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PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

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Pennsylvania Vegetable IPM Weekly Update

July 3, 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 Pennsylvana 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:

- 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 or by phone at 814-865-7328 or contact your local Extension Office.
- Weather patterns are slowing and localizing the spread of **cucurbit downy mildew** to nearby known sources. The closest reports are in one county in Maryland and one county in Virginia. Careful scouting and early management in these fields have limited spread. 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. Check the CDM ipmPIPE website for the latest information about confirmed reports.

Black soot (sporulation) characteristic of black mold on onion caused by the fungal pathogen Aspergillus niger (Photo: Beth Gugino).

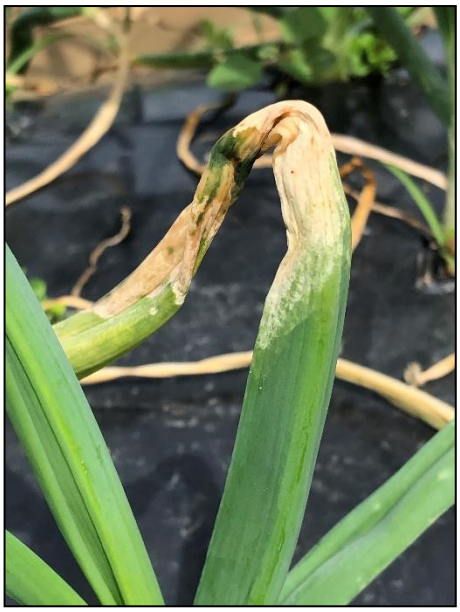
Black Mold on Onion and Other Common Diseases

Sweet onion harvest will be quickly upon us over the next several weeks if not already. Concern is often raised about the black soot that can develop under the papery scales between the bulb scales. That black soot is likely the disease called **black mold** caused by a fungal pathogen, *Aspergillus niger*. The fungus is common is soil and crop residue and affects many vegetable crops. On onion is causes a black dusty fungal growth on and between the bulb scales and when severe can lead to bulb rot by secondary bacterial organisms. It is primarily a post-harvest problem when the bulbs remain hot under high relative humidity (>80% RH) or there are fluctuations in temperature (e.g. coming out of cold storage) that result in the formation of condensation on the bulbs while in the bins and then exposure to high temperatures. Reducing exposure to high temperatures and storing a low humidity will help manage black mold.

Purple blotch and **Stemphylium leaf blight** are also becoming more common in onion fields as the onions mature. Purple blotch is caused by *Alternaria porri*, is characterized by zonate lesions (concentric rings similar to early blight on tomato) that are surrounded by tan to

Zonate lesions characteristic of purple blotch (top) and black sooty-like sporulation of Stemphylium leaf blight (bottom) (Photo: Beth Gugino).

yellow leaf tissue. As the disease progresses, multiple lesions can grow together and cause the entire leaf to blight down. Severe purple blotch can cause lesions on the neck and extend onto the very top of the bulb. Stemphyllium leaf blight is another fungal disease that starts as small tan lesions that become elongated and often lead to a tip blight. In the center of the lesions sooty-like spores develop which can turn your finger black when you run it across the leaf. As the disease progress, the entire leaf can blight down. Stemphylium usually will infect the side of the leaf exposed to the prevailing winds or leaf tissue that has been damaged due to equipment or already infected by purple blotch. Its favored by warm temperatures and long periods of leaf wetness. It is not uncommon to see both on the same leaf and both pathogens survive in crop debris between seasons so crop rotation is an important management strategy. During the season similar fungicides can be used to manage both diseases, some of the more effective products include Endura, Fontelis and Luna Tranquility (FRAC 7 fungicides) and Inspire Super and Quilt that contain FRAC 3 active ingredients. It is important to rotate between different FRAC codes, resistance to FRAC 11 fungicides (e.g. Quadris, Cabrio, Pristine, etc.) has been documented in New York. Protectant fungicides will also help under lower disease pressure.



Onion leaf collapsing due to center rot. The bacteria have not made into the neck and bulb of the onion yet (Photo: Beth Gugino).

