



PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

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Pennsylvania Vegetable IPM Weekly Update

July 6, 2022

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.

Pest Watch Report

Karly Regan, Penn State Extension Educator

MOTH CATCH VARIABLE AS WE ENTER JULY

Reported data was sparse for Pennsylvania this week. Corn earworm numbers caught in traps reporting data this week decreased throughout the state with one exception, in Clinton County. The site in Clinton County experienced average catches per night of 14-15 moths which means a spray interval of 3-4 days would be suggested for corn that's tasseling or silking. All other sites that reported data could reduce spray intervals to every 7 days or so, based on moth catch. As a reminder, corn that is tasseling or silking is very attractive to corn earworm, as eggs are laid on silks, and control must be achieved while larvae are recently hatched before they've entered the ear.



Fig 1. Corn earworm adult moth caught in monitoring trap

Once the spray threshold is reached, you can consider products from the pyrethroid class, diamide class, or spinosyn class for effective control. We tend to see the best efficacy from non-pyrethroid products such as Coragen, Blackhawk, and Radiant, as pyrethroid resistance has increased in migrating corn earworm populations. However, we tend to see more resistance later in the season than now, as moths migrate from further south in the United States up to our region. Diamides and spinosyns do not provide effective control of other pests such as sap beetles, brown marmorated stink bug, Japanese beetles, or adult corn rootworms. If you're seeing these pests as you scout your corn, consider adding a pyrethroid, or the premix Besiege to control those.

We're still seeing very few fall armyworm caught for this season in Pennsylvania, though one site in Centre County averaged 0.6 moths caught per night this week. By managing

for corn earworm, fall armyworm should be adequately controlled, as well.

Average weekly catch – 7-day moving average. The average catch per night (total catch, divided by the number of nights trapping), divided by the number of nights where data exist, multiplied by 7. If no data exist for that week, null is reported.

County	Site	CEW			FAW		
		June21	June27	July5	June21	June27	July5
Blair	Curryville	7	0.9	Null	0	0	Null
Blair	Sinking Valley	2.1	2.9	1	0	0	0
Bucks	Doylestown	0.6	0.4	Null	0	0	Null
Centre	State College	2	6	1.6	0	0	0
Centre	Rock Springs	2.8	2.8	0.5	0	0	0.6
Clinton	Loganton	0.3	0.3	14.5	0	0	0.1
Franklin	Shippensburg	9.1	7	Null	0.1	0	Null
Franklin	Waynesboro	8.7	5	Null	0	0	Null
Indiana	Indiana	2.7	0.5	0.4	0	0	0
Lancaster	Landisville	0.7	0.4	0.6	Null	0	0
Lancaster	New Danville	0.6	0.1	0	Null	0	0
Lancaster	Neffsville	0.4	0.6	0.1	Null	0	0
Lehigh	Germansville	5.8	Null	Null	0	Null	Null
Lycoming	Linden	Null	2	Null	Null	0	Null
Lycoming	Montoursville	Null	0.9	0.9	Null	0.9	Null
Mifflin	Belleville	7.1	6	Null	0	0	Null
Montour	Washingtonville	Null	2.6	1.6	No trap	No trap	No trap
Washington	Venetia	5.4	2.3	Null	Null	0	Null
York	York	0	1	0.8	0	0	0

THRESHOLDS Reproductive (tassel/silk) and late vegetative corn attract moths. Shorten spray schedules when populations increase.

