



PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

2301 N. Cameron St., Harrisburg, PA 17110 | 717-694-3596 | info@PAVeggies.org | PAVeggies.org

Pennsylvania Vegetable IPM Weekly Update

September 13, 2023

THIS IS THE LAST UPDATE FOR THE 2023 SEASON – We apologize that it is a couple of days late.

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.

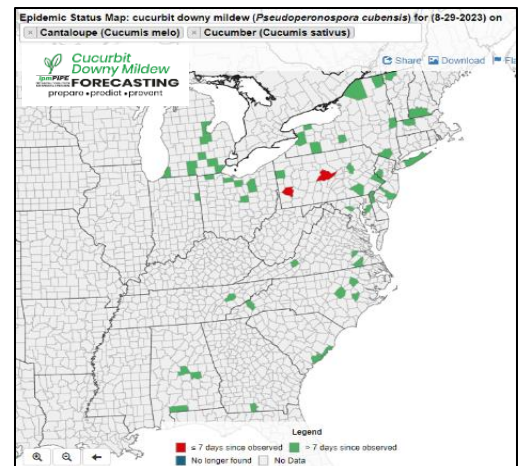
PA Vegetable and Berry Current Issues for September 12, 2023

Beth Gugino and Kathy Demchak

Extension Team Contributors: Glen Bupp, Tom Butzler, Megan Chawner, Tanner Delvalle, Tom Ford, Leah Fronk, Margarita López-Urbe, Megan Luke, Bob Pollock, Elsa Sánchez, and Robyn Underwood

FIELD/HIGH TUNNEL PRODUCTION

As the season winds down there have been fewer new reports of **cucurbit downy mildew**. The most recent report was on greenhouse cucumbers in Indiana Co., PA. The closer the crop is to fruit maturity and harvest, the less concerned you need to be about downy mildew. **Plectosporium blight** continues to be observed on cucurbit vines and pumpkin handles. This disease can easily sneak up and cause significant damage. Make note if this was a problem this year and consider implementing a more proactive fungicide program next year which includes some strobilurin-type fungicides.



Mottling and leaf distortion caused by a virus infection in pumpkin (Photo: Beth K. Gugino).

Viruses in cucurbit crops have been problematic in some fields this past season. Cucurbits can be affected by over 200 viruses worldwide. The symptoms range from mottling and puckering of the leaves to severe leaf distortion (shoestring-like leaves) similar to herbicide injury. The severity of symptoms varies based on the host type as well as cultivar, plant age, virus titer, air temperature and whether or not there is a mixed infection of multiple viruses. Most viruses that affect cucurbits are aphid transmitted with the aphid acquiring the virus from an infected host/weed and then quickly – within seconds to minutes – transmitting the virus. This means that insecticides will not limit virus transmission but could help reduce the overall aphid population thus reducing potential spread. Some potyviruses including zucchini yellows



Light purple sporulation caused by downy mildew on the underside of a greenhouse cucumber leaf (Photo: Bob Pollock).

mosaic virus (ZYMV) and squash mosaic virus (SqMV) can also be seedborne so infected volunteer plants can be a potential source of inoculum or the viruses could come in with the seed. Although not a very common method of transmission, there is some evidence that potyviruses could be sap transmitted on harvesting tools if quickly working down the row.

Black rot in fall planted brassica crops has been observed in several fields. Once symptoms develop, management strategies are limited to reducing spread to other plants through sanitation and copper-based protectant fungicides. **Alternaria leaf spot** is also still problematic. Some of the more effective fungicides include Priaxor (FRAC group 7 + 11), Switch (9 + 12), Quadris Top (3 + 11), and Endura (7). Luna Experience is another option for brassica leafy greens. It is important to check the label for your specific brassica crop.



Characteristic black rot lesions on cauliflower (Photo: Sara Hricko, formerly with Penn State Extension).

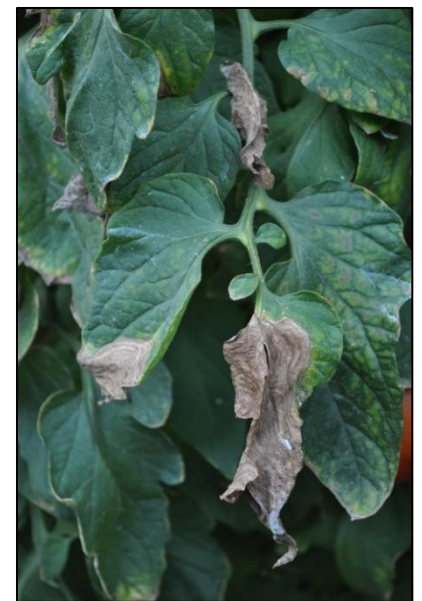


An adult harlequin bug on a broccoli leaf (Photo: Karly Regan, formerly with Penn State Extension).