Center rot, a bacterial disease that starts on a leaf (or leaves) and progresses down into the neck and bulb of the onion results in one or two discolored rings in the bulb, is a common site in many onion fields this year due to the wet weather. Bacterial diseases tend to be favored by heat so with the recent hot weather, some onions are starting to melt down. Keep in mind once the neck of the onion is dried, the disease cannot progress into the bulb so if you have hot spots in the field, consider harvesting and drying down those plants early. Copper-based fungicides tank mixed with mancozeb will help reduce potential spread via rain splash to neighboring plants. Mancozeb has a 7-day PHI.

Cucurbit Powdery Mildew Management for 2019

Powdery continues to be an annual concern in cucurbit production. Since the pathogen (primarily *Podosphaera xanthii*) overwinter in the Northeast and mid-Atlantic regions, the pathogens move into our production fields from other nearby sources typically moving from the southeast up along the east coast or in some cases from more northern sources.

The **first signs of powdery mildew** are small white powdery spots most commonly seen on the underside of the leaves or within the plant canopy. When scouting, it is important to thoroughly look over the entire plant. Also scout by cultivar to account for differences in host resistance; usually scouting the most susceptible cultivars first around the time of fruiting. If protectant fungicides are being used, sometimes the spots on the upper leaf surface

Severe powdery mildew on a susceptible pumpkin cv. Howden at the end of August 2017. No fungicides applied (left) or a weekly rotation of Fontelis, Torino and Vivando each tank mixed with Bravo WeatherStik (5 total applications) (right) (Photo credit: Beth Gugino).

are yellow or chlorotic with white powdery lesions on the corresponding underside of the leaf. Accurate diagnosis is critical because targeted conventional fungicides applied for managing powdery mildew are different than those used for downy mildew

When powdery mildew occurs early in the season and is left unmanaged it can severely reduce the photosynthetic area of the leaves needed to produce high quality marketable fruit. On pumpkin later in the season, it can also severely damage the handles leaving them weak further reducing marketability. **Fungicides are an important tool** for managing powdery mildew in-season however, resistance management is a concern. It is recommended that the most effective products are applied when symptoms are first observed (one powdery mildew spot on 45 to 50 leaves) and then later in the season when switch to a protectant spray program rather than the reverse. In the long run this will reduce the selection pressure for powdery mildew spores that are resistant to the fungicide because fewer spores are exposed to the active ingredient when disease severity is low.

Annually since 2009, pumpkin powdery mildew fungicide trials have been conducted on a susceptible pumpkin cultivar such as Sorcerer and Howden at the Russell E. Larson Research and Education Center in Centre Co., PA. Products that continue to be the most effective include Torino 0.85SC (FRAC code U6), Vivando 2.5SC (U8), Luna Experience 3.34SC (3 + 7) and Quintec 2.08SC (13). These are best used when alternated with products like Fontelis 1.67SC (7), Procure 480SC (3), tebuconazole (3), Inspire Super 2.8F (3 + 9), Pristine 40WSP (11 + 7), Aprovia Top 1.62EC (3 + 11) and Rally 40WSP (3) or with micronized wettable sulfur 80W (M2). Each application should be applied tank mixed with a broad-spectrum protectant fungicide to manage for fungicide resistance and always rotate between FRAC codes with each application. See the 2019 Mid-Atlantic Commercial Vegetable Production Recommendations, 2019 Fungicide Resistance Management Guidelines for Vegetable Crops and 2018 Cucurbit Downy and Powdery Mildew Efficacy Table.

Due to increasing **concerns about pollinator health** and their exposure to fungicides such as chlorothalonil when possible, time fungicide applications when fewer pollinators are foraging and visiting flowers and flowers are closed. In trials conducted over the past couple of years to identify alternatives to tank mixing with chlorothalonil, both Tritek (mineral oil) and Microthiol Disperss (sulfur) were determined to be equally effective tank mix partners and pose less of a risk to bee health.

Fortunately, cucurbit powdery mildew is one of the easier diseases to **manage organically** and there are a number of options including copper, sulfur, oil-based products like Eco E-rase (jojoba oil), JMS Stylet oil (paraffinic oil), Trilogy (neem oil) and Organocide (sesame oil), as well as potassium bicarbonate-based products such as Kaligreen and MilStop to name a few. With these products, spray coverage is essential since they are only effective at the site of application. So, apply them in a large enough volume of water at a higher pressure to move the spray and penetrate the plant canopy.

