



PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

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Pennsylvania Vegetable IPM Weekly Update

June 1, 2022

This is the first Update for 2022. You are receiving this Update because you requested it last year. Please call us at 717-694-3596 if you wish to continue receiving it for the 2022 season.

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.

Vegetable Disease Updates

Beth Gugino, Extension Vegetable Pathologist, Penn State University

GENERAL UPDATES:

- There are currently **no reports of late blight on tomato or potato** in the region. Tomato and potato plants are susceptible at any point during the growing season if conditions are favorable (cool and wet) and the pathogen is present. The source of the pathogen is typically potato cull piles, volunteer potatoes that were infected last season, and/or infected seed or transplants sourced from off-farm locations. Late blight can not survive in dead plant tissue or in the soil without living plant tissue. Last year, there were only seven confirmed reports of late blight on potato in Maine, Wisconsin, and clusters on tomato in Ontario, Canada and Niagara Co., NY as well as in northern GA, eastern TN, and western NC. None in the immediate mid-Atlantic region. All samples tested were the US23 genotype. The most common genotype detected in recent years. At this time, the inclusion of late blight target fungicides is not recommended unless inoculum is suspected nearby. 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.
- **Blackleg and soft rot on potato** caused by *Dickeya* spp. was confirmed in two fields on the eastern shore of Virginia and tied back to an infested potato seed lot. Scout potato fields and report issues with poor potato stand establishment. Infected seed tubers often fail to emerge leading to uneven stands. It is important to keep the tags from seed bags for reference if you run into tissues. Seed lots are often split between multiple locations so other growers may be having issues with the same seed lot as well. If purchasing smaller seed quantities, ask the ag supplier for information about the seed source. There are many pathogens that are



Severe late blight foliar lesions on tomato. (Photo credit: Beth Gugino).



Poor stand establishment associated with blackleg and soft rot of potato. (Photo credit: Tom Ford, Penn State Extension).

seedborne and despite all efforts by the seed potato grower, some lots perform poorly especially when environmental conditions favor diseases like late blight or blackleg and potato soft rot.

- Currently **cucurbit downy mildew (CDM)** has been reported as far north as the central South Carolina on cucumber (*Cucumis sativus*) with additional reports on cucumber, acorn/yellow/summer squash (*Cucurbita pepo*) in southern GA. Although there have not been many confirmed reports of downy mildew so far this year, the weather conditions last week were ideal for sustained long-range transport of the pathogen from the southeastern U.S. northward across Ohio and the western half of PA and NY. An unusual pattern for this time of year. This serves as a reminder that cucurbit crops are susceptible at any growth stage from young seedlings to mature plants. High tunnel cucumbers are equally as susceptible as field-grown crops. Fungicide options in a high tunnel are more limited and require the product to be labeled for use in the greenhouse. Some options include Previcur Flex (2-day PHI) as well as copper-based fungicides and several biologically based products. For a more complete list of options see Table E-11 in the 2022-23 Mid-Atlantic Commercial Vegetable Recommendations. Weekly reports on the status of CDM are posted in the educational kiosks at many of the produce auctions, in PVGA and Penn State Extension updates like these as well as via the 1-800-PENN-IPM hotline. If you want to receive automatic alerts via text or email from the CDM ipmPIPE monitoring website, you will need to [sign-up or re sign-up](#) if you were signed up before due to a change in the IT platform hosting the website. For emails, EDDMapS Alert will now be the subject line from alerts@cdm.ipmpipe.org.