On the insect front, **Harlequin bugs** have been observed in cabbage, kale, and other cole crops. These can be managed with pyrethroid or neonicotinoid insecticides, but applications must be made early. In organic production, pyrethrins may provide some control of Harlequin bugs. Harlequin bugs are black and orange as both nymphs and adults, and their feeding results in white patches on leaves. Eggs are black and white in color and barrel-shaped, laid in clusters on the underside of leaves. Both pests overwinter in plant residue of the target crop or weedy hosts, so post-harvest sanitation is an important cultural tactic to reduce damage next year.

This Fall as the temperature drops, dew periods extend, and the skies turn cloudy, be on the lookout for **Botrytis gray mold (and late blight) in high tunnel tomatoes**.

Although high tunnels provide direct protection from rain, high relative humidity and dew can still provide the moisture necessary for disease development. Gray mold affects many different types of vegetables and ornamentals so there are many potential sources of this pathogen. It easily grows on weakened or senescing (dying) plant tissue such as old flower blossoms or leaf litter; however, it can still cause lesions on the leaves and stems. Foliar lesions can be confused with late blight since both are irregular in shape; however, gray mold will develop more of a concentric ring pattern and the fuzzy growth (sporulation) is darker and grayer in color and can develop on both the upper and lower leaf surface as well as the surface of stem lesions. Stems can become girdled and break and foliar symptoms can become severe enough to cause defoliation. The fruit can become infected from dying flower petals that hang on as the fruit develop. These lesions are whitish in color, very soft and watery and typically develop near the stem end. This is in complete contrast to late blight that causes dark-brown greasy firm lesions on the fruit.



Irregular zonate lesions characteristic of Botrytis gray mold. Dense gray sporulation can often be seen on all symptomatic surfaces under very humid conditions. (Photo: Beth K. Gugino)

Late blight has been reported in four counties in central and northern New York and western North Carolina as well as in Quebec and Ontario, Canada. Reports in New York have primarily been on tomato with one report on potato. There have been no reports of late blight in PA.

BERRY CROPS

Several growers have reported poor vigor and small size in strawberry plug plants that they are receiving. This could be due to many different factors, including the propagator receiving smaller tips than usual, and poor weather conditions while the tips were being rooted. In addition, diseases like anthracnose, if present at a low level, can cause decreased

vigor. There seems to be a fair amount of anthracnose in plug plants this year, along with some gray mold and Phomopsis. See the last issue of this update for more details on detecting and treating for diseases.

If the plug plants are light in color, they may be low in nutrients. A light dose of a soluble fertilizer while the plants are still in the flats should help to green them up, and they often will start growing better once they become established in the field. Hopefully a long Fall will give them time to grow and make up for any poor growth earlier in the season.

Sap beetles have been reported in relatively high levels in some day-neutral strawberry fields. At this point, they will be difficult to control with insecticides. Using buckets to clean off infested berries and the beetles that are in them, and then removing the infested fruit completely from the field will help to keep numbers from increasing further in the berry patch. Bag or bury the fruit - do not just throw it on a compost pile, as the beetles will just continue to multiply there.

Now is the time of year when late leaf rust is often seen on either red or black raspberries. In some years it can be quite severe. It is important to realize that this is not orange rust, and is not a systemic disease, so there is no need to pull the plants out. However, the rust can appear on the fruit making it unmarketable. Category 3 and 11 fungicides will help but may not be needed depending on severity.



Late leaf rust on 'Niwot' leaf underside. (Photo: K. Demchak)

Now might be a good time to mention that the warm fall weather that we had last year resulted in grower uncertainty about when to make applications of fall herbicides and apply straw for overwintering. Should this happen again, watch the plants and use their appearance as your guide. Applying either herbicides or straw (or both) too early can cause problems. Some plantings were burned badly by Chateau when applied last Fall before the plants were dormant, even though it was the usual timing for the applications. Also, applying straw cuts off light to the plant that it needs to manufacture its winter carbohydrate reserves plus the energy to begin growing in the spring. Plants will take on a flattened appearance when they are dormant, even if they are of a variety with leaves that don't turn color, and then it is safe to apply straw, though waiting even later to apply Chateau is safer. If they have not yet taken on this flattened appearance when very cold temperatures are forecast (very low 20's or lower), then you may have no choice but to go ahead with straw application, but try to wait as long as possible, and consider using a Devrinol/Sinbar combo for weed control rather than something "hotter".

