



# PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

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## *Pennsylvania Vegetable IPM Weekly Update*

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*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, Kathy Demchak and David Biddinger*

**General conditions:** The produce season has very quickly ramped up with harvest of many crops underway as well as fields being prepped and planted for fall crops and August planting of strawberries. In some areas the stagnant hot muggy air mass that fueled numerous severe thunderstorms has delayed planting, caused variable levels of crop damage, and exacerbated diseases and crop issues associated with rain and flooded soils. The break from the daily storms this week will hopefully facilitate some drying.

### FIELD PRODUCTION

Continue to be on the lookout for **downy mildew on cucumber and cantaloupe**. Most recently there have been new reports in southeastern Pennsylvania and New York as well as around the Great Lakes in Ontario, Canada and Michigan. **Powdery mildew** is also starting to show up on cucurbit crops. It is important to scout cucurbit crops by cultivar or at least start scouting the cultivars that are most susceptible. When scouting be sure to look at the underside of the leaves and petioles where symptoms are likely to first develop. Fusarium stem and crown rot is being reported on pumpkin and **Phytophthora blight** is being reported on cucurbit and pepper crops.

**Bacterial disease issues** are being reported on numerous crops from onions to tomatoes to peppers to brassicas. It is not surprising given the high temperatures and frequent rain events that are ideal for spreading bacterial pathogens. Once bacterial diseases are observed in the field, they can be very challenging to manage. The primary go-to is fixed copper often tank mixed with mancozeb. The use of plant defense resistance inducers such as Actigard are most effective when incorporated into a program early before symptoms are observed. Take notes on which cultivars are most effected and consider planting alternative cultivars in the future. This is particularly true for peppers which vary considerably in which races they carry resistance to. Be on the lookout for copper resistance.

There continue to be **no reports of late blight** in the region however there have been a couple of reports of **buckeye rot**. This is caused by a different species of Phytophthora than one that causes late blight, but the symptoms can look similar. Buckeye rot will typically develop on the leaves and fruit closest to the ground and will produce little to no spores, so it does not spread rapidly like late blight. **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.



*Characteristic angular black rot lesions on a cabbage leaf. Photo: Beth K. Gugino*

When applying fungicides adequate coverage is important because many products are either strictly protectants or are only locally systemic.



*Girdling lesions on cauliflower stems caused by wirestem. Photo: Beth K. Gugino*

**Wirestem** is a disease of young brassica/cole crops such as cauliflower, cabbage, and broccoli. It tends to be more problematic in fall versus spring planted crops due to more prevalent warm and wet soils. It can also be worse in soils with higher organic matter that provide a food source for the fungal pathogen *Rhizoctonia solani* and in heavier textured soils. It causes lesions along the seedling or young transplant stem that eventually girdle the stem and severely restrict root development. Over fertilizing transplants during production and after transplanting can make them more susceptible to wirestem. Consider applying fungicides before or shortly after transplanting.

**Two migratory moths - Corn earworm (CEW) and Fall Armyworm (FAW)**— are increasing. Tasseling and silking corn will be highly attractive to these moths. CEW eggs are laid on silk, individually, hatch in 2-3 days, and neonate larvae bore through the silk channel and into the ear tip within one to a few days. Insecticide control requires contact to the very young larvae, before it moves into the ear. FAW lay eggs in clusters on leaf tissue, including the flag leaf. Larvae feed on leaf tissue in whorl stage corn but will rapidly tunnel into the ear from multiple places. You can distinguish the larvae by looking at the head capsule: CEW tend to have a lighter color head capsule, and FAW has a darker head capsule with a more pronounced



*Corn earworm (left, photo H. Fescemeyer) and fall armyworm (right, photo R. Bessin).*

inverted Y marking made from the color along the edge of the plates that make up the head. Both moth species, which are in the same family (Noctuidae) have resistance to pyrethroids. Other options include those from IRAC group 5 (Blackhawk, Radiant) and IRAC group 28 (Coragen, Vantacor). The group 5 options have low bee toxicity, and Vantacor can be obtained in smaller quantities. However, these group 5 or 28 options will not control sap beetles, silk-clipping beetles (adult stage of Western corn rootworm), or stink bugs. Another migratory noctuid, the **Yellow striped armyworm (YSAW)**, has been causing defoliation or fruit damage in tomato and potato in previous years. Although we have not had reports of YSAW so far this year, now would be the time to check for early signs of defoliation or direct damage to tomato fruit.



