



PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

2301 N. Cameron St., Harrisburg, PA 17110 | 717-694-3596 | pvmrp@embarqmail.com | PAVeggies.org

Pennsylvania Vegetable IPM Weekly Update

August 31, 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 VARIABLE ACROSS THE STATE THIS WEEK

Corn earworm numbers caught in traps reporting data this week were increasing at many sites again this week, while decreasing at others. Sites in Blair, Bucks, Franklin, Lancaster, Lehigh, Mifflin, Montgomery, Northampton, and Washington Counties experienced average catch per night of 10-38 moths, which means a spray interval of 3-4 days would be suggested for corn that's tasseling or silking. Centre and York Counties experienced average catch per night of 8-9 moths which means a spray interval of 4-5 days would be suggested. Bedford County experienced average catch per night of 5 moths which means a spray interval of 5-6 days is recommended. 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. An adult male corn earworm moth caught in a monitoring trap



Fig. 2. Fall armyworm feeding damage on corn

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. Particularly, we tend to see more resistance later in the season, 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, stink bugs, 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 very low this week with 6 or fewer moths caught in Bucks, Centre, Franklin, Lycoming, and Mifflin Counties and zero caught in all other counties reporting this week. 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.

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		
		Aug 15	Aug 22	Aug 29	Aug 15	Aug 22	Aug 22
Bedford	Curryville	9.7	4.9	4.7	1.7	0.9	0
Blair	Sinking Valley	10.7	10.4	23.1	0.9	0	0
Bucks	Doylestown	26	25	34.3	0	0.4	0.3
Butler	Cabot	Null	1.4	0	No trap	No trap	No trap
Centre	State College	0.5	0.6	2.4	0	0	0.3
Centre	Rock Springs	4.5	5.3	8.7	0.4	1.8	0
Clinton	Loganton	0.25	3	1.7	0	0.3	0
Franklin	Shippensburg	16	11	24.7	0	0.1	0
Franklin	Waynesboro	23.1	30.3	38.3	0	0.1	0.1
Indiana	Indiana	3.7	1.6	0.4	0	0.4	0
Juniata	Port Royal	3.4	Null	Null	0.1	Null	Null
Lancaster	Landisville	15.9	5.3	24.3	0	0	0
Lancaster	New Danville	6	12.6	15.4	0	0	0
Lancaster	Neffsville	30.2	7	34	0	0	0
Lehigh	Germansville	14.6	6.6	33.5	0	0	0
Luzerne	Drums	0	0	1.4	0	0	0
Lycoming	Linden	1.5	Null	1.8	0.4	Null	0.4
Lycoming	Montoursville	0.6	Null	0.1	1.1	Null	0.6
Mifflin	Bellefonte	2.7	6	10.1	1.7	0.1	0.9
Montgomery	Souderton	24.3	31.1	37.4	0	0	0
Montour	Washingtonville	Null	Null	Null	No trap	No trap	No trap
Northampton	Easton	2.8	Null	30.3	Null	Null	0
Washington	Venetia	Null	8	15	No trap	No trap	No trap
York	York	12.1	5	9.3	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

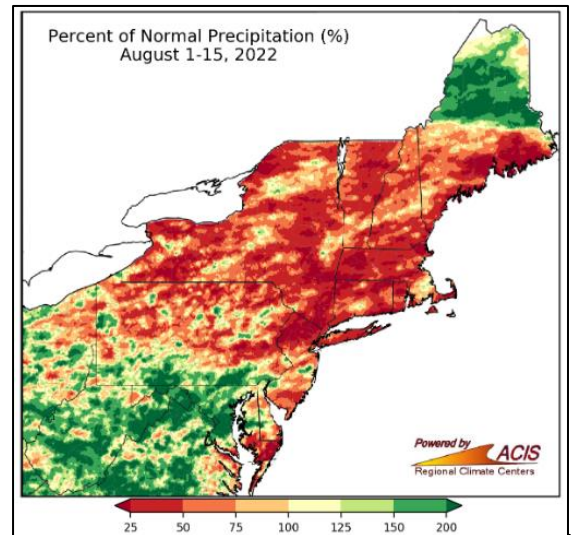
PA Vegetable and Berry Current Issues for August 30, 2022

