



PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

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Pennsylvania Vegetable IPM Weekly Update

July 7, 2021

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.

PA Vegetable and Berry Current Issues

Beth Gugino, Shelby Fleischer, and Kathy Demchak

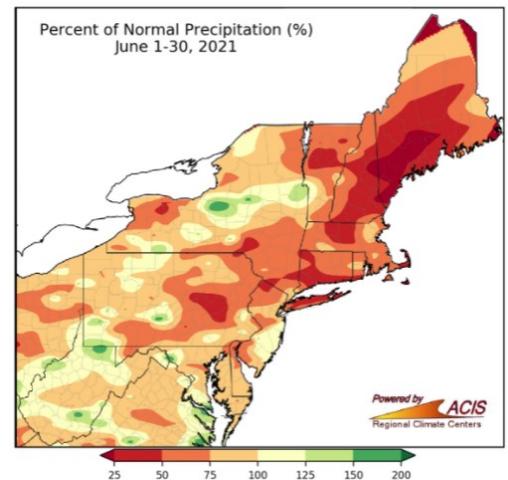
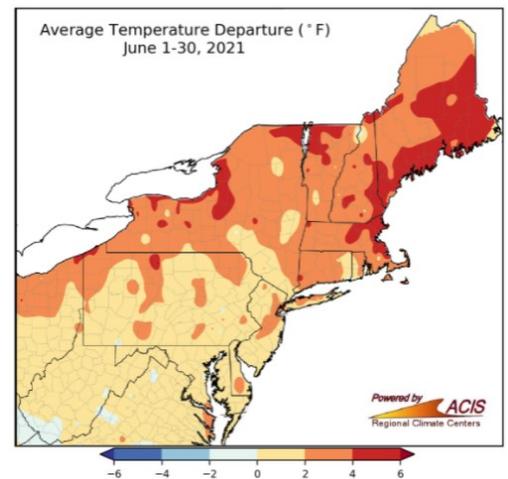
General conditions as of July 6, 2021: Based on data collected and summarized by the [Northeast Regional Climate Center](https://nrcc.cornell.edu), June turned out to be one of the hottest on record for many areas in the Northeastern US with the majority of PA being 1 to 4°F above normal. Precipitation was also down across much of the Northeast although a few locations registered higher than usual rainfall highlighted by green on the precipitation map to the right. NOAA's Climate Prediction Center is currently forecasting that temperatures and precipitation in July will be higher and wetter than average. For more information check out Northeast Regional Climate Center (<https://nrcc.cornell.edu>).

FIELD PRODUCTION

Continue to be on the lookout for **downy mildew on cucumber and cantaloupe**. It takes three to twelve days for symptoms to become visible depending on the temperature, moisture, and amount of inoculum. On hot sunny days, it is easiest to see symptoms earlier in the morning. There will be water-soaking on the underside of the leaves and then as the leaves dry, the purplish sporulation will become more apparent. There are still NO reports on pumpkin and butternut squash in our region, so the use of downy mildew specific fungicides is only recommended on cucumber and cantaloupe at this time.

As we head further into July, the onion crop is continuing to size. **Onion**

bacterial rots are a common sight in many fields due to the heavy rain events and high temperatures. When harvesting take steps to dry down the onion necks as quickly as possible that will help limit the progression of the bacteria from the leaves into the bulb. The bacteria are not able to move through dried tissue. Limiting water close to the time of harvest will start forcing the plants to start to dry down and lodge however, turning the water on just prior to harvest to wet the roots will reduce the number of basil plates torn if the soil is tight when pulling for harvest. Applications of copper tanked mixed with mancozeb are recommended. Mancozeb as well as many other products recommended to manage foliar fungal diseases have a 7d PHI so read the label and apply accordingly.



Maps sourced from the Northeast Regional Climate Center (<https://nrcc.cornell.edu>).

There continue to be no reports of late blight in the region however be on the lookout for **early blight** as well as **Septoria leaf spot on tomato**. These commonly develop on the lower leaves with the onset of fruiting as the plants reallocate resources from the lower leaves into fruit production. There have also been a few reports of bacterial speck/spot.

As a general reminder, it is **important to thoroughly read all pesticide labels before applying products** to make sure that they are being used legally. There have been numerous reports of crop injury or at times complete crop failure as a result of misapplication. This is particularly true for herbicides that can have multi-year plant back restrictions. Also, for some herbicides, applying them over the plastic and counting on the rain to wash them off can also be risky. If not thoroughly washed, off then residual herbicide can wash into the planting holes causing plant injury. Herbicide injury can look very similar to virus infection but rather than a few scattered symptomatic plants, more plants in either an area or across the field may be affected.