Special Request: DO YOU GROW ARUGULA AND/OR OTHER BRASSICA LEAFY GREENS?

The Northeast Arugula Team (NEAT) was formed in response to grower inquiries about bacterial diseases of arugula and other brassica leafy greens. With funding from Northeast SARE, we are seeking to identify diseases on brassica leafy greens in New Hampshire, New York, Pennsylvania, and Vermont.

Common Bacterial Diseases, Hosts, & Causal Agents: Brassica bacterial pathogens have a combined wide range of brassica hosts including arugula, broccoli, radish, turnip, cabbages, collards, mustards, bok choy, kale, cauliflower, etc. Laboratory examination may be required for exact diagnosis as more than one disease can occur on the foliage. Examples of disease:



Photo Credit Steve Koike

Black rot (*X. campestris* pv. *campestris*) is recognized by a V-shaped lesion originating at the leaf margin.



Photo Credit Carolee Bull

Bacterial blight, (*P. cannabina* pv. *alisalensis*) on arugula can be identified by small chlorotic-bordered lesions that spread quickly.



Photo Credit Carolee Bull

Pepper Spot, (*P. syringae* pv. *maculicola*) looks as though somebody sprinkled table-pepper on leaves.

Our Team: NEAT is a collaborative effort among The Pennsylvania State University (Carolee Bull, Shaheen Bibi, & Cameron Cedeno), Cornell University (Elisabeth Hodgdon), University of New Hampshire (Rebecca Sideman), and University of Vermont (Ann Hazelrigg). NEAT is advised by a committee of farmers, developers, and plant breeders. NEAT receives funding through the NE SARE Project LNE23-463.

To learn more about our project and our team, please visit the NEAT Homepage:

<https://plantpath.psu.edu/research/labs/bull/research/neat>

We want your diseased Brassica Leafy Greens: Our goal is to identify bacterial pathogens causing diseases on arugula and other brassica leafy greens, design effective management strategies and spread the information to growers. If you are in Pennsylvania, we are willing to come to your farm to survey your brassica leafy green plantings for disease or other issues limiting production. **To express interest in sending samples for identification or to schedule a survey please contact Cameron Cedeno 724-732-2238, cjc315@psu.edu using the subject "NEAT" and/or consider filling out this 5-minute survey. Link: https://unh.az1.qualtrics.com/jfe/form/SV_aibplcPXBwAoRZI**

PestWatch Report – September 13

Glen Bupp and Leah Fronk

LAST REPORT FOR 2023

This will be the last update for the 2023 season with only eight counties reporting in this week. Catch numbers remain variable with some areas experiencing increases and others a decrease. Centre, Clinton, Erie, Franklin, Juniata, and York are experiencing moderate to high catch numbers indicating a spray rotation of 3-4 or 2-3 nights respectively. The remaining areas are seeing low numbers and are on a 5 day or more spray rotation.

As the season closes it is important to remember that corn that is tasseling is still 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.

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, as pyrethroid resistance has increased in migrating corn earworm populations. Particularly, we tend to see more resistance later in the season, as moths migrate from further south in the United States up to our region. Consider consulting the Mid-Atlantic Commercial Vegetable Recommendations guide for products to use. Diamides and spinosyns do not provide effective control of other pests such as sap beetles, stink bugs, 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.

Two fall armyworm were caught across the state this week. Both in Centre County. By managing for corn earworm, fall armyworm should be adequately controlled, as well. Fall armyworm damage can occur on the ear, as well as on the foliage. Foliage feeding will leave ragged edges and waste that resembles sawdust.



Fig 1. A corn earworm adult, recognizable by its thin filament antennae and green eyes.



Fig. 2. Fall armyworm feeding damage on corn

Average weekly catch for corn earworm.

Location	3-Sep	10-Sep
Centre, Pennsylvania		
Centre County - PSU Research Farm	69	123
State College	10	49
Clinton, Pennsylvania		
Loganton	55	173
Erie, Pennsylvania		
Lake City Nursery Rd	53	113
Lake City Rt 5	179	615
Franklin, Pennsylvania		
Waynesboro	250	225
Juniata, Pennsylvania		
Port Royal		76
Luzerne, Pennsylvania		
Drums	57	25
Washington, Pennsylvania		
Peters Township	49	60
York, Pennsylvania		
York	113	93

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

Our thanks to all the Penn State Extension and grower partners that have worked together to maintain the sweet corn insect pest trapping network this season for the benefit of the entire industry.