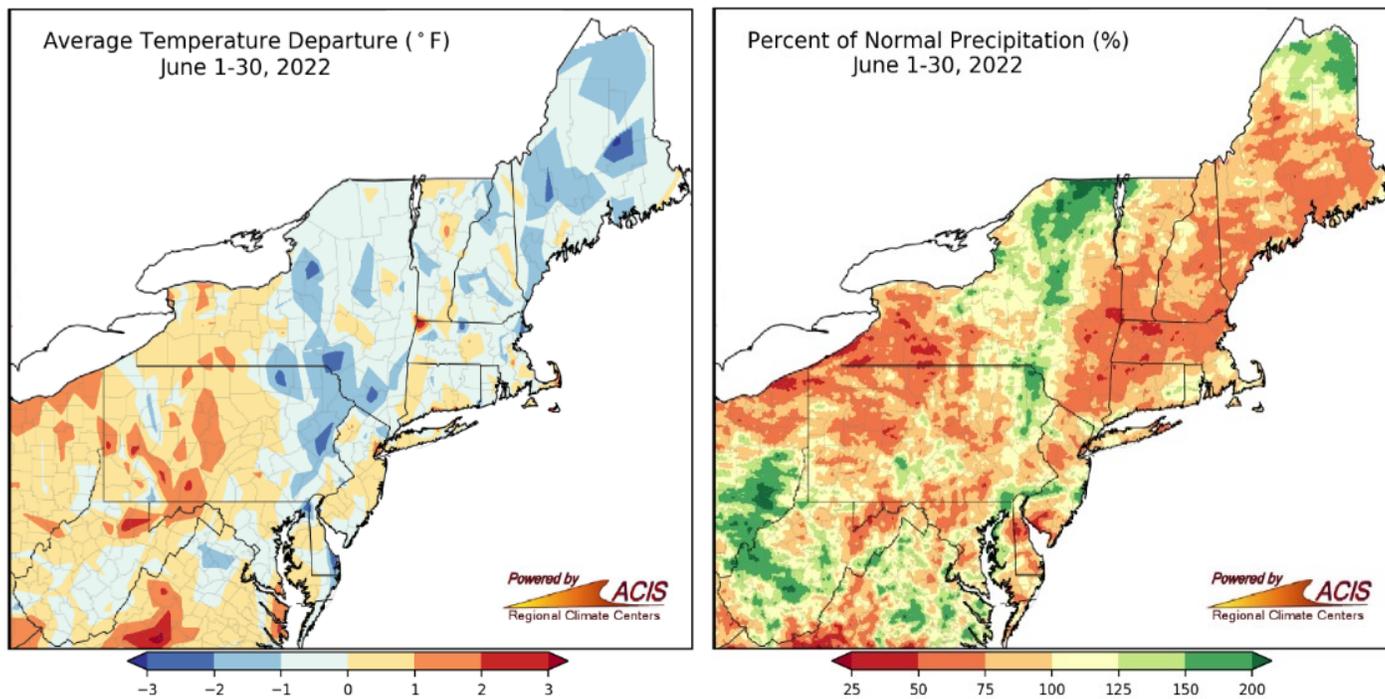
Threshold based on CEW	Catch per week	Spray Frequency
Almost Absent	1-13	7+
Very low	14-35	5-6
Low	36-70	4-5
Moderate	71-349	3-4
High	>350	2-3

PA Vegetable and Berry Current Issues as of July 5

Beth Gugino, Shelby Fleischer, Kathy Demchak, and Karly Regan, Penn State Univ. and Extension

GENERAL CONDITIONS

Data and analysis from the Northeast Regional Climate Center indicate that June was cool and dry across much of the northeastern US. For PA, the cooler than average conditions fell across the far eastern part of the state including Lancaster, Chester, Lehigh, and Berks counties, and the northeastern corner of the state. Meanwhile, precipitation varied from 25% of normal to over 200% of normal. Much of PA was below average with Erie Co. recording its 18th driest June on record. Currently July is forecasted to be wetter than normal in the southeastern region of PA while temperatures are predicted to be higher than normal across much of the state.



June 2022 average temperature and percent of normal precipitation from the [Northeast Regional Climate Center](#).

FIELD PRODUCTION

Since being confirmed on cucumber in Lancaster Co. on June 23rd, there have been no new reports of **cucurbit downy mildew** in the region. However, in southeastern PA there have been several very favorable days for downy mildew spread and development over the past week. Regular scouting and use of downy mildew specific fungicides on cucumber and cantaloupe is recommended especially if rain is in the forecast. If you suspect downy mildew, please let us know. Other diseases being observed in cucurbits include angular leaf spot as well as bacterial wilt on pumpkin which is transmitted by the spotted and striped cucumber beetles. The youngest cucurbit plants are most likely to die because of bacterial wilt. No powdery mildew has been noted yet, but it has been recently reported in southern NJ.

Bacterial diseases of onion are increasing in fields that have received some of the heavier rains. Storm damage can create entry points for pathogens so maintaining a fungicide program can help maintain the foliage as the plants are bulbing. Surface feeding damage has been reported in some onion fields. Often this can be attributed to the salt marsh caterpillar which is much hairier than the leek moth. Although the damage can be extensive it is often very localized in the field and can be managed by manually crushing the pest. Younger stages are more yellow in color but darken as they age.



