



PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

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Pennsylvania Vegetable IPM Weekly Update

June 10, 2020

This is the first Update of the 2020 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). The source of the pathogen is typically potato cull piles, volunteer potatoes that were infected last season, and infected seed or transplants. Late blight cannot survive in dead plant tissue or in the soil. 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.
- In general, **cucurbit downy mildew** has been slower to start this year in the throughout the southeast which in part is attributed to the drier weather pattern that persisted in late April and throughout May. However as active fronts move up the coast, so will downy mildew which was reported on cucumber in South Carolina and North Carolina this past week. 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 at <https://cdm.ipmpipe.org/alerts/> 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.
- Scout your high tunnels for **Sclerotia stem and fruit** rot otherwise known as timber rot on tomato and white mold on legumes. In high tunnels we are typically concerned about timber rot, but this fungal pathogen has over 400 hosts including most vegetables. The fungus typically produces a dense white mat of fungal growth within which black sclerotia will develop as the plant tissue dies. When the sclerotia fall into the soil, they can survive for years in the absence of a host. This season high tunnel zucchini was a new host for me (pictured left; photo credit: Tom Butzler).



KEEP AN EYE OUT FOR ONION BACTERIAL DISEASES

Although the early season cold temperatures delayed crop development across much of PA, as the temperatures heat up and severe storms move across the state bacterial disease is likely to increase. The bacteria are easily spread between plants via rain splash and enter the plant through natural openings as well as wounds created from storm damage or thrips feeding injury. Although frequent rain events can knock back **thrips** populations, it is important to maintain a regular scouting program and use insecticides such as Radian, as needed. Thrips larvae are most commonly found in the leaf axil at the base of the plant where they are protected. Increased thrips feeding

damage has been correlated to increased foliar fungal disease problems such as **Stemphylium leaf blight** and **purple blotch** in addition to bacterial diseases like **center rot**.

The most characteristic foliar symptom of **center rot** is one, or more interior leaves that become bleached and collapse. The leading edge of the lesion is often grayish green in color and water soaked as it moves towards the neck of the onion. Eventually the bacteria can move into the bulb causing the associated scale to become discolored while the rest of the onion remains firm.

Currently a copper-based product tank-mixed with mancozeb is recommended for in-season management. It will protect the surface of the plant from bacteria that may be splash dispersed but will not affect any bacteria that may already be inside the plant tissue.

Penn State is part of a four-year project recently funded by the USDA Specialty Crop Initiative Program title [Stop the Rot](#) that involves 12 states that cut across all seven onion growing regions in the US. PA is not the only state to have issues with onion bacterial diseases. It is estimated that bacterial diseases account for more than \$60M in losses annually to the onion bulb industry. The long-term outcomes of this project include new



Interior bleached leaf characteristic of center rot on onion cv. Candy (left); Center rot lesion progressing down an onion leaf to the neck (right). (Photo credit: Beth Gugino).

onion cultivars with resistance to important bacterial pathogens; reduce losses due to bacterial diseases through practical management solutions; more sustainable onion production and increased economic sustainability. We will be looking for grower cooperators throughout this project. If you suspect you have onion bacterial disease issues or are interested in learning more about the project please contact me by email at bkgugino@psu.edu or by phone at 814-865-7328. More information to come!

PA Vegetable and Berry Current Issues

From Penn State Extension Specialists and Educators as of June 2, 2020

COVID-19 resource update: Several outbreaks of COVID-19 have occurred in greenhouse or field operations in Ontario, resulting in one worker death and hundreds of positive cases, while one smaller outbreak has occurred in New York to date. Steps should be taken to minimize the possibility of additional outbreaks occurring in other locations. COVID-19 resources related to farm worker housing can be found in the Pennsylvania Department of Agriculture publication “Covid-19: Modifications to Seasonal Farm Labor Camp Requirements” at <https://www.agriculture.pa.gov/Documents/Seasonal%20Farm%20Labor%20Camp%20Guidance.pdf>.

General conditions and observations: The earlier cold and freezing temperatures led to the set back and replanting of some crops. Damage has been observed on early planted sweet corn, peas and some strawberry blossoms had been damaged by frost. However, now with the warmer more humid conditions, more severe weather is creeping into the forecast. When diagnosing crop issues, keep in mind that many of the symptoms you see may be the result of environmental damage especially if the new growth appears healthy and no chemical or biological pesticides have been applied. There have also been several suspected reports of herbicide drift, some of which have ended up being linked to causes other than herbicides.



Severe storm damage on onion (right) and thrips feeding injury (left). Photo credit: Beth Gugino.

