



PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

2301 NORTH CAMERON STREET, HARRISBURG, PENNSYLVANIA 17110-9405

717.694.3596

Pennsylvania Vegetable IPM Weekly Update

July 31, 2019

The information supplied in these Updates is from Penn State Extension Specialists and Educators.

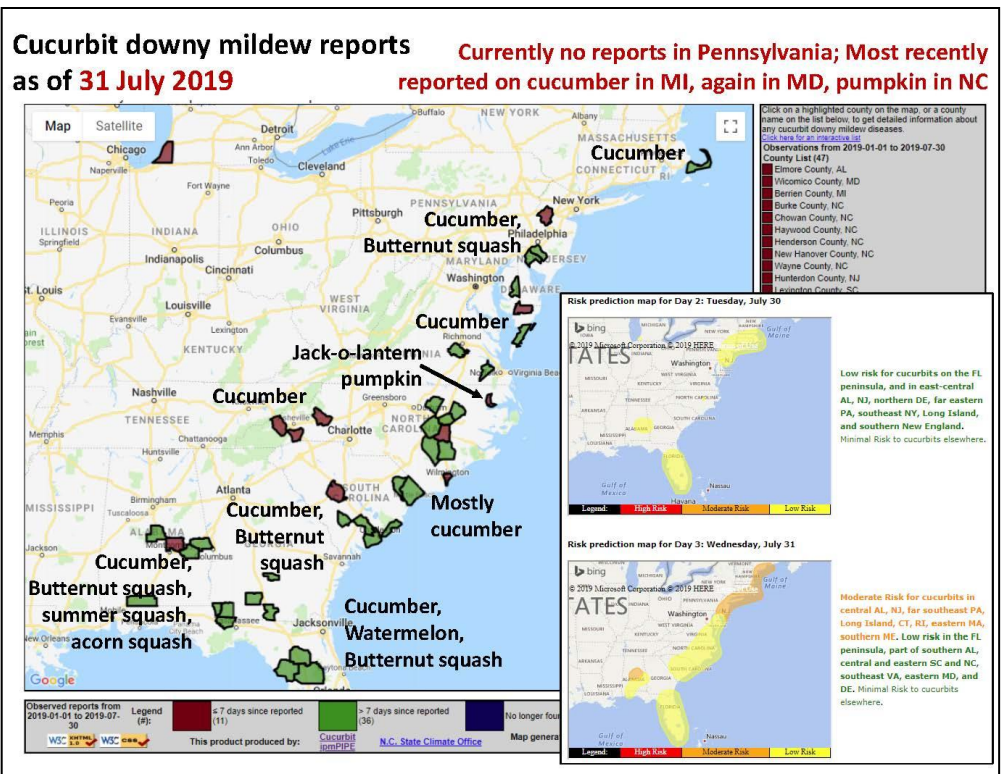
These Updates are a service of the Pennsylvania Vegetable Marketing and Research Program which, in cooperation with the Pennsylvania Vegetable Growers Association, supports vegetable research at Penn State University and other institutions.

VEGETABLE DISEASE UPDATES

Dr. Beth Guginio, Extension Vegetable Pathologist, Penn State University

GENERAL UPDATES:

- Since the confirmation of **late blight** in Erie Co., PA last week there have been no new reports on either tomato or potato however, there continue to be additional reports of *P. nicotianae* on potato and tomato. It is very similar to in appearance to late blight but does not produce the sporulation on the underside of the leaves and prefers warm wet conditions compared to the cool wet conditions which favor late blight.
- **Common diseases** being observed in PA vegetable fields include: **early blight** and **Septoria leaf spot** on tomato as well as several reports of **bacterial canker**. In some cases, high tunnel diseases that require high humidity such as **leaf mold** are being observed in the field. **Powdery mildew** is common on many different cucurbit types. Remember powdery mildew resistance does not equal immunity. Powdery mildew development on resistant cultivars may be delayed and/or not become as severe as a susceptible cultivar.
- Within the past week **cucurbit downy mildew** was confirmed on cucumber in MI as well as another report in MD (yesterday), jack-o-lantern pumpkin and several reports on cucumber in NC, cucumber in SC and acorn squash, summer squash, butternut squash and cucumber in AL. This means that potential sources of inoculum could now come from either up the east coast or from the northwest. The southeastern region of PA continues to be at moderate risk from sources along the east coast. At the very least, growers in southeastern