Vegetable and Berry Current Issues

Compiled by Penn State Extension Specialists and Educators

General conditions: The warm dry weather is a welcome change across the state although late-day summer thunderstorms are likely to cause problems in isolated areas. Despite all the wet weather, some fields are quickly becoming dry and nutritional issues as well as blossom end rot on tomato are being seen. Crops are growing out of some of the earlier herbicide damage resulting from the heavy rains moving the herbicides either deeper in the root zone or washing it into the planting holes.

INSECT PEST UPDATE

The second generation of **striped cucumber beetles** are now active in cucurbit fields across the state. Although **corn earworm** counts were low during late June, we had significant flights in early June. It takes about a month for another generation to emerge, so we expect that to start soon, and **CEW trap counts are already picking back up**. Continue regular scouting, damage to the ears is anticipated. Tasseling and silking corn is highly attractive, and without tasseling field corn to dilute the pressure, it will concentrate on sweet corn. Although **European corn borer** counts are historically low, a site in Clinton County had heavy infestations in the tassels. A spray at row-tassel helps avoid larval ECB moving into sweet corn ears. Now is the time to be scouting for hot weather pests such as **spider mites** and **thrips**. White **cabbage moths** are flying in many cole crop fields. Scout for eggs and larvae, and time insecticides to hatching larvae. High populations of **Japanese beetles** were seen feeding on sweet corn foliage and silk in one field. Be on the lookout for flea beetle in eggplant.

TOMATO HIGH TUNNEL ISSUES

Botrytis and **timber rot** continue to be observed in many tomato high tunnels although the drier weather has slowed the spread and dried up many of the lesions and stem infections. As the plant tissue continues to die the overwintering survival structures (sclerotia) will begin to form. It is important to rogue symptomatic plants making sure to prevent the sclerotia from falling and being incorporated into the soil.

BERRIES

Fruit anthracnose continues to be problematic on strawberry, though only on fruit of late June-bearing varieties or day-neutrals. Symptoms to watch for on foliage consist mainly of brown spots on leaves and sunken lesions on runners, possibly with an orange-to-salmon discoloration. **Spotted wing drosophila** is being seen more consistently in blueberries and is likely in raspberries as well. See information on SWD management and especially the table on need for pesticide reapplication as related to rainfall amounts in last week's Blueberry Bulletin from Rutgers https://njaes.rutgers.edu/blueberry-bulletin/pdfs/2019/bb-v35n10.pdf . While some of the information on SWD management refers to machine-harvested fields, other information is relevant for everyone. **Botrytis** fruit rot is being seen on blueberries due to a long season of wet weather along with some Phomopsis issues being seen on. Drier weather should help. Recommendations for fungicides can be found here: https://njaes.rutgers.edu/pubs/publication.php?pid=E265.

Sweet Corn Insect Pest Monitoring

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

Corn Earworm is present throughout the state.

Corn earworm (CEW) captures declined in late June, but higher captures are starting, exceeding spray thresholds at sites in Lancaster, Mifflin, Washington, and Westmoreland counties. Tasseling and silking corn will be very attractive

European corn borer (ECB) counts are scattered, but localized hot spot exists in counties in the center of PA, and significant damage to tassels occurred in Clinton Co. Scout for feeding damage in vegetative corn.