ONIONS and other ALLIUMS

Damage from severe storms and heavy rain has been observed in some onion fields. The weather-related damage is typically observed only on the exposed side of the leaves compared to thrips injury which occurs on all sides of the leaf as it emerges from the neck of the plant where the thrips nymphs prefer to feed. Severe storm damage even in the absence of hail can create entry points for fungal and bacterial pathogens so consider applying a tank mix of mancozeb and copper to help protect this plant tissue from infection by pathogens. Be on the lookout for thrips and bacterial diseases as the temperatures start to reach into the upper 80's and reach over 90°F. Scout for thrips with a good 10x hand lens, looking in the axils of leaves.

HIGH TUNNELS

Keep an eye out for **powdery mildew on tomatoes** in high tunnels and greenhouses. This is an example of a disease that is more commonly a problem in enclosed structures rather than in open field production. Powdery mildew is one of the easier diseases to manage using products that are labelled for “greenhouse use” such as potassium bicarbonate or botanical oils. See the **Special Note** below for more information regarding pesticide applications inside enclosed spaces – the new definition for greenhouses and high tunnels.

FIELD PRODUCTION ISSUES

Several species of ‘leaf beetles’ (family Chrysomelidae) are showing up, sometimes in high numbers. Striped cucumber beetles are active and are aggregating in pockets across the state: we have seen > 20 beetles per plant on the highly attractive Blue Hubbard variety of winter squash that is sometimes used as a trap crop. The combination of a male-produced pheromone, plant volatiles coming from beetle feeding, and frass volatiles from that feeding, all attract these beetles. The plant pathogen that causes bacterial wilt in cucurbits overwinters in striped cucumber beetles and moves into the plant from beetle frass moving into feeding wounds. Younger plants are more susceptible. These overwintered adults are laying eggs in the soil at the base of the plants, and larvae develop on roots. Managing these immigrants will help reduce problems with the next generation that develop from these eggs, which appear in late June or early July. Because the younger plants are more susceptible to the pathogen, and controlling early immigrants reduces problems with later generations, thresholds on young plants are low (1 beetle/plant, or some suggest 1 beetle/10 plants). Later, larger plants can tolerate higher thresholds (~5/plant).

Along with cucumber beetles, other ‘leaf beetles’ that are showing up include flea beetles and Colorado potato beetles. Flea beetles have a similar life cycle as cucumber beetles, laying eggs in the soil, and larvae developing on roots. In contrast, Colorado potato beetle eggs and larva are on leaf tissue, and there is much more leaf feeding/defoliation. This also makes the insecticides that require ingestion and are most effective when ingested by early instar larvae – including several OCIA-labeled products – work better with Colorado potato beetle compared to the leaf beetles or cucumber beetles that develop on roots.



Striped cucumber beetle (top; photo credit N. Sloff) and feeding marks on 'Blue Hubbard' cotyledons (bottom; photo credit S. Fleischer).

SPECIAL NOTE: Pesticide Applications in Enclosed Spaces

When it comes to making pesticide applications, the Pennsylvania Department of Agriculture has updated and broadened the term “greenhouse” to an “enclosed space” which now includes high tunnels, greenhouses, and hoop houses. Per 40 CFR Part 170 enclosed space production is the production of agricultural plants indoors or in a structure or space that is covered in whole or in part by any nonporous coverings and is large enough to permit a person to enter.

Common situations that would still be considered enclosed spaces:

- A hoop house cover with plastic film, regardless of the sides being rolled up or down.
- A greenhouse with the roof vented.
- A high tunnel with both ends open.

Common situations that would not be considered enclosed spaces:

- A hoop house with all plastic film completely removed; for example, it is common to remove plastic film for summer production.
- A hoop house with a shade cloth where the plastic film traditionally would be.
- A tunnel, such as a low tunnel, that is not tall enough for a person to enter.

When selecting pesticides to manage pest and disease outbreaks in enclosed structures, only products that are labelled for use in greenhouses/enclosed structures on that crop group can be applied. If the label specifically restricts applications in the greenhouse/enclosed spaces, you are not permitted to apply it. Also, if the label does not specifically include or exclude greenhouse/enclosed spaces (no mention at all), you are not permitted to apply it. Questions can be directed to Jessica Lenker, jeslenker@pa.gov, 717-772-5217.

BERRY CROPS

Most strawberry growers using matted-row production in cooler regions of the state are reporting escaping significant damage from frosts, while damage in warmer parts of the state, especially if in plasticulture, ranged from just a few blossoms lost to an estimated 40% crop loss and greater. On some sites, the blueberry crop is very heavy, especially with the cultivar Bluecrop where plants may have many fruit and few leaves. In these instances, it may be wise to remove a portion of the crop, as otherwise berries may remain small and be slow to ripen.



Tarnished plant bug nymph on strawberry. Photo credit: Kathy Demchak.