Salt marsh caterpillar and surface feeding damage on onion leaves. Photo: Beth Gugino.



Black rot on cabbage and broccoli has been reported. It typically comes onto the farm with the seed but can also survive associated with cruciferous weeds or in crop residue. If associated with the seed, then differences between varieties and types of cole crops may be observed. The bacteria can also enter through wounds following heavy rain, hail, insect feeding or mechanical injury. Depending on the weather conditions, symptoms may be visible within 8 to 12 days, or it may take up to 40

Tan lesions initiating from the leaf margin with dark veins are characteristic of black rot on cabbage and other cole crops. Photo: Sara Hricko, Penn State Extension.

days for symptom expression. Optimal conditions for disease development are temperatures ranging from 77 to 86°F and the presence of free moisture either from rain, fog, dew, or irrigation. Copper is the primary management tool once the crop is in the field to help reduce spread from infected to healthy plants.

There have been additional confirmed reports of **tomato spotted wilt virus** in tomato field production. This virus is vectored by thrips and is not seedborne. It most commonly affects tomato, pepper, and ornamentals. Removal of infected plants removes a potential source of inoculum. Weed management is also important.

Japanese beetles are now out in high numbers in several regions of the state. They defoliate the area between leaf veins as they feed, leaving behind skeletonized leaves and are difficult to control with insecticides. There also have been reports of **slug damage on sweet potato**. Slugs are particularly problematic in areas with high moisture, such as those with straw mulch or dense canopy.

Squash bugs are mating so be on the lookout for the egg masses. When they hatch the young nymphs will remain on the underside of leaves. Insecticides are most effective on the younger nymphs. 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 as well as cabbage moth. Vine borer feeding will lead to wilted and yellowing plants, often with holes near the base of plants filled with green or orange waste resembling sawdust.



Female squash bug laying eggs in a diamond-shaped pattern on a pumpkin leaf. Photo: Beth Gugino.

BERRY CROPS

Any plantings of strawberries that are known to have a significant amount of root or crown disease issues should not be carried over, as it is likely that disease inoculum will only build up in the planting over time, making disease control in future plantings in the same field more difficult. However, fields showing only a few plants with disease issues may be kept. Now - after renovation - is the time to treat fields prone to **Phytophthora issues** (red stele or Phytophthora crown rot) with Ridomil Gold SL or Orondis Gold Premix. These products are soil-applied as a banded application or through the drip system. See the label for allowable methods of application.

Several cane diseases are present on blueberry canes including **Botryosphaeria** and **Phomopsis**. Botryosphaeria stem blight in particular seems to be becoming more common in PA over time. Warmer and wetter conditions, and the plant stress of being planted in less-than-ideal locations and soil types are both likely to be contributing factors to this increase. Fungicides are not particularly effective on Botryosphaeria. Pruning out newly infected canes during the summer is the main method of control for either of these blueberry cane diseases and others. Watch for wilting cane tips that do not recover when it is cooler and cut through canes to look for any browning of the cane tissue, either in the center or off to one side of the cane. Continue to cut lower on the stem until the tissue is light green all the way through, and not water-soaked in appearance, which may be an indication that the fungus is invading the cane tissue



Symptoms caused by Botryosphaeria on blueberry canes. Photos: K. Demchak.

As mentioned in the last issue, scale insects may be found on blueberry plants. Putnam scale can spread to the fruit and settle on it, making it unmarketable. The scale can be difficult to spot and blends in with the cane. Look for it on older canes in areas where the surface of the bark has split, and watch for the crawlers and treat them as described in this article: <https://extension.psu.edu/watch-for-scale-insects-on-blueberries-while-you-are-pruning>.

Spotted wing drosophila season is beginning, so be sure to apply insecticides as needed, keep plantings cleanly and frequently picked, and remove cull fruit from the field. There are some indications that sprays applied when SWD first moves into plantings help to keep SWD numbers down later.