*Head capsule of Corn earworm (left) and fall armyworm (right). Photo: G. Dively.*



*Squash bug adult, hatching nymphs, and yellow vine decline. Photos: N. Sloff (left), T. Kuhar (center), S. Fleischer (right).*

**Squash bugs** are active in pumpkin and squash. Look for egg masses, and young nymphs on the underside of leaves. The early instars, which range in color, stay clustered on or near the egg mass for a while. Sprays can be effective, but contact is difficult as the canopy closes. Sprays are most effective prior to canopy closure. Squash bugs are the vector for a pathogen called yellow vine decline. Recent data from Virginia Tech suggests that Sivanto and Beleaf are effective and help conserve a common parasitoid of squash bug. **Squash vine borer** is also active.

## BERRY CROPS

**Spotted wing drosophila** is the main pest of concern for berry growers at this time of year. For updated info on insecticide efficacy and a table with that includes allowable materials for berry crops with pre-harvest and re-entry intervals, see this article: <https://extension.psu.edu/spotted-wing-drosophila-a-2021-update-for-berry-growers>

Some growers are reporting issues with high populations of **yellow jackets** in pick-your-own blueberry fields and fruit damage to day-neutral strawberry fruit. This is a serious concern for pick-your-own customers and other harvesters, as yellow jackets can sting multiple times, may have large nests nearby, and can be very aggressive when disturbed. It may take a multi-pronged approach to achieve control, and of course, protective clothing should be used before any control method (destroying underground nests, baiting and deploying traps, or spraying in the field) is undertaken. More information on yellow jacket and wasps can be found here: <https://extension.psu.edu/tree-fruit-insect-pests-yellow-jackets-and-hornets>. Some of the sprays mentioned for SWD control in the link provided in the previous paragraph for SWD management (Mustang Maxx, Brigade or Bifenture, and malathion) would be expected to help with this problem in addition to helping manage SWD.

APHIS is proposing to issue permits related for the release of a **tiny wasp parasitoid as a biological control agent for spotted wing drosophila**. A public comment period related to this proposed action is open from now through August 16. Comments may be submitted by visiting this web page <https://www.regulations.gov/document/APHIS-2021-0021-0001> and then clicking on the blue comment button in the upper left portion of the page. By clicking on "View More Documents", you can download the Environmental Assessment which provides more details about the parasitoid, and how and why it was chosen. Success is far from certain, but this is one step towards potentially decreasing SWD issues longer-term.

The correct time of year for **sampling berry crops for a nutrient analysis** is now or coming up shortly. For more information on how to sample these crops correctly and in a way that will result in useable results, see this article <https://extension.psu.edu/tissue-nutrient-analysis-for-berry-crops-getting-the-most-for-your-money> Sampling at the wrong time of the year or choosing the wrong leaves can lead to incorrect conclusions about the plants' nutritional status.

## 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 region. If you suspect late blight on your farm, please let me know either by email at [bkgugino@psu.edu](mailto:bkgugino@psu.edu) or by phone at 814-865-7328 or contact your local Extension Office.
- Reports of **downy mildew on cucumber and cantaloupe** are increasing daily across the region with new reports in New York, Michigan, Ohio, Pennsylvania, and Delaware. Today in PA it was confirmed in Juniata and Lehigh Counties on cucumber in a commercial field and home garden, respectively. The reports continue to be limited to cucumber and cantaloupe which are affected by one strain of the pathogen. Pumpkin, butternut squash and watermelon are affected by a different strain. The closest reports on those hosts remain on jack-o-lantern pumpkin and butternut squash in single fields in Alabama and an older report on watermelon in South Carolina. If you suspect downy mildew on your farm, please let me know either by email at [bkgugino@psu.edu](mailto: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.
- This past week was a bit of a broken record with isolated severe storms saturating soils and causing damage across the state. Be on the lookout for diseases that are favored by wet soils including **buckeye rot**, **Phytophthora blight**, and **Pythium cottony leak** which have been reported on tomato, cucurbits/peppers, and snap bean, respectively. Diseases such as **early blight on tomato** that are promoted by rain splash are also on





*Pythium cottony leak on snap bean pods close to the soil surface (Photo: Grower photo submitted to Beth K. Gugino for diagnosis)*



the increase. **Bacterial diseases** on several crops are also being reported on tomato, pepper, onion, and cabbage/cauliflower (brassicas). The hot stormy weather is ideal for the spread of bacterial diseases. Fixed-copper based fungicides tank mixed with mancozeb are still most effective against bacterial diseases. Products targeting improvement of the plant's defense response are most effective when started early in the season prior to the development of bacterial disease symptoms.