Beth Gugino, Kathy Demchak, and Karly Regan, Penn State

GENERAL CONDITIONS

Environmental conditions have been highly variable across the state and even within the same farm with some fields experiencing regular rainfall and others being missed by most rain events. The Northeast Regional Climate Center

(<https://www.nrcc.cornell.edu/services/blog/2022/08/16/index.html>) recently published a map showing the percent of normal precipitation for the first half of August across the northeast (pictured right). While much of the state was below average (redder in color), there were areas especially in the southcentral part of PA that experienced significantly wetter conditions (more green in color).



FIELD PRODUCTION

Downy mildew on jack-o-lantern pumpkin is now being reported in three counties across Virginia as well as in a couple in North Carolina and one in northwestern Ohio. It is being reported on butternut squash in Massachusetts and eastern Tennessee. All other nearby reports have been on cucumber and cantaloupe. **Powdery mildew** continues to be reported on a wide array of cucurbit crops in both the greenhouse and field which is typical for this time of the season. On pumpkin and other decorative cucurbits as the fruit mature, it is important to continue to protect the handles with a fungicide program until close to harvest to prevent them from becoming brown and shriveled thus reducing marketability.

Aside from bacterial leaf spot and Phytophthora blight, **anthracnose is one of the most common diseases on pepper**. It starts as small depressions in the fruit that enlarge and become covered with salmon to orange-colored spores. Pepper fruit are susceptible at any growth stage compared to tomato fruit which are primarily susceptible at later stages of maturity. The same pathogen can also cause anthracnose on strawberries which are commonly grown in diversified vegetable production systems. Host resistance is not available, so fungicides are the primary tool especially in fields with a known history of the disease. See the [2022-23 Mid-Atlantic Vegetable Production Recommendations](#) for a list of recommended in-season products. Roguing symptomatic plants as well as maintaining a three to four-year crop rotation out of susceptible hosts can help reduce inoculum pressure.



Pumpkin handle infected with powdery mildew. As the disease progresses, the stem will become shriveled and brown reducing marketability (Photo: Beth K. Gugino).

The summer tomato diseases, **early blight and Septoria leaf spot**, continue to be reported and this past week **gray leaf spot or Stemphylium leaf spot** caused by several species of Stemphylium was confirmed. Symptoms can be easily confused with early blight and Septoria leaf spot; however, the lesions will not develop concentric rings characteristic of early blight and will not have the small dark spots (pycnidia) in the center of the tan lesions as with Septoria leaf spot. The lesions will be small and tan in color and commonly crack in the center. It is most common on heirloom tomato cultivars that lack resistance compared to hybrid tomato cultivars. Recommendations for management of early blight and Septoria also apply to gray leaf spot. **Bacterial spot and bacterial canker on tomato** continue to be confirmed in various regions of the state.



Tan lesions characteristic of gray leaf spot on the upper tomato leaflet compared to Septoria leaf spot on the bottom leaflet (Photo: Meg McGrath, Cornell).

On the insect front, we continue to see **cabbage looper** active in cabbage, kale, and other cole crops and **spotted and striped cucumber beetles** are still being reported in cucurbit fields. Be on the lookout for **wireworm** damage in potatoes. This pest leaves scars or tunneling on developing tubers, which can increase the risk of soft rots. Although damage can occur now, management must be done prior to planting. Foliar insecticides do not control wireworms since their feeding is belowground. Adults lay eggs in grassy areas, so managing weeds and avoiding planting potatoes after a grass hay crop can help reduce risk. Larvae are long-lived for up to six years, so long-term rotation away from potatoes is important. Tillage or insecticides applied at or prior to planting can also be used.