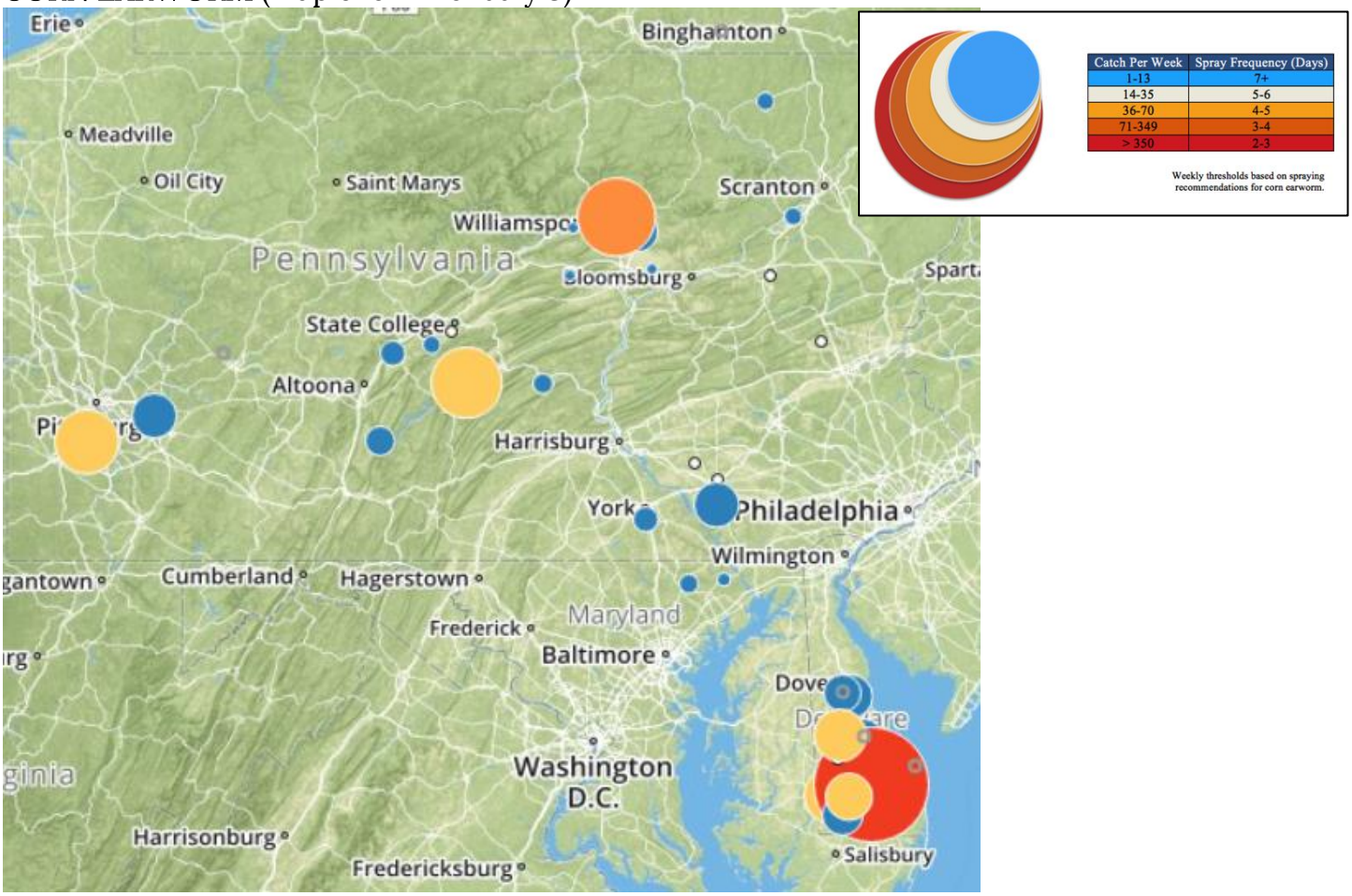
European corn borer feeding.

Fall armyworm (FAW) counts are low. Captures in FAW traps this time of year may also be due to non-target capture of wheathead armyworm, which is not a pest. See details here: https://ento.psu.edu/extension/factsheets/armyworm-pheromone-captures.

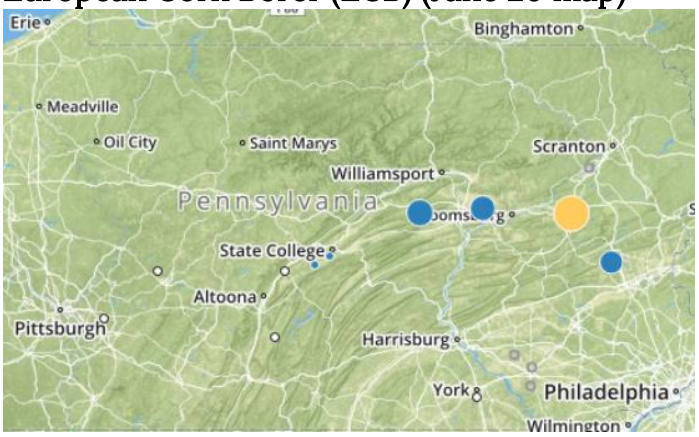
Fall Armyworm in vegetative corn.