Cucurbits can be affected by more than 25 viruses. Symptoms can range from mottling and puckering of the leaves to severe leaf distortion and shoestring-like leaves. Viruses are nearly impossible to diagnose based on symptoms alone and could be confused with herbicide damage. The younger the plants are infected, the greater the potential for significant yield loss. Viruses are also not mutually exclusive, and symptoms can be more severe on plants infected by more than one virus. **Cucurbit viruses** are primarily insect transmitted. Squash mosaic virus is transmitted by the striped and spotted cucumber beetles while papaya ringspot virus (PRSV-W), watermelon mosaic virus (WMV), zucchini yellow mosaic virus (ZYMV) and cucumber mosaic virus (CMV) are transmitted by aphids. The cucumber beetles can transmit the virus repeatedly over an extended period of time (10 to 20 days) while aphids acquire and transmit the virus very rapidly (seconds to a minute). Insecticides do little to halt the transmission of virus. Management consists of planting on reflective plastic mulch to help repel the insects, managing potential weed reservoirs also consider selecting resistant cultivars. For example, yellow squash cultivars such as XPT 1832 III, Conqueror III, and Prelude II as well as the zucchini cultivars Independence II, Judgement III and Justice III express the viral coat protein that provides high to intermediate resistance to WMV, ZYMV, CMV and papaya ringspot virus. These are the most common viruses found in cucurbit fields.

*Mottling and leaf distortion typical of a viral infection on pumpkin (Photo: Grower photo submitted to Beth K. Gugino for diagnosis)*

## **Sweet Corn Insect Pest Monitoring**

*Shelby Fleisher, Extension Vegetable Entomologist, Penn State University*

Corn earworm (CEW) catch in PA have been variable – some locations staying low, but 9 of 20 sites above thresholds, and one site in Blair County spiking into the 3–4-day interval. In Delaware, 6 of 10 sites are also in this 3–4-day spray category. Lower counts may be due to sprays being applied at the sampling sites. **Taseling and silking corn will be very attractive.** CEW has resistance to pyrethroids which increases during the season. Other options include spinosyns (IRAC group 5: Blackhawk, Radiant) and diamides (IRAC group 28: Coragen, Vantacor). Diamides have low bee toxicity, and Vantacor can be obtained in smaller quantities. 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.

**European corn borer (ECB)** continued to be low. Mifflin and Union counties showed an uptick, but this could be due to a nontarget, the carrot seed moth. Regardless, this capture rate is below a spray threshold for ECB, and sprays for CEW work against ECB.

**Fall armyworm (FAW)** moved into PA this past week, which we picked up with spikes in Bedford, Erie, and Mifflin counties. Concerns about pyrethroid resistance is exasperated with FAW, which has a history of resistance.

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

County	Trap Name	CEW				ECB				FAW		
		6-Jul	13-Jul	20-Jul		6-Jul	13-Jul	20-Jul		6-Jul	13-Jul	20-Jul
Blair	Tyrone	15	29	90		0	0	0		0	0	0
Bedford	Martinsburg	35	13	26		0	0	0		0	5	35
Bucks	Bedminster	2		2		0	0	2		0	0	0
Centre	State College	1	6	35		1	0	0		0	0	0
Centre	Rock Springs	2	5	14		0	0	0		0	1	0
Clinton	Loganton	0	24			2	1					
Erie	Fairview	21	9	6						0	0	2
Erie	Lake City	56	24	22						7	6	40
Indiana	Brush Valley	2	0	7						1	1	2
Indiana	Creekside	8	19	54						0	0	5
Juniata	Port Royal		25							0		
Juniata	Greenbar		2									
Lancaster	Landisville	55	9	6		0	0	2		0	0	0
Lancaster	Neffsville	5	3	2		0	0	4		0	0	1
Lancaster	New Danville	2	4	2		0	0	0		0	0	0
Lehigh	Germansville		4				0				0	
Luzerne	Drums	3	0	0		5	10	3		0	0	0
Lycoming	Linden	5	6	12						1	1	4
Lycoming	Montoursville	10		4		0				0		1
Lycoming	Muncy	41	15	21						0	1	0
Mifflin	Belleville		45	37			0	10			1	60
Montour	Washingtonville	24				2						
Schuylkill	Tower City	0	4			0	5			0	0	
Union	Winfield	20		10		4		11				
Washington	Venetia	16	8	58								
Bradford	Troy		21									
Bradford	Ahern	0	0									
York	York	11	10	3		0	0	0		0	0	7

**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		

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