Corn earworm trap counts have been exceeding thresholds in multiple counties, and spiking (exceeding 90/week, a 4-fold increase in a week) in Delaware. This may be due to a 2nd generation in Delaware. Parts of PA also had early CEW detections, and their offspring could emerge within the next few weeks. Tasseling and silking corn will be highly attractive to these moths. Eggs are laid on silk, and insecticide control requires contact to the very young larvae, before it moves into the ear. CEW has resistance to pyrethroids – the level of resistance tends to start low and increase during the season. Pyrethroids at this time of year can result in flaring corn leaf aphid populations, because the pyrethroids reduce beneficials that are commonly found in corn. Other options include those from IRAC group 5 (Blackhawk, Radiant) and IRAC group 28 (Coragen, Vantacor). The group 28 options have low bee toxicity, and Vantacor can be obtained in smaller quantities. These options also control the other ‘worm’ pest in sweet corn (European corn borer and fall armyworm). However, these group 5 or 28 options will not control sap beetles, silk-clipping beetles (adult stage of Western corn rootworm), or stink bugs.



*Corn earworm feeding can result in large amount of frass in the ear tip.
Photo H. Fescemeyer*



Rhubarb curculio adult (left), close-up of weevil-like snout (center), and damage (right). Photo T. Ford.

A relatively rare pest – the **rhubarb cucurlio** – is damaging rhubarb in south-central PA. This large (1.5 inch) long weevil-like species, with a yellowish bloom that comes off, has one generation per year, and feeds and lays its eggs into rhubarb and other weeds. Weed control, especially controlling dock, may help keep populations low. Larval survivorship tends to be low in rhubarb.

Other insect pests being seen now include **Japanese beetle** (and related species such as June beetle), **cucumber beetles**, **onion thrips**, **imported cabbage worm** (a.k.a. cabbage butterfly), and spider mites. **Spider mites** have been especially high in high tunnel cucumbers and Imported cabbage worm in areas using brassica cover crops. On farms with a heavy **sap beetle** population from strawberries, growers have had sap beetles show up in cauliflower after the wrapper leaves are tied up. Sanitation is key for managing sap beetles. We expect to soon see **squash bugs**. Reports of **allium leafminer** pupae continue to come in from people finding them when they harvest garlic. **Root maggots** have shown up effecting beets. On a more positive note, we also soon expect to see the **squash bee** emerging, but we have not seen them active yet.

BERRY CROPS

After a relatively quiet anthracnose season for June-bearing strawberries, warm temperatures and moist conditions are resulting in development of **fruit anthracnose** on day-neutral strawberries. As in the past, it is important to include fungicides with low risk of resistance development as either a tank-mix or rotational partner; captan is especially useful as it has a low risk of resistance development due to multi-site activity and also has fairly good activity against anthracnose. See this article for a review of what we know about [anthracnose on strawberries](#), along with info on cultural and chemical control methods.

As fields are being prepared for **new plasticulture plantings**, it is important to choose sites where the field has been out of strawberries for as long as possible, with three years being the absolute minimum. The more times the field has had strawberries in it, the more likely it is that disease organisms of more types accumulated in the soil over time. Disease organisms like anthracnose that need plant tissue to persist have been found in non-decomposed strawberry crowns for up to three years after the crop was last grown in the field. Other diseases with resting structures that do not need plant tissue to survive can persist for longer.

In some blueberry fields, **disease organisms are being isolated that aren't normally pathogenic**, which means that the plants are weakened from **plant stress**. Common problems are high soil pH, lack of mulch which results in the blueberry plant's delicate root system being exposed to too much heat or to drying out, and lack of sufficient irrigation, which becomes a bigger problem when there is a lack of mulch. If you have been applying sulfur in a pelleted form, and the soil pH is not decreasing, it may be because the coating of the pellets is not breaking down even after a year or longer, so future fall or spring applications in the form of a sulfur powder either dry or in a slurry may be a more effective option. Iron deficiencies from a soil pH that is too high results in interveinal chlorosis, though the plants may otherwise look fairly healthy.

Spotted wing drosophila season has arrived, so be sure to apply insecticides as needed, keep plantings cleanly and frequently picked, and remove cull fruit from the field. Ratings of insecticide effectiveness and groupings by chemical class can be found in this publication from the Sustainable Spotted Wing Drosophila Management web site: [2021 ranking of insecticides for their performance against spotted-wing Drosophila](#)

Vegetable Disease Updates

Beth Gugino, Extension Vegetable Pathologist, Penn State University

GENERAL UPDATES:

- There are currently **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.



Anthracnose on strawberry fruit showing typical symptoms of dark sunken lesions, darkened seeds, and some orange spore masses beginning to develop. Photo: K. Demchak.



Sulfur pellets have been found to remain intact in the field long after application, resulting in little change in soil pH. Photo: K. Demchak.