Pest problems are fairly limited in scope at this time. Spider mites are present in some field strawberries and high tunnel brambles. In high tunnels, where warm temperatures can cause populations to grow quickly, it is recommended that scouting be undertaken, and predatory mites be released while spider mite populations are still low. Consult with your predatory mite supplier to make sure you are releasing the best specie(s) for your situation. Season-long control can be obtained with one or possibly two releases if predators are released before two-spotted spider mite populations get out of hand. Tarnished plant bug is likely to become a bigger problem as the season progresses, so keep an eye out for their presence especially if neighboring crops are mowed or patches of weeds are controlled. Some issues with 'Flavorfest' strawberry plant collapse have been reported that appear to be related to a crown rot caused by Phytophthora. Botrytis is present on strawberries, while anthracnose presence appears to be limited or under control at this time. See the recent article on anthracnose management in the most recent issue of Penn State's Vegetable and Small Fruit Gazette and Fruit Times at

<https://extension.psu.edu/strawberry-anthracnose-better-understanding-and-management>

RESOURCES FOR STAY UP TO DATE WITH THE LATEST INFORMATION

- **1-800-PENN-IPM hotline** has expanded its menu options for the 2020 production season. Dial 1-800-PENN-IPM (1-800-736-6476) and select from a range of crop groups and topics from vegetables (onion, tomato/potato, sweet corn, vine crops), small fruit, tree fruit, to greenhouse IPM and hear weekly updated 90 second voice messages with the latest information on crop, pest and disease management to help you through the growing season. In addition, find updates on Coronavirus for produce growers and private pesticide applicator information.
- **Sign-up with Penn State Extension** to receive the latest news and information on vegetable and small fruit crop production as well as pest and disease management either electronically at <https://extension.psu.edu/forage-and-food-crops/vegetables> or by phone at 1-877-345-0691.
- **Cucurbit downy mildew alerts** can be obtained by email or text message by signing up at <https://cdm.ipmpipe.org/alerts/>. You can specify the distance from your farm for which you would like to receive reports. NOTE: If you signed up for alerts in a previous to 2020 then you will need to sign-up again due to a website upgrade.
- **The 2020-2021 Mid-Atlantic Fruit and Vegetable Production Recommendations** contains the latest information to help commercial vegetable growers in the mid-Atlantic regional make production and pest management decisions. The hardcopy can be purchased either online at <https://extension.psu.edu/commercial-vegetable-production-recommendations> or by calling 1-877-345-0691. Individual sections are also available for download at <https://extension.psu.edu/mid-atlantic-commercial-vegetable-production-recommendations-sections>. This publication will now be updated every other year so the next update will be in 2022.

Sweet Corn Insect Pest Monitoring

Shelby Fleischer, Extension Vegetable Entomologist, Penn State University

Interactive Maps with Google style view at <http://www.pestwatch.psu.edu/sweetcorn/tool/index.html>

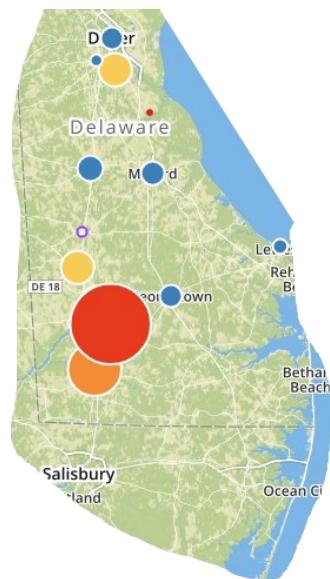


Corn Earworm



Corn earworm (CEW) catch is strong in southern Delaware, suggesting successful overwintering in the DelMarVA. Positive values also occurred in southeastern PA (Bucks and Lancaster counties) and along the Hudson river. Overall, catch in PA is low to absent. Tasseling and silking corn will be very attractive. Moths will also lay eggs on many host plants when corn is not available. Tomatoes and hemp make a good host (CEW is also known as "tomato fruitworm").

ECB feeding damage.



European corn borer (ECB) counts are low. Scout for feeding damage and shothole patterns.

Fall armyworm (FAW) counts are low. Captures this time of year may be the non-target capture of wheathead armyworm, which is not a pest.

Average weekly catch –moving average for the last 7 days. The average catch per night (catch/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. Shaded cells indicate no trap for that site.



Catch Per Week	Spray Frequency (Days)
1-13	7+
14-35	5-6
36-70	4-5
71-349	3-4
> 350	2-3

Weekly thresholds based on spraying recommendations for corn earworm.

County	Town/Farm	CEW			ECB			FAW		
		27-May	3-Jun	10-Jun	27-May	3-Jun	10-Jun	27-May	3-Jun	10-Jun
Bucks	Bedminster	null	null	3	null	null	0			
Centre	Rock Springs	null	null	0	null	null	0	null	null	0
Lancaster	Landisville	null	null	0.6	null	null	1.2	null	null	0
Lancaster	Neffsville	null	null	0	null	null	0	null	null	0
York	York	null	null	0	null	null	0	null	null	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