PENNSYLVANIA VEGETABLE MARKETING & RESEARCH PROGRAM

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Pennsylvania Vegetable IPM Weekly Update

September 2, 2020

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

- Late last week **late blight** was confirmed in Chautauqua County, NY on both tomatoes and potatoes. Late blight is characterized by lesions that are irregularly shaped and initially water-soaked and pale green before turning gray-brown in color. Under humid conditions, the lesions on the underside of the leaves will sporulate giving them a white fuzzy appearance. The lesions will tend to develop on the upper to middle part of the plant canopy as opposed to early blight or Septoria leaf spot (tomato only) that start on the lower leaves and move upwards often defoliating the plant if left unmanaged. Early blight lesions have more well-defined margins and are more circular in shape with tight concentric rings and may be surrounded by yellowing leaf tissue. Fungicide programs that include protectants like mancozeb or chlorothalonil will also help protect against late blight. Many of the products that are recommended for downy mildew on cucurbit crops are also recommended for late blight on tomato and potato including Orondis Opti, Ranman, Previcur Flex, etc. A more complete list of recommended fungicides can be found in the 2020-21 Mid-Atlantic Commercial Vegetable Production Recommendations. If you are done with harvest and in a county close to the confirmed report, consider disking under the crop or burning it down with an herbicide so the field does not unknowingly become a source of inoculum since you are no longer actively scouting. Keep in mind that late blight can also develop in late season tomato high tunnels. Heavy dew and high humidity can provide enough moisture for disease development. If you suspect late blight on your farm please let me know either by email at bkgugino@psu.edu, by phone at 814-865-7328 or contact your local Extension Office.

Whitish sporulation characteristic of late blight on the bottom of potato leaves. Photo credit: Beth Gugino.

- **Downy mildew on cucumber** is widespread across Pennsylvania with **one report on butternut squash** in Blair Co. Regular scouting remains critical. At this time, it is recommended that targeted downy mildew specific fungicides should be used on all cucurbit crops including pumpkin especially if still several weeks away from harvest and conditions are favorable for disease. Almost all of Pennsylvania has been at moderate to high risk over the past several days. Although downy mildew does not directly affect the fruit it can quickly defoliate the plants under favorable conditions leaving the fruit subject to sunburn or not fully ripen. Make sure to rotate FRAC codes to minimize potential development of fungicide resistance. Forecast maps are updated three days a week on Monday, Wednesday and Friday at http://cdm.ipmpipe.org. If you suspect that you may have downy mildew, please let me know by email at bkgugino@psu.edu or by phone at 814-865-7328 or contact your local Extension Office.

- As pumpkin harvest begins, there have been several reports of **pumpkin fruit rots** which can be caused several bacterial and fungal diseases. Some growers are seeing small circular whitish lesions on the pumpkin fruit. Depending on the cultivar, they can be surrounded by dark margin or sometimes a more orangish-yellow to tan margin if the cultivar has a white rind. These are likely the result of **bacterial leaf spot** caused by *Xanthomonas cucurbitae* or **angular leaf spot** caused by *Pseudomonas syringae* pv. *lachrymans* which infected the pumpkins earlier in the growing season. Both are foliar diseases and the fruit become infected when the bacteria are splash dispersed from the leaves onto the fruit or transferred during via passing equipment or people. The bacteria will colonize the lenticels on the fruit surface and under favorable conditions multiply and lead to the development of visible symptoms. The lesions can expand, and exudates can ooze from the lesions and dry on the outside of the fruit. Secondary organisms can also infect and lead to soft rot. Both pathogens are thought to be seedborne but the impact on disease development is not well understood. Efforts are being made at several universities to better understand the epidemiology of these bacterial diseases and to identify a potential seed treatment protocol since cucurbit seed *is too sen*sitive to hot water treat. A 2-year minimum crop rotation is recommended to allow the crop residue to thoroughly decompose. Applications of copper tank mixed with mancozeb beginning at fruit set through expansion will help reduce fruit symptoms, however thorough coverage of the leaves and fruit is necessary. Several university research trials have also demonstrated a reduction in fruit symptoms with the application of Actigard, a plant defense inducing product, in addition to copper prior to disease onset.

Bacterial spot symptoms on pumpkin fruit. Photo credit: PA Veg Grower in Bucks Co.