PA should be using a protectant spray program. We are actively monitoring for this disease so please either contact me via email at bkgugino@psu.edu, by phone at 814-865-7328 or contact your local Extension office for confirmation. All reports aid in our ability to successfully forecast disease risk. Check the [CDM ipmPIPE website](#) for the latest reports and forecasts that are updated three times per week.

PHYTOPHTHORA BLIGHT IN CUCURBITS AND PEPPERS: MID-SEASON MANAGEMENT STRATEGIES

Phytophthora blight caused by *Phytophthora capsici*, can be a particularly devastating diseases of cucurbits, lima and snap beans as well as solanaceous crops – primarily pepper. It is a true soilborne pathogen that can survive from year to year in the soil causing crown and root rots as well as foliar and fruit rots. Of the cucurbit crops, pumpkin and winter squash tend to be most susceptible compared to cucumber, muskmelon and watermelon. Although in the same crop family as tomato and pepper, tobacco is not considered a significant host for *P. capsici* and to my knowledge has never been observed causing disease on tobacco in Pennsylvania. Symptoms usually develop first in low lying areas of the field where soil remains wet longer.



Powder sugar-like sporulation characteristic of Phytophthora blight on pepper fruit. Photo: Beth K. Gugino.

On the vines, lesions are initially water soaked before becoming dark olive green and then dark brown. Lesions that girdle the stems result in a rapid collapse of the plant part above the lesion. Similar lesions can also develop on the petioles and the leaves and result in rapid death of the plant part. Initial symptoms on the fruit are water soaked or depressed spots typically on *the underside of the fruit where it is in contact with the soil. Symptoms can develop on the upper side of the fruit following rain or an irrigation event that splashes infested soil and spores up onto the fruit.* Eventually the fruit will become covered with white sporangia (looks like powdered sugar) and will rapidly collapse either in the field or shortly after harvest. During rain events and/or when the field becomes saturated, the sporangia can dislodge and move in the water throughout the field.

In-season management recommendations include:

- If possible, remove symptomatic plants/fruit from the field and discard on non-agricultural land.
- For larger hot spots, consider disking under symptomatic section of the field and disking in breaks to prevent movement of water from that part of the field. Create a “quarantine zone”. This will also prevent further movement of the pathogen on equipment. Be sure to clean off equipment prior to use in another field. Depending on the time of year, consider planting sorghum sudangrass rapeseed, or other cover crop to help hold soil in place and potentially be used as a biofumigant to help reduce the pathogen population.
- This pathogen is easily spread on equipment within and between farms via infested soil on tires and other equipment parts. If employing a contract sprayer, check to see what sanitation measures they make to reduce the risk of movement of pathogens between farms.
- Fungicides may suppress and help limit crop loss however, if conditions are highly favorable, they often fail. For pumpkins and winter squash, products such as Orondis Ultra, Ranman, Zampro, Revus, Tanos, Form and Presidio are recommended. For peppers, products like Ranman, Presidio and Orondis Gold will target the crown rot phase while Ranman, Forum, Revus, Zampro, Presidio and Orondis Gold will help prevent aerial stem and fruit rot. All products should be tank mixed with copper and rotated by FRAC codes. See the [2019 Mid-Atlantic Commercial Vegetable Production Recommendations](#) for additional recommendations.

VEGETABLE AND BERRY CURRENT ISSUES

Penn State Extension Specialists and Educators

General conditions: Except for a few locations, conditions across much of the state have been hot and in general, drier. Nutrient deficiencies are being observed in some fields likely due to the excessive moisture early in the season and some growers are reporting pollination issues in crops like cucurbits. The higher temperatures have led to increased pressure from insect pests such as spider mites and thrips.

