



PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

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Pennsylvania Vegetable IPM Weekly Update

August 4, 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

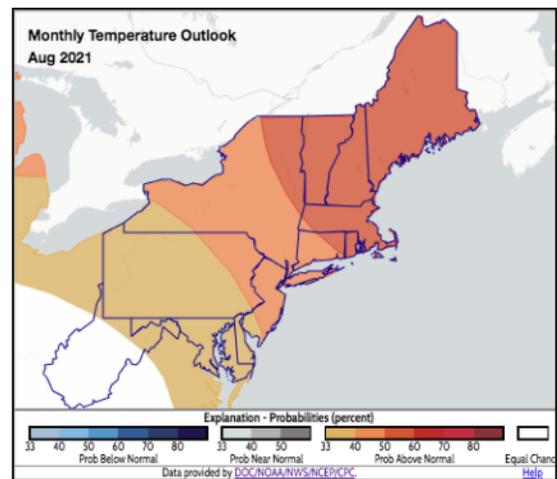
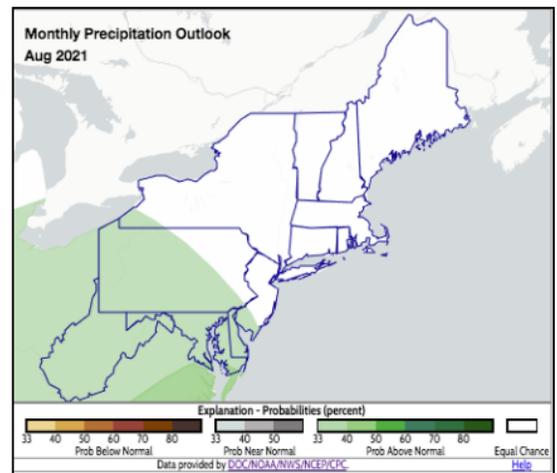
Beth Gugino, Shelby Fleischer, and Kathy Demchak

General Conditions as of August 3, 2021

Based on data collected and summarized by the [Northeast Regional Climate Center](#) in their blog, overall total July precipitation was variable across Pennsylvania with some places like Erie, PA recording their 7th wettest July on record while places like Pittsburgh and Allentown were below average. Some places like Scranton and Williamsport, PA had measurable precipitation on 18 and 16 of the 31 days in July, respectively. During the later half of July, 17 tornadoes touched down across Pennsylvania, New Jersey, and Maryland with the most occurring in Pennsylvania. In general, temperatures across much of the interior part of the state were slightly above average with the extreme western and some of the northeastern counties being slightly below average. Currently August is forecasted experience slightly above average rainfall and slightly warmer than average temperatures. 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 has been confirmed in Centre, Huntingdon, Mifflin, Juniata, Luzerne, Lehigh, Bucks, Lancaster and Chester Counties. The closest report on jack-o-lantern pumpkin, acorn and summer squash is in Kentucky and butternut squash in Alabama. The drier weather is currently putting the region at lower risk. Now is a good time to make sure your cucumber and cantaloupe crops are protected with fungicides before the next storms are forecasted. **Powdery mildew** continues to also be on the increase is also starting to show up on cucurbit crops. **Alternaria leaf spot** is being reported on watermelon and cantaloupe. **Copper injury** is occurring on cantaloupe. The damage can occur as a result of foliar copper applications or if copper is being applied through the drip irrigation system. Keep in mind that there is no research-based evidence that copper applied through the drip irrigation will help with disease management. Copper-based products are contact protectant types of products and must be



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



Yellow leaf margins on cantaloupe due to the application of copper-based fungicides causing phytotoxicity (left; Photo: Beth K. Gugino) and *Alternaria* leaf spot on cantaloupe (right; G. Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org).

applied to the plant surface to be effective. When applying copper on cantaloupe do not adjust your water pH down as this only increases the likelihood of phytotoxicity. Also be on the lookout for a number of cucurbit insect pests described further below.

Bacterial spot is being reported on tomato and pepper as well as **early blight** and **Septoria leaf spot**. So far there is no reported late blight in the region. The closest reports are on potato and tomato in northern Georgia. As the night temperatures start to drop and we experience longer dew periods, the risk for late blight will

increase if there is inoculum nearby.

Phoma leaf spot is also being seen in red beet plantings. This is a seedborne fungal disease that can also survive associated with crop residue, so a 3-year crop rotation is recommended.