In summary, **summary**, although **CEW** counts were low during late June, we had significant flights in early June. It takes about a month for another generation to emerge, so we expect that to start soon, and **CEW trap counts are already picking back up**. Taseling and silking corn is highly attractive, and without tasseling field corn to dilute the pressure, it will concentrate on sweet corn. Although **ECB** counts are historically low, a site in Clinton County had heavy infestations in the tasels. A spray at row-tasel helps avoid larval ECB moving into sweet corn ears.

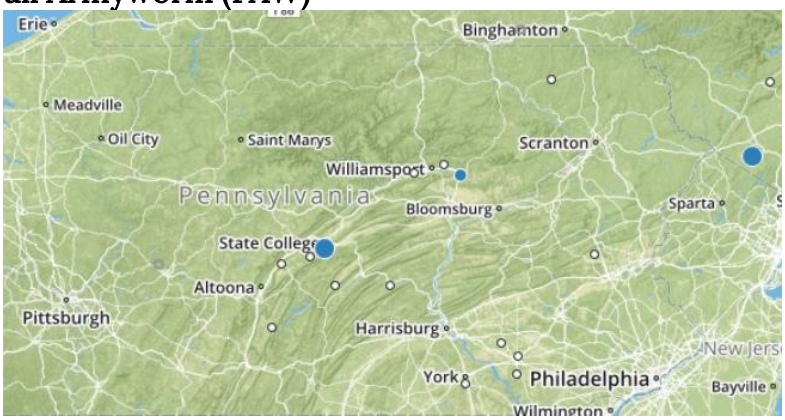
CORN EARWORM (map shown for July 3)



European Corn Borer (ECB) (June 20 map)



Fall Armyworm (FAW)



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.

		CEW			ECB			FAW		
County	Trap Name	Jun 19	Jun 26	Jul 03	Jun 19	Jun 26	Jul 03	Jun 19	Jun 26	Jul 03
Blair	Curryville,	7.0	null	5.4	0.0	null	0.0	0.0	null	0.0
Blair	Tyrone	0.0	3.1	4.0	0.0	0.0	0.0	0.0	0.0	0.0
Centre	State College	10.0	0.0	0.0	10.5	1.0	1.0	0.0	0.0	5.0
Centre	Rock Springs	1.9	2.6	2.0	0.0	1.0	1.0	0.0	1.0	0.0
Clinton	Loganton	2.8	0.0	0.9	4.9	9.1	0.0			
Indiana	Creekside	11.0	13.0	null	0.0	0.0	null	null	1.0	null
Juniata	Millerstown	11.0	null	2.5				null	null	0.0
Lancaster	Landisville	null	null	0.0	null	null	0.0	null	null	0.0
Lancaster	Neffsville	null	null	0.0	null	null	0.0	null	null	0.0
Lancaster	New Danville	null	null	13.0	null	null	0.0	null	null	0.0
Lehigh	Germansville	8.4	0.0	0.0	9.8	5.3	null	0.0	0.0	0.0
Luzerne	Drums	11.0	0.0	0.0	15.0	8.0	2.0			
Luzerne	Plains	null	null	2.0	null	null	4.0			
Lycoming	Linden	0.9	0.0	1.0				2.6	0.0	0.0
Lycoming	Montoursville	8.8	9.0	44.0				4.4	0.0	0.0
Lycoming	Muncy	12.3	4.0	12.0				0.0	1.0	2.0
Mifflin	Belleville	null	7.5	32.0				null	0.0	0.0
Montour	Washingtonville	null	4.0	1.0	null	7.0	2.0			
Susquehanna	Montrose	null	null	2.0				null	null	0.0
Washington	Venetia	12.0	24.0	26.0						
Westmoreland	Jeannette	28.0	null	12.7	0.0	null	0.0			
York	York	0.0	2.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0

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 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

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