Symptoms of iron chlorosis are most apparent on new growth. Photo: K. Demchak.



Sclerotia from timber rot developing in a tomato stem. (Photo credit: Beth K. Gugino.



Differing severity of physiological leaf curl on two tomato cultivars separated by the wooden stake (Photo credit: Beth K. Gugino.

- To-date **cucurbit downy mildew** has only been reported on **cucumber and cantaloupe** in our region. There have been NO reports on pumpkin, butternut squash, and watermelon. If you suspect 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. Knowing where the disease is an important component for area-wide management. See <https://cdm.ipmpipe.org> for the latest reports and disease risk forecasts.
- **Timber rot on tomato** has developed in a number of high tunnels this season. Timber rot causes stems to become brown/tan and under humid conditions dense white fungal mycelium can develop and eventually form into overwintering sclerotia as the plant tissue dies. Sanitation is an important tool for managing this disease. When sclerotia fall to the soil they can be a source of the pathogen next season and for many seasons to come.
- **Heat stress** can come in many forms from sunburn to lower stem girdling to severe leaf curling and blossom and fruit drop. Applying pesticides to your crops under high temperature conditions can also lead to issues with phytotoxicity. The sensitivity of crops and varieties can differ and often look like a disease. It is important to provide adequate and frequent water especially for crops growing on plastic mulch. For tips on irrigating in hot summer check out the article: [Irrigating through a dry \[or wet\], hot summer](#).

DISTINGUISHING CUCURBIT DOWNY MILDEW FROM OTHER FOLIAR CUCURBIT DISEASES

With the confirmed reports of downy mildew on cucumber and cantaloupe in the region, it is important to recognize that there are several other foliar diseases that affect cucurbits could potentially be confused with cucurbit downy mildew. These include angular leaf spot, bacterial leaf blight, anthracnose and powdery mildew with angular leaf spot being the most likely look-alike. Also keep in mind that these diseases are not mutually exclusive so more than one disease could be affecting the plants.

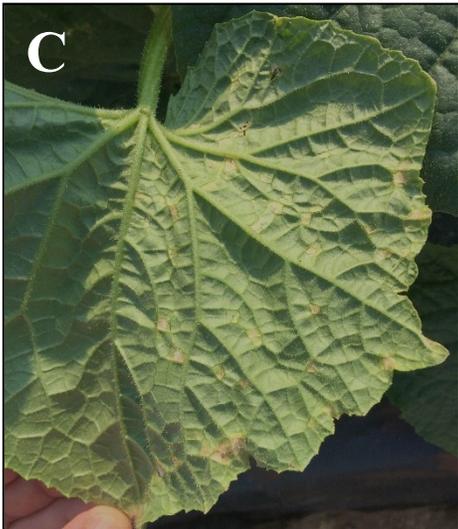
Angular leaf spot (ALS), is a bacterial disease with symptoms very similar to downy mildew. The vein-limited lesions are initially water-soaked in appearance before turning tan to brown in color that depending on the cultivar can be surrounded by a yellow halo/border. The lesions will often dry and drop out, leaving irregular shaped holes in the leaves. The difference is that ALS will not produce the purplish spores on the underside of the leaf because the disease is caused by a bacterium and not a fungus. Even after placing the leaves in a sealed bag overnight, spores' characteristic of downy mildew will not form.

Bacterial leaf spot (BLS), is also a bacterial disease caused by a different pathogen than ALS. It is also soaked lesions similar to angular leaf spot. They tend to be smaller on pumpkin and winter squash compared to cucumber and again surrounded by a yellow halo. Both diseases are favored by warm and wet conditions and spread via rain splash. The pathogens can be seedborne and often affect the older leaves first before being splashed up onto the younger leaves and fruit. It is not uncommon for the plants to outgrow the foliar symptoms when conditions become less favorable (dry).

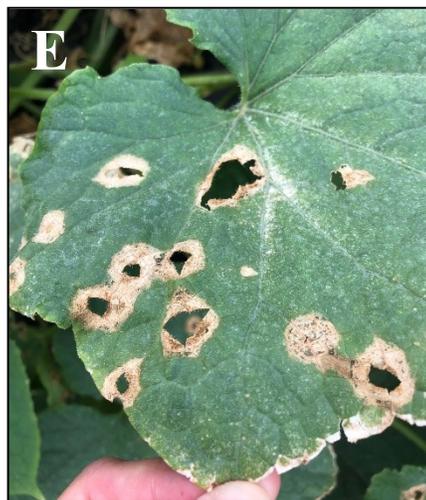
Anthracnose is a fungal disease that results in larger tan circular lesions that are ¼ to ½ inch in diameter on cucumber and muskmelon leaves. On watermelon, lesions are more irregular and turn dark brown to black in color. As the lesions dry up, they crack creating a shot-hole appearance. Cantaloupe, squash and pumpkin tend to be less susceptible. Stem lesions can girdle vines causing them to wilt and collapse.