Vegetable Disease Updates

Beth Gugino, Penn State Extension Vegetable Pathologist

GENERAL UPDATES:

- Currently 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.
- On tomato, keep an eye out for common summertime foliar like **early blight** and **Septoria leaf spot**. They initially develop on the lower leaves typically with the onset of fruiting as the plant reallocates more resources into fruit production. There is not much new in terms of fungicides for managing these diseases. Continuing to rotate between FRAC codes for resistance management is recommended starting with a protectant fungicide or one that contains a protectant such as Gavel or Zing! and alternating with premix product that contains a FRAC 3 fungicide such as Aprovia Top or Revus Top or a FRAC 11 fungicide such as Priaxor or Fontelis. The spores produced by early blight and Septoria are splash dispersed so protecting the crop prior to rain when it is at a susceptible growth stage is most critical. Also minimizing handling of the plants when they are wet will help reduce spread of the disease in the field.
- There have been no new reports of **downy mildew on cucurbits** in the mid-Atlantic region However inoculum is continuing to build along the east coast with additional reports on cucumber in NC and SC as well as on butternut squash in AL. Scouting and the use of downy mildew specific fungicides on cucumber and cantaloupe is recommended. Protectant fungicides being applied alone or as a tank mix for other diseases will also help protect against downy mildew on other cucurbits such as summer squash, pumpkin, and winter squash. As always, if you suspect cucurbit 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. For the latest reports and forecasts check out <https://cdm.ipmpipe.org/>.

BE READY FOR POWDERY MILDEW ON CUCURBITS

Although not confirmed yet in PA, powdery mildew as recently confirmed on cucurbits in southern NJ. This disease is most easily managed when fungicide programs are initiated with the first detection of symptoms in the field. One powdery mildew lesion on 50 scouted middle-aged leaves is enough to start a fungicide program. Be sure to scout both the top and bottom of the leaves as well as the petioles. Conditions are more favorable for disease development within the plant canopy. Also scout your most susceptible cultivars first. Host resistance helps to delay the onset of symptoms and often overall disease severity especially when coupled with a fungicide program.

The development of fungicide resistance continues to be a concern with powdery mildew. It is important to have thought through a Fungicide Resistance Action Code (FRAC) rotation or alternation in advance



White circular powdery mildew colonies on the underside of a pumpkin leaf. The angular darker purple lesion is downy mildew. (Photo credit: Beth Gugino)

so that the pathogen is exposed to a different mode of action with each subsequent application in the sequence. Products like Vivando (FRAC 50), Luna Experience (3 + 7), and Quintec (13) can be alternated and rotated with a FRAC 3 DMI containing fungicide such as Procure, Proline, and Aprovia Top to name a few. See the [2022-23 Mid-Atlantic Commercial Vegetable Recommendations](#) for the complete list of recommendations.

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 several 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.

Clinic Corner: Findings from the Penn State Plant Disease Clinic

Jennie Mazzone Penn State Research Technologist and Assistant Diagnostician

Phytophthora Blight on Pepper

A pepper sample was submitted to the [Penn State Plant Disease Clinic](#) in June from a field in Montour County, PA. The plants showed severe wilting. The crowns and roots were necrotic. Roots also showed extensive sloughing (separation of outer root sheath from cortex). An Agdia ImmunoStrip test of the roots was positive for *Phytophthora*, which indicates that these plants have Phytophthora blight.

Phytophthora blight on pepper is caused by the pathogen *Phytophthora capsici*. This pathogen has a wide host range including all pepper types, eggplant, tomato, snap bean, and cucurbits. The pathogen typically enters the plant in the crown or roots but can infect any plant part where infested soil splashes onto the plant. Crown rot and wilt occur under wet conditions. Fruit rot initially appears as water-soaked areas that are eventually colonized by the pathogen and appear as signs of white, cottony mold.

This disease usually begins in low, wet areas of the planting. Heavy rains and floods can quickly spread the pathogen. Avoid planting in poorly drained fields. Planting on raised beds can help improve drainage. If possible, use a 3-year rotation with crops other than peppers, cucurbits, eggplants, or tomatoes. Plant resistant varieties and sanitize equipment used in infested fields. Please refer to the [2022-23 Mid-Atlantic Commercial Vegetable Recommendations](#) for more management recommendations.



Severe wilting of pepper sample (upper left). Cutting into the pepper crown showed necrosis and rot (upper right). Roots showing necrosis and sloughing (left). (Photo credits: Jennie Mazzone)

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