Oviposition marks by Allium leafminer will appear as a row of small white dots along a leaf, often near the tip or at the highest point on a bent leaf (Photo: Karly Regan).

We have begun to see activity of **Allium leafminer** in cooler regions of Pennsylvania. The fall generation of this pest emerges as nights cool down for the season and can last 5-7 weeks. Row covers can help prevent damage to any susceptible crops if applied prior to emergence of adult flies. If not using row covers, scout for their activity by looking for rows of small white dots near the highest point on leaves (pictured right) and consider applying a systemic insecticide along with a spreader-sticker surfactant during the period of adult flight and shortly after to control larval feeding.

BERRY CROPS

Leaf diseases are being seen in some plantings of brambles. These include primarily **raspberry leaf spot**, which as the name implies, is common on raspberry, and **Septoria leaf spot** which affects blackberry, though anthracnose can cause leaf spots as well. These diseases look very similar in appearance, and the first two can cause defoliation mainly of lower leaves if they become severe enough, affecting plant vigor and ability to make carbohydrates going into the fall. All of the usual cultural practices such as removing old fruiting canes, keeping rows narrow, controlling weeds, and trellising plants to improve air flow will help.



Raspberry leaf spot on black raspberry (left) and Septoria leaf spot on blackberry (right). (Photos: Karly Regan (raspberry leaf spot) and Kathy Demchak (Septoria)).

This is also the time of year when **late leaf rust** can become a problem on red or black primocane-fruiting raspberries. This disease is not a systemic rust (like orange rust is), so there is no need to pull the plants out. For all the above diseases, certain fungicides in categories 3 and 11 (check labels to see which ones list the above diseases) are helpful in control.

Spotted wing drosophila is continuing to be problematic. Anyone with day-neutral strawberries should keep an eye peeled for soft spots on fruit, and growers of berries of any kind should watch for a noticeably shorter shelf-life. Employ all the cultural controls that you can (thorough harvests, reduced intervals between harvests, and refrigeration) and use insecticides as needed.



Late leaf rust on 'Niwot' black raspberry. (Photo: K. Demchak).

Fall is when **powdery mildew** can take off in strawberries. Watch for inward leaf curling and purple blotches that first show up along the leaf edges. Day-neutral cultivars are especially susceptible, as is the June-bearing cultivar Galletta. Fungicides generally are not needed unless the disease is severe or fruit is affected. Fungicides that specifically list powdery mildew on the label (category 3, 11, or specific fungicides such as Quintec), are effective, but fungicides used for other common diseases such as gray mold have little effect.

*Powdery mildew on 'Galletta' strawberry.
(Photo: K. Demchak).*

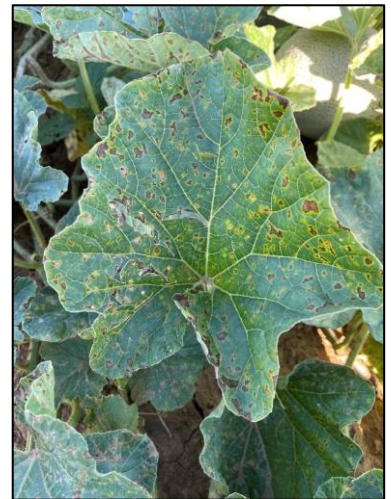


Vegetable Disease Updates

Beth Gugino, Penn State Extension Vegetable Pathologist

GENERAL UPDATES:

- **No new cases of late blight** have been reported on tomato or potato across the region this past week. 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. We are also always interested in a sample to genotype. For over the past decade, US-23 has been the predominant genotype affecting both tomato and potato in the northeastern and mid-Atlantic regions of the U.S.
- **Downy mildew continues to spread on cucumber and cantaloupe** across the region and within the past week mostly near previously reported sources. There have been no new reports on butternut squash (previously reported in MA) or jack-o-lantern pumpkin (previously reported in OH, VA, and NC). In PA, downy mildew was most recently confirmed in western PA on cucumber in Washington Co. and cantaloupe in Mercer Co. and previously on cucumber in Adams, Cambria, Centre, Huntingdon, Mifflin, Dauphin, Lehigh, Juniata, Snyder, Lancaster, Berks, Bucks, and Delaware Co. 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 **Alternaria leaf spot on fall planted cole crops**. The fungal species of Alternaria that affects cole crops is specific to cash crops, cover crops, and weeds in that plant family. Similar to other diseases caused by Alternaria, concentric rings patterns will develop as the lesions expand and often the centers can crack and fall out. The disease is favored by moderate temperatures ranging from 75 to 82°F. The disease can also affect the heads of cole crops causing small black to brown discolored spots that are easily colonized by secondary soft rotting bacteria. Selecting cultivars that have tighter heads and more readily shed water will tend to be less susceptible. During the season, fungicides are the most effective tool. Check the [2022-23 Mid-Atlantic Commercial Vegetable Recommendations](#) for a list of recommended products. Be sure to read the fungicide label to make sure that the specific cole crop that you are treating is labelled because some products for example, Luna Experience is only labelled for brassica leaf greens and rotate between Fungicide Resistance Action Committee (FRAC) codes for resistance management.



*Characteristic symptoms of downy mildew on the upper leaf surface of cantaloupe
(Photo credit: Beth K. Gugino).*



Alternaria leaf spot lesions with characteristic concentric lesions on a cabbage leaf (Photo credit: Beth K. Gugino).

Clinic Corner: Findings from the Penn State Plant Disease Clinic

Jennie Mazzone Penn State Research Technologist and Assistant Diagnostician

DIAGNOSING VIRUSES ON VEGETABLES

Viruses make plants look strange and can often resemble herbicide drift injury. Viruses are submicroscopic, which means they are so small that you cannot see them with the naked eye and require a specialized microscope called an electron microscope to visualize. Therefore, we rely on plant symptoms to give us clues when they are infected with a virus.

Symptoms associated with virus infections include:

- Reduced growth resulting in stunting
- Mosaic pattern of light and dark green (or yellow and green) on leaves
- Malformation of leaves or growing points
- Yellow streaking of leaves (especially monocots)
- Yellow spotting on leaves
- Ringspots (circular line patterns on leaves)
- Cup-shaped leaves
- Uniform yellowing, bronzing, or reddening of foliage
- Flower color breaking
- Distinct yellowing only of veins
- Crinkling or curling of margins of leaves



Cucumber mosaic virus causing yellow mosaic pattern on cucumber leaves (left) which is vectored by many species of aphids (right) (Photo credits: Jennie Mazzone).



Ringspots, yellowing, and necrotic leaf spots on tomato caused by tomato spotted wilt virus (left) and thrips larva insect vector (right) (Photo credits: Jennie Mazzone).

Viruses can enter healthy plants through wounds made by vectors or by equipment, such as pruning shears. Vectors transmit viruses from one plant to the next and include sucking insects, such as aphids, leafhoppers, thrips, and whiteflies, as well as chewing insects, such as beetles. Some viruses, such as cucumber mosaic virus (CMV), die quickly if outside a cell or if the cell dies, but other viruses, such as tobacco mosaic virus (TMV), retain their ability to infect for years after the infected plant part dies and can survive on hard surfaces.

Weed management also plays a big part in managing viral diseases because perennial weeds often serve as a reservoir for viruses to survive in when other host plants are absent. Viruses can also be carried in seed, cuttings, tubers, graft rootstocks, scions, or buds when propagating a virus-infected plant. For this reason, purchasing certified virus-free seed and planting stock is important to avoid problems in many vegetables.

If you think you may be dealing with a plant virus, send a sample to the [Penn State Plant Disease Clinic](#). We can test for many of the common viruses that occur in PA.

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