Insect Pest Update

The second generation of **striped cucumber beetles** continue to remain active in cucurbit fields although populations are starting level off. **Squash bugs** are also starting to hatch. **Flea beetles** are being reported on eggplant as well as **slugs** in fields mulched with straw. Due to the high temperatures, **spider mites** are a common site in many field and high tunnel tomato crops. **Sweet corn trap counts** have been variable across the state, with populations in some locations remaining low while in others the counts are rather high. Some growers are continuing to experience worm issues in ears despite low trap counts and a regular spray program. In some cases, this is likely due to the development of pyrethroid resistance from immigrating populations in southern locations, plus in fields where growers have relied on pyrethroids without rotating to other modes of action for resistance management. In general, the hot and dry weather also favors and mites on many different crops and there have been higher populations of **potato leafhoppers** are being observed.



Stippling and webbing associated with a severe two-spotted spider mite infestation on tomato. Photo credit: Beth Gugino.

General Disease Update

Since the last issues update, **late blight** (US-23) was confirmed on potato in Erie Co. on 18 July and was likely originated from the seed. There continue to be additional reports of *P. nicotianae* on potato and tomato. It is very similar to in appearance to late blight but does not produce the sporulation on the underside of the leaves and prefers warm wet conditions compared to the cool wet conditions which favor late blight. **Phytophthora blight** has been confirmed in various cucumber, pumpkin, butternut squash and pepper field across the state. In some cases, the field had a history of the disease and others there was no disease history. **Cucurbit powdery mildew** is a common site as is **early blight on tomato**. High humidity diseases common in high tunnels such as **leaf mold** are also being reported in the field. Report of **cucurbit downy mildew** within the past seven days have been on cucumber in MI as well as another report in MD (today), jack-o-lantern pumpkin and cucumber in NC, cucumber in SC and acorn squash, summer squash, butternut squash and cucumber in AL. This means that potential sources of inoculum could come from either up the east coast or from the northwest.



Chlorotic lesion characteristic of leaf mold on the upper surface of a tomato leaf (left) and the corresponding dark sporulation on the lower leaf surface (right). Looks like a downy mildew but tomato is not susceptible to downy mildew. Photo credit: Beth Gugino.

Berries

Potato leafhopper is being observed in strawberry and raspberry plantings causing leaf yellowing and distortion. Damage can cause stunting of plants especially in new strawberry plantings. A number of broad-spectrum insecticides are effective. Second generation **strawberry rootworm** adults are causing small holes in leaves and their larvae will feed on the roots later in the year. If an insecticide application is needed for control, make the application in late evening as nighttime is when adults are most active. Similar to vegetables, **two-spotted spider mites** are being seen in high tunnel raspberries causing leaf stippling as is damage from **raspberry caneborer** adults which wilt the plant tips. Removal of the wilted tips and a few inches of cane growth below the damage promptly is the recommended control measure.



In the photo on the upper left, both leafhopper damage and strawberry rootworm damage can be seen. Leaf stippling from two-spotted spider mite feeding on raspberry (upper right). In the lower left photo, two rows of punctures and an oviposition hole between them made by raspberry cane borer can be seen. The raspberry cane has wilted and broken off at the upper row of punctures. At this stage, the cane can be cut just a few inches below the injury to remove the larvae, as it has not left tunneled downwards in the cane. Photo credit: Kathy Demchak