Phoma leaf spot lesion on a red table beet leaf (Photo: Beth K. Gugino).

Typically at this time of year, corn earworm trap catches are driving management decisions, but this past week we've seen spikes of **fall armyworm (FAW)**, and outbreaks of **sap beetles**, that cause equal or greater concerns. FAW does not undergo diapause, so overwintering is limited to very far south (southern FL, southern TX, perhaps the Gulf Coast). Migratory behavior and nighttime wind currents result in populations arriving here, several generations after the New Year starts.

The sporadic, highly disjunct pattern of its arrival we are seeing is consistent with that model. Although larvae feed heavily on vegetative corn, when in tasseling or silking corn the larvae bore rapidly into the ear, from the base, side or tip. **Sap beetle** populations got off to a strong start this spring, and are now showing up in sweet corn, especially in cultivars with exposed tips, and farms with strawberries or other crops that provide good hosts. The larvae look like small white worms in the ear with sclerotized tubercles at the rear. A recent article of sap beetles is here: <https://extension.psu.edu/sap-beetle-management-in-sweet-corn>. Farm scale sanitation (for example, clean harvests or strawberries) are key to sap beetle management.



Fall armyworm (top, photo R. Bessin) and sap beetle larvae (bottom, photo T. Ford).

Some populations of both corn earworm and fall armyworm exhibit resistance to pyrethroids. Other options include spinosyns (IRAC group 5: Blackhawk, Radiant) and diamides (IRAC group 28: Coragen, Vantacor). Diamides have low bee toxicity. These also control ECB and FAW, but not sap beetles, silk-clipping beetles (adult Western corn rootworm), or stink bugs – pyrethroids are often used for these. Premixes that include pyrethroids and diamides (Beseige, Elevest) are options.

Multiple types of mites are causing problems. **Two-spotted spider mites** are showing up in tomatoes, watermelons, and cucumbers. But also, tarsonemid mites – **broad mite, cyclamen mite, tomato russet mite** – are causing problems in multiple locations, both in field and tunnel production. Miticides (Oberon, Portal, others) are registered for control. Additional suggestions are to start with clean transplants – no flowers on transplants – and do a good job controlling pests that fly (fungus gnats in greenhouse/tunnels) because the mites use them to hitchhike.



*Cyclamen mite damage on pepper plants (left) and fruit (right)
(Photos L. Stivers)*

Cucumber beetles, squash bug, and squash vine borer are all very active now, with some locations having high populations. Scout plants carefully, including the underside of leaves, for all life stages. Damage from **stink bugs, including Brown Marmorated Stink Bug (BMSB)** is showing up in tomatoes. An overview of BMSB damage and



Brown marmorated stink bug (BMSB) damage on tomato fruit (Photo S. Fleischer).

management for multiple vegetables is at <https://www.stopbmsb.org/stopBMSB/assets/File/BMSB-in-Vegetables-English.pdf> (a Spanish version is available as well).

BERRY CROPS

Spotted wing drosophila is present in many small fruit growers' fields, and adults, larvae and pupae are likely to be present. More information on insecticide efficacy and management may be found in this article: <https://extension.psu.edu/spotted-wing-drosophila-a-2021-update-for-berry-growers>.

Some growers are reporting some damage to day-neutral strawberries from spotted wing drosophila, but keep in mind that young sap beetle larvae may also be present in the fruit, especially if you have seen sap beetle adults around. To tell the two types of larvae apart, look for a head. Spotted wing drosophila larvae are tiny and have no apparent head, while sap beetle larvae are larger and have a head capsule that is darker than the rest of the body.

Some growers are reporting day-neutral strawberry fruit that is misshapen and seedy. Causes may damage from tarnished plant bug or long-necked seed bug. Both insects move very quickly, making it difficult to spot them. **Long-necked seed bugs** may in the strawberry field only briefly before they move on to other crops. Insecticides applied for spotted wing drosophila are generally effective on both pests.

There have been a few instances of **yellow-necked caterpillar** defoliating blueberry plants. This caterpillar tends to congregate, so bushes can be quickly stripped of leaves before the caterpillars move on to a different bush, leaving bare stems on plants that otherwise look healthy. These bushes will have difficulty recovering from the damage and may appear weak next year. Because the caterpillars are located together, physical removal is relatively easy and is the best control method.