Powdery mildew is also a fungal disease which develops initially as individual white powdery colonies on both the upper and lower leaf surface as well as the stems and petioles of susceptible cultivars. If applying a protectant fungicide like

chlorothalonil then often round chlorotic lesions can be seen on the upper leaf surface with corresponding white colonies on the lower leaf surface or other plant surfaces which are not protected by the fungicide.



Tan lesions with chlorotic borders characteristic of angular leaf spot on cucumber on the upper leaf surface (A) and lower leaf surface (C). Downy mildew has similar lesions but there will be purplish sporulation on the underside (B). Bacterial leaf spot lesions tend to be much smaller and less angular in shape on pumpkin (D). Large tan circular to irregular shaped lesions characteristic of anthracnose on cucumber (E). Both powdery (white) and downy mildew sporulation on a pumpkin leaf (Photo credits: Beth Gugino).



Sweet Corn Insect Pest Monitoring

Shelby Fleisher, Extension Vegetable Entomologist, Penn State University



Corn earworm

Corn earworm (CEW) catch is above threshold in 7 of 20 sites. Sites in Blair, Bedford, Erie, Lancaster, Lycoming, Washington, and Washington exceeds thresholds, sites in Juniata, Mifflin and York were above threshold last week. Sites Erie and Lancaster (and Mifflin last week) suggest tightening spray frequencies. **Tasseling and silking corn will be very attractive.** CEW has resistance to pyrethroids – the level of resistance tends to start low and increase during the season – and pyrethroids flare corn leaf aphid populations, because they reduce beneficials commonly found in corn. Other options include those in IRAC group 5 (spinosyns: Blackhawk, Radiant) and IRAC group 28 (diamides: Coragen, Vantacor). The group 28 options (diamides) have low bee toxicity, and Vantacor can be obtained in smaller quantities. These also control European

corn borer and fall armyworm. However, group 5 or 28 will not control sap beetles, silk-clipping beetles (adult Western corn rootworm), or stink bugs. Pyrethroids or premixes that include pyrethroids and diamides (Beseige, Elevest) are then needed.

European corn borer (ECB) adults should be active, but counts were very low (≤ 2). ECB has been declining due to Bt field corn but localized populations remain. Scout for feeding damage and shothole patterns.

Fall armyworm (FAW) counts reached 7 in Lycoming and Erie counties; all other locations were ≤ 3 .

Average weekly catch –moving average for the last 7 days.

County	Trap Name	CEW			ECB			FAW		
		22-Jun	29-Jun	6-Jul	22-Jun	29-Jun	6-Jul	22-Jun	29-Jun	6-Jul
Blair	Tyrone	6	25	15	0	0	0	0	0	0
Bedford	Martinsburg	58	48	35	0	0	0	0	0	0
Bucks	Bedminster	0	0	2	1	0	0	0	0	0
Centre	Harner	1	5	1	0	0	1	0	1	0
Centre	Rock Springs	6	3	2	0	0	0	0	1	0
Clinton	Loganton	0	4	0	0	0	2			
Erie	Dudas Farm			21						0
Erie	Mason			56						7
Indiana	Brush Valley	16	10	2						1
Indiana	Creekside	9	5	4						0
Juniata	Happy Breeze	8	22					1		
Juniata	Greenbar	10	5							
Lancaster	Landisville	29	49	55	0	0	0	0	0	0
Lancaster	Neffsville	1	3	5	2	1	0	0	1	0
Lancaster	New Danville	2	4	2	0	0	0	0	0	0
Lehigh	Germansville			5			0			0
Lycoming	Linden		2	2					2	3
Lycoming	Montoursville	4	9	10	2	0		0	0	7
Lycoming	Muncy		31	21					0	2
Mifflin	Streamside		40			1			0	
Montour	Washingtonville		8			1				
schuylkill	Tower City			0			0			0
Washington	Venetia	8	19	16						
Bradford	Bristols	3			0			0		
Bradford	Ahern	0								
York	York	11	29	11	1	0	0	0	1	0

THRESHOLDS: Reproductive (tassel/silk) and late vegetative corn attracts moths. Shorten spray schedules when populations increase. If CEW is not a problem, then consider ECB.

	CEW		ECB	
	Catch/Week	Spray Frequency (days)	Catch/Week	Spray Frequency (days)
Almost Absent	1-13	7 or more	<15	7 or more
Very low	14-35	5-6	15-35	6
Low	36-70	4-5	36-70	5
Moderate	71-349	3-4	>70	4
High	>350	2-3		