SWEET CORN INSECT PET MONITORING

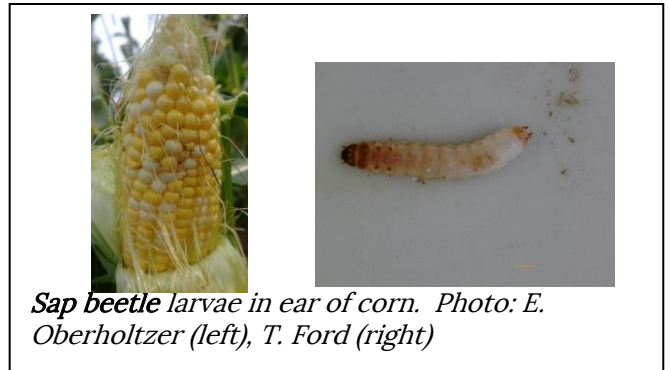
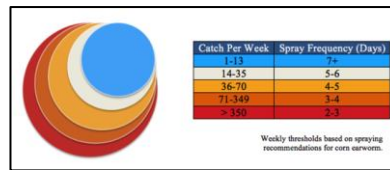
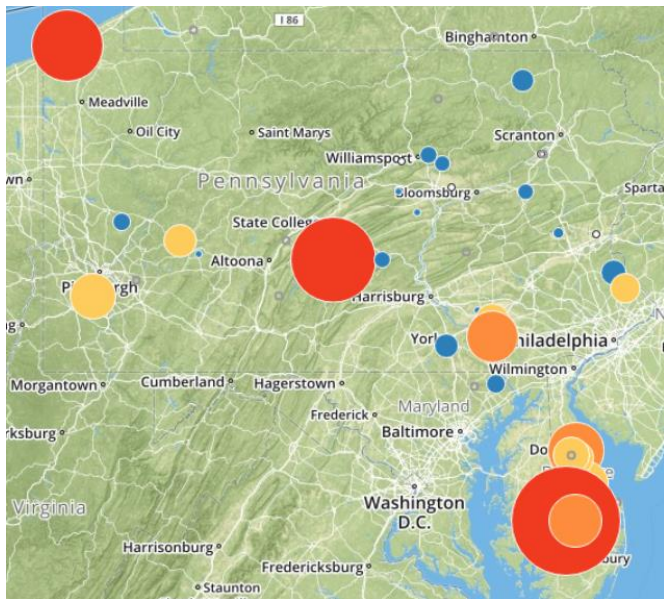
Dr. Shelby Fleischer, Extension Vegetable Entomologist, Penn State University

Corn earworm (CEW) captures continue to exceed spray thresholds across the southern and western half of the state. Ten of 33 reporting sites exceeded spray thresholds in the last 2 weeks. Most suggest a 5-6 day interval, but sites in Erie and Mifflin counties suggest a 3-4 day interval. Some growers have reported earworm damage even though trap counts were low. This may have been due to pyrethroid resistance, but at least at one location the damage was from **sap beetles**. Sap beetles (also called picnic beetles) build up populations in farms with ripe or over-ripe fruit nearby. Relying on “worm” materials (Coragen, Blackhawk, Radiant) is not expected to control sap beetles. Adding a pyrethroid, or the premix Besiege, should help with sap beetles.

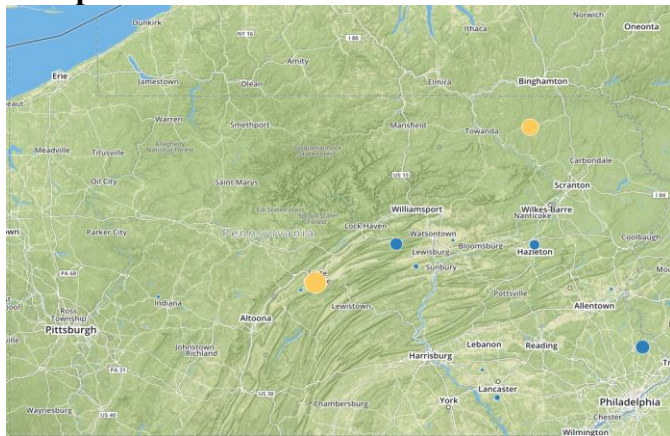
European corn borer (ECB) counts are have been moderate in Center, Clinton, and Luzern counties.

Fall armyworm (FAW) counts captures are focused in Erie. Immigration of FAW west of the Appalachians often comes from the central part of the US, moving up from Texas, and tracking westerly airflow patterns.