*Blackberry with adult SWD and numerous oviposition wounds. Breathing tubes from an egg may be seen within the box.
(Photo K. Demchak).*



Now is the time to **remove spent floricanes** from raspberry fields. Be sure to cut the floricanes out as low as possible, as the pruning stubs are sources of inoculum for diseases such as cane anthracnose, spur blight and cane blight. These diseases will sporulate from the pruning stubs next spring, infecting new tender canes as they emerge from the ground.

SWD usually pupates at ground level, but in this case, the pupa remained within the fruit. (Photo K. Demchak).



Extreme case of long-necked seed bug damage on 'Seascape' strawberry. In most cases, only the tip of the fruit will be affected (left). Long-necked seed bug (right) (Photos: K. Demchak).



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

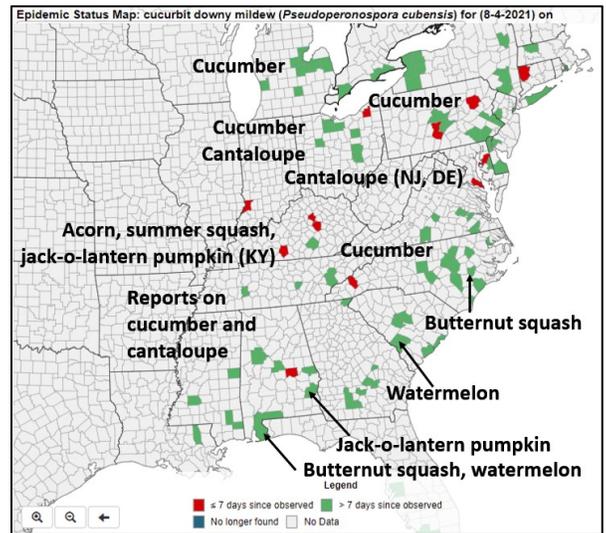
Vegetable Disease Updates

Beth Gugino, Extension Vegetable Pathologist, Penn State University

GENERAL UPDATES:

- There continue to be **no reports of late blight** on tomato or potato in the mid-Atlantic and Northeast regions however late blight was confirmed in one potato field in Wisconsin and one tomato field in northern Georgia. Late blight is favored by the cooler temperatures and longer dew periods that are typical as well move into fall. 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.

- Reports of **downy mildew on cucumber and cantaloupe** continue to increase and are primarily from home gardens and commercial fields where fungicides are not actively being applied. In Pennsylvania, it has been confirmed in Centre, Huntingdon, Mifflin, Juniata, Luzerne, Lehigh, Bucks, Lancaster and Chester Counties. The closest report on jack-o-lantern pumpkin, acorn and summer squash is in Kentucky and butternut squash in Alabama. The drier weather is currently putting the region at lower risk. Now is a good time to make sure your cucumber and cantaloupe crops are protected with fungicides before the next storms are forecasted. 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.



Cucurbit downy mildew monitoring map as of 9:00am 4 August 2021 (<https://cdm.ipmpipe.org>).

TWO COMMON FOLIAR DISEASES OF RED TABLE BEETS

When growing red table beets, there are two foliar diseases to be on the lookout for: Cercospora leaf blight and Phoma leaf spot. These fungal pathogens cause foliar circular lesions that under favorable environmental conditions can coalesce together, greatly reducing the green plant tissue available for photosynthesis and leading to reduced yield. Lesions caused by Cercospora are circular, tan in the center and surrounded by a reddish-purple halo or margin. Lesions from Phoma leaf spot are larger and develop concentric rings (similar to diseases caused by Alternaria e.g. Early blight on tomato/potato). It can also develop a reddish margin surrounding the lesion.

Both diseases are favored by warm and humid/wet conditions and are easily splash dispersed within and between plants in the field during rain events. Their host range includes other crops and weeds in the Chenopodiaceae which contains spinach, Swiss chard, quinoa, and sugar beet as well as pigweed, waterhemp, and lambsquarters to name a few. Weeds can serve as reservoirs of the pathogen so weed management is an important part of an integrated management program. In addition, a two to three-year crop rotation will facilitate the decomposition of crop debris and improving air circulation by widening row spacing can also help. Fungicide programs that rotate



Phoma leaf spot lesion on red table beet (top). Note the concentric ring pattern. Cercospora leaf blight lesions (bottom) are circular, tan in the center with a red-purple margin (Photos: Beth K. Guqino).

