blight** on tomato or potato in the region. If you suspect late blight on your farm, please let me know either by email at bkgugino@psu.edu or by phone at 814-865-7328 or contact your local Extension Office.
- In Pennsylvania, the most recent reports of **downy mildew on cucumber** are in Centre, Mifflin, Dauphin, and Lehigh Co. in addition to those previously reported that include Juniata, Snyder, Lancaster, Berks and Bucks Co. There have also been additional reports in Michigan, West Virginia, and Virginia all on cucumber. There have been no confirmed reports on pumpkin, winter squash or watermelon north of eastern Tennessee. If you suspect cucurbit downy mildew on your farm, please let me know either by email at bkgugino@psu.edu or by phone at 814-865-7328 or contact your local Extension Office. For the latest reports and forecasts check out <https://cdms.ipmpipe.org>.

- Be on the lookout for **basil downy mildew**. Inoculum tends to build later into the season. Similar to other downy mildews, this one, caused by *Peronospora belbahrii*, is also host specific. Symptoms include yellowing or chlorosis of the foliage which looks very similar to a nutrient deficiency. However, when conditions are cool (50 to 78°F) and wet (> 85% relative humidity) purplish gray to black sporulation can be visible on the underside of the leaf (similar in appearance to cucurbit downy mildew). The pathogen does not survive in the absence of a plant host and therefore does not survive overwinter in field production (or home garden) situations. Management primarily focuses on planting pathogen-free seed, selecting less susceptible cultivars and applying fungicides. Conventional fungicides including Ranman (FRAC 21), Revus (FRAC 40), Quadris (FRAC 11), Armicarb (FRAC NC) and phosphorous acid (FRAC 33) fungicides are registered for basil downy mildew. A number of OMRI-approved products are also labelled for basil downy mildew including but not limited to Procidic, Actinovate, Double Nickel, MilStop, Regalia, Cueva, Trilogy and OxiDate. Practices that minimize leaf wetness and reduce humidity will also help manage disease. Once done with harvest, disk under or burn down the crop with an herbicide to eliminate potential sources of inoculum for other plantings. If not already planting resistant varieties, consider them for future growing seasons especially if growing the crop later in the season.



Characteristic yellowing on the upper leaf surface and purplish dark sporulation on the lower leaf surface caused by downy mildew on basil. (Photo credit: Beth K. Gugino).

- The past few years there have been some outbreaks of **Plectosporium blight on pumpkin and squash** (also called Microdochium blight) across the region. The symptoms are fairly unique and include white diamond shaped lesions that develop on the petioles and on the veins underside the leaves. The fruit can also develop small white spots that can coalesce and cover larger portions of the fruit and make the fruit more susceptible to



Plectosporium blight on a pumpkin handle post-harvest (left; Photo: Jeff Stoltzfus, Penn State Extension) and on the fruit (right; Photo: Tom Maloney, Penn State Extension).

soft rot. The soilborne fungal pathogen is favored by warm and prolonged wet conditions so symptoms may develop in lower parts of the field that retain water longer. Typically, regular protectant fungicide applications with good coverage can be effective for managing *Plectosporium* blight. Be sure to rotate cucurbits out of affected fields for 3 to 4 years to allow for thorough decomposition of crop residue.

Clinic Corner: Findings from the Penn State Plant Disease Clinic

Jennie Mazzone Penn State Research Technologist and Assistant Diagnostician

Septoria Leaf Spot on Tomato

The [Penn State Plant Disease Clinic](#) received a tomato sample from a home garden in Bedford County, Pennsylvania in June. The sample had small, necrotic, circular leaf spots with dark margins. The spots were reported to be more severe on the lower leaves. Microscopic examination of the spots revealed the fungus *Septoria*, which causes Septoria leaf spot on tomato.

Septoria leaf spot is a very common disease on tomato. It can be confused with other foliar diseases but there are some diagnostic features that help distinguish this disease. Septoria leaf spots typically have nearly perfect circles with tan centers and dark margins. Close observation of the spots with a hand-lens can reveal small, black circular fruiting bodies called pycnidia within the spot. Early blight (caused by the fungus *Alternaria solani*) can cause similar symptoms but its more advanced leaf spots help distinguish it with the formation of a concentric circle (or bull's eye) pattern within the leaf spot. Bacterial spot and speck (caused by the bacteria *Xanthomonas* spp. and *Pseudomonas* spp. respectively) can also cause spots on tomato leaves but these spots would lack fungal fruiting body signs. Keep in mind that these diseases are not mutually exclusive so more than one disease could be affecting the plants. If you suspect foliar disease on your tomato and you are unsure of the cause, submit a sample to the [Plant Disease Clinic](#).



Necrotic leaf spots with dark margin on tomato caused by Septoria leaf spot (top; Photo: Beth K. Gugino); early blight causing necrotic leaf spots with concentric ring pattern surrounded by chlorosis on tomato (bottom left; Photo: Jennie Mazzone) and bacterial spot causing small necrotic spots on tomato (bottom right; Photo: Beth K. Gugino).

Septoria leaf spot is notorious for infecting the lower leaves of the plant first and spreading upward, causing defoliation of severely affected leaves. The fungus overwinters on plant debris in the soil and can infect the plant during rain events where splash dispersal occurs. Control Septoria leaf spot by avoiding overhead irrigation, crop rotation, proper plant spacing, trellising to increase air circulation, removing crop debris to reduce inoculum, and protectant fungicide applications. Please refer to the [2022-23 Mid-Atlantic Commercial Vegetable Recommendations](#) for additional management recommendations.