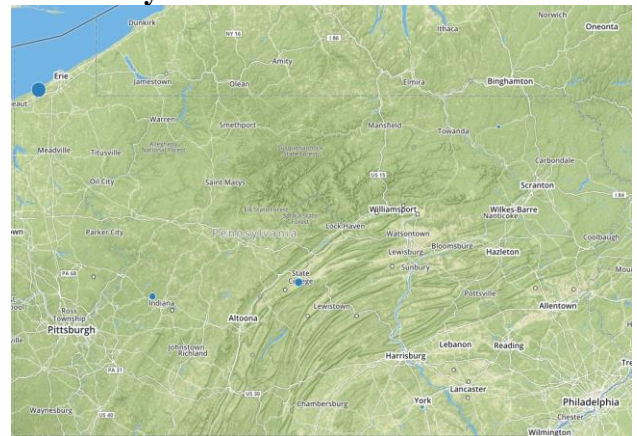
Current Trap Counts Corn Earworm



European Corn Borer



Fall Armyworm



Average weekly catch – a moving average for the last 7 days. The average catch per night (catch, divided by the number of nights trapping), divided by the number of nights where data exist, multiplied by 7. Weeks where all the average-catch-per-night values are nulls are treated as if no data exist for that week.

County	Town/Farm	CEW			ECB			FAW		
		17-Jul	24-Jul	31-Jul	17-Jul	24-Jul	31-Jul	17-Jul	24-Jul	31-Jul
Blair	Curryville	3	3	null	0	0	null	0	0	null
Blair	Tyrone	1	6	null	0	0	null	0	0	null
Bradford	Sechrist Farm	0	null	null	2	null	null	0	null	null
Bucks	Bedminster	null	null	10						
Bucks	Buckingham	6	20	14	8	10	11			
Butler	Cabot	null	3	5				null	null	0
Centre	State College	0.9	2	5	0.9	27	26	0	2	4
Centre	Rock Springs	0.9	2.7	6.3	0	6.5	1	1.3	1.5	0
Clinton	Loganton	null	1.1	0.9	null	14.5	8.8			
Erie	Fairview	null	53	12				null	1	1
Erie	Lake City	14	26	81				1	15	13
Indiana	Brush Valley	0	0	1				0	0	0
Indiana	Creekside	2	61.3	16.8	0	null	0.5	0	1.8	2.8
Juniata	Port Royal	6	null	4.2				0	null	0
Lackawanna	Ransom	0	null	null	0	null	null			
Lancaster	Landisville	11	18	1	4	1	1	0	0	0
Lancaster	Neffsville	10	3	19	5	3	0	0	0	0
Lancaster	New Danville	15	17	42	0	3	2	0	0	0
Lehigh	Germansville	1	0	1.8	1	3	0	0	0	0
Luzerne	Drums	0	7	4	1	20	6	0	null	null
Luzerne	Plains	0	0	0	1	0	0			
Lycoming	Linden	0	null	0				0	null	0
Lycoming	Montoursville	5.8	null	4.7				0	null	0
Lycoming	Muncy	3.5	null	3.9				0.5	null	0
Mifflin	Belleville	null	32.5	115				null	0.5	0
Montour	Washingtonville	2	null	0	2	null	1			
Northampton	Nazareth	null	0	0	null	0.5	1	null	0	0
Schuylkill	Tower City	null	0	null	null	0	null	null	0	null
Susquehanna	Montrose	0	null	4	7	null	8	0	null	.5
Union	New Berlin	null	9	1	null	null	1.5	null	0	0
Washington	Venetia	14	60	33						
Westmoreland	Jeannette	null	22.9	null	null	0	null			
York	York	2	1	9	1	4	0	0	3	1

THRESHOLDS

CEW Threshold			ECB Thresholds		
	Catch Per Week	Spray Frequency		Catch Per Week	Spray Frequency
Almost absent	1-13	7+			
Very low	14-35	5-6	Almost absent	< 14	7+
Low	36-70	4-5	Very low	15-35	6
Moderate	71-349	3-4	Low	36-70	5
High	> 350	2-3	Moderate	> 70	4

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