FRAC code 11 strobilurin fungicides such as Quadris, Cabrio, and Reason will FRAC 3 and FRAC 7 containing fungicides such as tebuconazole, Fontelis, and Merivon can help. Fungicide resistance to FRAC 11 fungicides is a significant concern in larger table beet growing areas in the region including New York and New Jersey. Tank mixing with copper can help with resistance management. For organic programs copper-based fungicides can also be tank mixed with biofungicides such as Double Nickel, LifeGard, and Regalia.

Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

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

Sweet Corn Insect Pest Monitoring

Shelby Fleisher, Extension Vegetable Entomologist, Penn State University



*Close-up view of a corn earworm (*Helicoverpa zea*) feeding on an ear of sweet corn. Photo: Eugene E. Nelson, Bugwood.org*

Corn earworm catch in PA have trended lower. Only 5 of 21 sites were above thresholds, and all the widest, 5–6 day, suggested interval. This decrease is in contrast to Delaware, where counts are high. CEW has resistance to pyrethroids. Other options include spinosyns (IRAC group 5: Blackhawk, Radiant) and diamides (IRAC group 28: Coragen, Vantacor). Diamides have low bee toxicity. These also control ECB and FAW, but not 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.

Fall armyworm (FAW), continued, or increased, in Bedford, Erie, Lycoming, and Mifflin counties. Concerns about pyrethroid resistance are exasperated with FAW,

which has a history of resistance. FAW does not undergo diapause, so its overwintering is limited to very far south (southern FL, southern TX, perhaps the Gulf Coast). Migratory behavior and nighttime wind currents result in populations arriving here, several generations after the New Year starts. Although larvae feed on vegetative corn, when it gets into tasseling or silking corn then the larvae bore rapidly into the ear, from the base, side, or tip.

European corn borer (ECB) continued to be low. Mifflin has high captures, but this could be due to a nontarget, carrot seed moth. Sprays for CEW or FAW work against ECB.



Fall armyworm (left, photo R. Bessin) and sap beetle larvae (right, photo T. Ford, Penn State).

Sap beetles are showing up in additional counties, especially in cultivars with exposed tips, and farms with strawberries or other crops that provide good hosts. The larvae look like small white worms in the ear with sclerotized tubercles at the rear. A recent article on sap beetles is here: [Sap Beetle Management in Sweet Corn](#). Multiple applications that include pyrethroids were needed for sap beetle control in small plot trials. Farm scale sanitation (clean harvests) are key to sap beetle management.

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

County	Trap Name	CEW				ECB				FAW		
		20-Jul	27-Jul	3-Aug		20-Jul	27-Jul	3-Aug		20-Jul	27-Jul	3-Aug
Blair	Tyrone	90	40	8		0	15	6		0	3	4
Bedford	Martinsburg	26	26	6		0	12	4		35	30	96
Bucks	Bedminster	2	17	27		2	0	0		0	0	0
Centre	State College	35	12			0	0			0	0	
Centre	Rock Springs	14	4			0	0			0	0	
Clinton	Loganton	26	9	5		3	3	0				
Erie	Fairview	6	6	7						2	39	6
Erie	Lake City	22	15	22						40	151	79
Indiana	Brush Valley	7	2	2						2	6	0
Indiana	Creekside	54	8	1						5	12	0
Juniata	Port Royal	24								1		
Juniata	Greenbarn	5										
Lancaster	Landisville	6	10	5		2	2	1		0	2	1
Lancaster	Neffsville	2	1	2		4	0	0		1	0	4
Lancaster	New Danville	2	2	8		0	0	0		0	0	0
Lehigh	Germansville	13	4	7		2	0	0		0	1	6
Lycoming	Linden	12		1						4		5
Lycoming	Montoursville	4	16	12						1	1	46
Lycoming	Muncy	21	20	0						0	0	1
Mifflin	Belleville	37	50	15		10	30	42		60	75	48
Montour	Washingtonville	2	10			2	7					
Northampton	Nazareth		10	4			1	0			0	0
Schuylkill	Tower City		2	2			2	0				
Susquehanna	Montrose	3	0	3		1	3	2		39	7	2
Union	Winfield	10	6			11	1					
Washington	Venetia	58	60	17								
York	York	3	9	4		0	0	0		7	1	9

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	≤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			