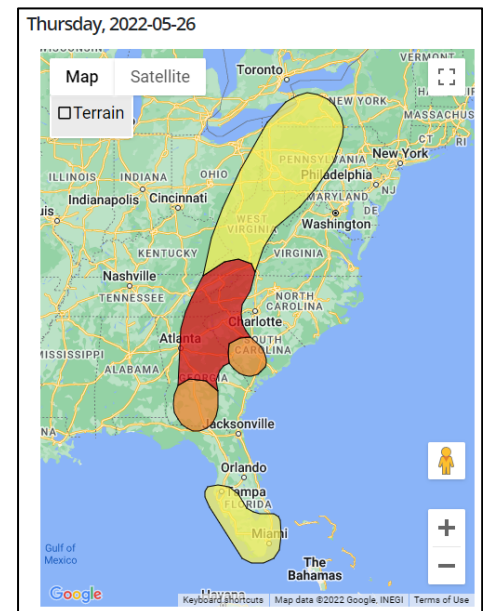
Classic symptoms of downy mildew on the upper leaf surface of cucumber. Angular lesions are initially chlorotic before turning tan and necrotic. (Photo credit: Beth Gugino).

Clinic Corner: Findings from the Penn State Plant Disease Clinic WITH JENNIE MAZZONE

Bacterial Disease on Garlic

A garlic sample was submitted to the Penn State Plant Disease Clinic in late March from Lancaster Co., PA. The leaf tips were dying (chlorotic/necrotic), and the bulbs were rotting. A soft, watery rot was developing on some internal leaves. A check of the sample for bloat nematode was negative. The leaves and bulbs were cultured for both fungal and bacterial pathogens. The culture tests followed by DNA sequencing revealed the presence of a *Pseudomonas* sp. No other bulb or root rot pathogens including *Fusarium*, *Pythium* and *Rhizoctonia* were found.

Pseudomonas can cause a bacterial leaf blight and bulb rot on garlic and other alliums. *Pseudomonas* infections can be particularly problematic during cool, wet weather. The pathogen colonizes the leaf tissue and as disease progresses, moves downward and causes bulb rot. Often, secondary bacteria can invade this diseased tissue and contribute to rotting.



Forecasted risk of downy mildew development based on known sources of downy mildew and the forecasted weather. High, moderate, and low are denoted as red, orange, and yellow. (Photo credit: Thomas Keever; cdm.ipmpipe.org).

To manage this and other bacterial diseases on garlic, follow the general cultural management strategies for bacterial disease (e.g., plant pathogen-free seed, avoid overhead irrigation, minimize plant injury, rotate to a non-host for two or more years). Initiate a preventative copper-based fungicide program. Harvesting garlic early and drying down the necks to prevent movement of the bacteria into the bulb/cloves may also be helpful.



Garlic sample showing leaf tip chlorosis/necrosis (top left), soft, watery rot on internal garlic leaf (top right) and bulb rot symptom (left). (Photo credits: Jennie Mazzone).

PA Vegetable and Berry Current Issues as of May 24, 2022

Beth Gugino, Kathy Demchak, and Shelby Fleischer, Penn State Extension

General conditions: Field planting is finally underway across much of Pennsylvania thanks to the more favorable planting conditions. Many of the issues described below are common this time of year in our region. Maintaining a regular scouting program for common pests and diseases and having a plan of action thought out in advance is a good integrated pest management approach. Annual soil testing, regular plant tissue testing of crops like tomato and knowing and correcting the pH of your irrigation water are also critical to making informed in-season fertilizer management decisions.

ONIONS and other ALLIUMS

Emergence of the spring adults from overwintering pupae of **Allium leafminer (ALM)** is now over so it is time to start thinking about **thrips**. **Onion thrips** are the most common specie in onion, but other species, such as **western flower thrips** can also feed on onion. Thrips are also a common problem in greenhouses, feeding on flowers and young transplants. Both species have a wide host range, and some species transmit viruses. When scouting for thrips in onion, pull the center leaves apart and look down in the base of the leaves for the very small larvae. They will quickly scatter so a hand lens can be helpful. Severe feeding damage reduces the photosynthetic capacity of the plants and creates openings for bacterial and fungal pathogens to enter the plant. Thrips have also been reported in high tunnel tomatoes, cucumbers, and lettuce. An outbreak of **spongy moth** (formerly gypsy moth) was reported in several onion fields in central PA. Although onion is not considered a preferred host, larval feeding could still cause damage and create entry wounds for other pathogens. Products labeled for onion and other lepidopteran pests including the Btk strain of Bt (*Bacillus thuringiensis* var. *kurstaki*) could be used to spot treat if needed. **Onion maggot** has also been reported.



Thrips larvae on onion. Photo: Whitney Cranshaw, Colorado State Univ., bugwood.org.

HIGH TUNNELS

Aside from the usual suspects, **bacterial canker on tomato** was confirmed in a high tunnel this past week. The bacterial canker pathogen can be seedborne and it can also overwinter on wooden stakes, greenhouse/high tunnel structures as well as crop residue and weed hosts. Bacterial canker is best managed preventatively. Once symptoms develop and the disease is confirmed, rogue out symptomatic plants as well as adjacent plants. Only work with the plants when they are dry. Bacteria need leaf wetness to infect. Use your hands rather than pruning implements when suckering to reduce risk of transferring the bacteria to the cut surface. Application of copper-based products may help reduce some spread. Keep in mind that this will be an uphill battle.

Downy mildew on spinach caused by *Peronospora farinose* f. sp. *spinaciae* was recently confirmed on two farms. The pathogen primarily affects spinach causing irregular yellow patches on the upper leaf surface and white to purplish sporulation on the lower leaf surface (similar to downy mildew on cucurbits). Host resistance is the most effective management tool. However, since there are 19 races of the pathogen, planting multiple cultivars with resistance to varying races is recommended to minimize potential losses to any one pathogen race.

Crop nutritional issues have been observed in a number of high tunnels and greenhouses. It is important to know what nutrients are being applied at what rates. Water quality in terms of pH and soluble salts is also important for optimizing nutrient availability and minimizing nutritional stress. Plant tissue testing can be an important source of information during the season to help adjust in-season fertility. For a tutorial on plant nutrition in hydroponic systems check out [Hydroponic Systems and Principles of Plant Nutrition: Essential Nutrients, Function, Deficiency, and Excess](#). For those growing in native soils check out a series of articles that was recently written by Elsa Sánchez and Tom Ford based on soil samples from the high tunnels of 27 growers. These articles will help growers navigate the topics of soil chemical properties and crop health and include High Tunnel Soil Health Test Report: [Soil pH](#), [Soluble Salt Levels](#), [Soil Nutrient Levels](#), and [Organic Matter and Cation Exchange Capacity](#).

Mite and thrips damage as well as **aphids** and **whiteflies** have also been observed in greenhouse/high tunnel crops. Keep in mind that thrips can vector viruses such as tomato spotted wilt virus. It is especially important not to comingle vegetable transplants with ornamental transplants or hanging baskets which can often be the source of thrips entry to the farm. Weedy hosts can harbor insect pests so weed management inside and outside the structure is important. Mowing of cover crops and hay in nearby fields can also lead to an influx of pests.

FIELD PRODUCTION

Seedcorn maggot has reportedly caused damage in beans and peas. The adult is a fly like a housefly, but you are unlikely to see it. It is only 5 mm (~ 1/4 inch) long and is grayer in color than a housefly. They overwinter as a pupa in soils (farther south all life stages can be found during the winter). Adults emerge in early spring and lay an average of 270 eggs per female in moist soil. Soil containing abundant decaying vegetation, and exposed peat or potting soil is also attractive to the ovipositing female. Larvae complete their development within 2-3 weeks. Three to five generations may occur per year, but damage to vegetable crops in our area tends to be limited to the early generations. The maggots burrow into the seed. The larvae feed on peas, beans, corn, cabbage, turnip, radish, onion, beet, spinach and sprouting potato. Damage can be avoided by delaying planting until the first generation larvae have pupated. This date varies with locality but is approximately June 10 for New York State. Peak flight for seedcorn maggot is 360 GDD (base 40 F), 450-540 for onion maggot, and 450 for cabbage maggot. Cultural controls include thorough incorporation of organic matter, covering the root-ball of transplants, and planting when soil temperatures are warm. Presumably, plants 'out-grow' the seed or root feeding when temperatures are warm. Insecticide options should be applied prior to planting. White or yellow sticky traps (Great Lakes IPM, or Gemplers) can be used to monitor for adult activity. This can be combined with a slow-release attractant ("Adult maggot lure", from AgBio Inc., 9915 Raleigh St. Westminster, CO 80031; 303-469-9221; agbio@agbio-inc.com) to improve catch. Other attractants for seedcorn maggot include blood meal, fish meal, onion pulp, and yeasts.



Seedcorn maggot larvae in millimeters (~5mm) [License Holder: Jade Savage, Bishop's University](#),

BERRY CROPS

There have been a few reports of variable vigor in raspberries this spring with canes starting to leaf out but then stopping growth. Given the fluctuating temperatures that we had this spring, it is likely that this could be caused by **winter injury**, and the stress of the hot weather we had recently may have been more than the plants could handle. If the plants looked great last Fall, but were weak this spring, winter injury could be the issue. There also could be some cane diseases present that are affecting translocation. One way to separate out above-ground causes from below-ground ones is that with above-ground causes (winter injury or cane diseases) floricanes may look weak, but new primocanes will start out growing well. If primocane growth is poor also, then a root or crown area problem should be considered. Though not a complete list, common issues that could affect primocane growth include verticillium wilt (most common in black raspberries), phytophthora root rot (most common in red raspberries), crown gall (most common on red raspberries and blackberries), and various borers.

There have been a number of reports of **spongy moth** (*Lymantria dispar*, previously known as “gypsy moth”) feeding on blueberries. The best time to treat for this pest is when caterpillars are still small and in their early instars. The Btk strain of Bt (*Bacillus thuringiensis* var. *kurstaki*) is effective. Though there are some color variations, earlier instars can be differentiated from later instars by their black head capsules. The head capsule becomes lighter in later instars, and Btk is likely to be less effective. Other insecticides can be used later, but Btk is the safest option and is a way to prevent greater damage from occurring later.

Growers are reminded to keep watch for symptoms of our new strawberry disease, **Neopestalotiopsis**, as indicated in the first 2022 update issued last week. Only isolated instances of this disease have been seen so far in the mid-Atlantic region. Thiram and Switch are the two fungicides that provide partial control while others have little effectiveness.

For an update on our more typical common diseases of **gray mold** (*Botrytis*) and **anthracnose**, including info on a new species of botrytis that is present in the Mid-Atlantic, resistance issues, and recommended chemical control options, see this article: <https://extension.psu.edu/strategies-for-effective-management-of-botrytis-and-anthracnose-fruit-rot-in-strawberries>



Thornless blackberry failing to leaf out due to a cane canker disease in combination with winter injury. Photo: Kathy Demchak.



Spongy moth larvae with black head capsule, which indicates it is an early instar. Photo: Kathy Demchak.

Cyclamen mite damage has been noticed in some strawberry plantings. Cyclamen mites are too tiny to see without a microscope, but the symptoms are noticeable and consist of new leaves being discolored and misshapen as they emerge. The symptoms could be mistaken for injury from a growth-regulator type herbicide but occur because the mite is feeding on new leaves in the crown of the plant as they are being formed. Predatory mites are effective but need to be released while cyclamen mite populations are still low, and damage is confined to a few plants. Chemical sprays are unlikely to have much effect at this time of the year, as the presence of foliage makes it difficult to get a miticide into the crown area, though renovation time is an option for matted-row producers. Use a high volume of water (200 gal/acre). Agri-Mek (abamectin) and Portal (fenpyroximate) both have efficacy against cyclamen mites.



Discolored and malformed new strawberry leaves affected by cyclamen mites. Photo: Kathy Demchak.

Tarnished plant bugs continue to be noted in a number of strawberry fields. Keep an eye out for damage from this pest as populations will only increase over time.