Pythium fruit rot on immature pumpkin fruit. Photo credit: John Esslinger.

Sclerotinia fruit rot on pumpkin. Photo credit: John Esslinger.

Fruit rots can also be caused by **Phytophthora blight**, **Plectosporium blight**, **black rot** (fruit rot phase of Gummy stem blight), **Fusarium rot**, **Pythium rot**, and **Sclerotinia rot** among others. For many of these diseases, direct contact between the soil and the fruit is the primary site of infection and complete fungicide coverage is nearly impossible after canopy closure. Growing pumpkins in a reduced tillage system or having a mulch barrier between the fruit and soil can help to reduce losses from fruit rots caused by soilborne pathogens. Maintain a 3+ year crop rotation out of pumpkin and in some cases rotations with grain crops are recommended due to wide host ranges (e.g. Sclerotinia rot). Managing foliar symptoms will also help reduce losses to fruit rots. Harvest mature fruit as soon as possible to avoid "storing" them in the field. Store fruit in a cool, shaded, and dry location. In general, post-harvest fruit washing is not recommended. The infection occurred in the field so washing it will not eliminate that pathogens and may spread the pathogens making potential losses worse.

Yellow Striped Armyworm Outbreak

An outbreak of Yellow Striped Armyworm (YSAW) has occurred in potatoes, along the Susquehanna River, north of Harrisburg. High populations have defoliated fields up to 30 acres in size.
The yellow striped armyworm, *Spodoptera ornithogalli*, overwinters in southern areas and migrate northward each year. Eggs, larva, and adults are killed by freezing temperatures. Pupa can withstand colder temperatures, and this species overwinters in North Carolina and Kentucky. In warm winters, migrants may reach our area earlier, and complete more generations. It is not new to have YSAW in our area. What is new is to see it reaching high enough numbers to be considered a pest. The geographic distribution of this species reaching pest status has historically been limited to southern states, the Caribbean, Mexico, and South America.

YSAW has an extremely wide host range. A short list includes asparagus, bean, beet, crucifers, cucurbits, tomato, alfalfa, small fruit, peach, wheat… the literature includes many more. Important weed hosts include dock, horseweed, lambsquarter, plantain, and pigweed. In recent years, we have seen YSAW causing significant problems in tomatoes, and the text in this alert is from an alert about YSAW in tomatoes written with Steve Bogash in 2012. But it is relatively rare to see YSAW causing major problems in potatoes.
Adults look very much like the adult form of fall armyworm. The wingspan is 1.3 to 1.6 inches. Front wings have a complex pattern of brown, tan and grey areas. Adults are difficult to distinguish from its relatives (such as the fall armyworm), but the larvae are distinct. Larvae have a yellow stripe running longitudinally along their body. Less distinct stripes are below that, including a pink stripe above the prologs. Black triangles are positioned above the yellow stripe on most abdominal segments.

In Kentucky, adults are active in April or May. Eggs are laid in clusters of 200-500 eggs per cluster, on the underside of leaves. Females are capable of depositing up to 3000 eggs. Young instars initially are gregarious, and later disperse, sometimes using silk strands carried by the wind, as they mature. There are typically 6 instars. Typical life cycles in Kentucky are 5-7 days in the egg stage, about 3 weeks as larvae, followed by pupation, and 3 to 4 generations per year.

Yellow striped armyworm causing field scale defoliation in potatoes. Photo: Bob Leiby, August 28, 2020

Resistance is very common in its relative, the fall armyworm. Insecticidal control can be expected to be more effective when targeting early instars. Scout for early signs of infestation. In southern states, problems tend to start in the vegetative stage of plants. However, the larvae may move rapidly to fruit. In Florida tomatoes, the recommendation is to treat with an insecticide if there is one larva or more per six plants before bloom; after bloom, treat if one egg or larva is found per field. Pheromone lures might help. Great Lakes IPM carries a pheromone lure for yellow striped armyworm. Also, the lure currently used to trap the Western bean cutworm is capturing yellow striped armyworm adults. Field research should be conducted to determine if the lure is sufficiently selective – does it only, or mostly, attract yellow striped armyworms, or do we have a significant non-target capture in our area. Another option is to use blacklight traps, but you would need to sort through the captures of many species.

YSAW damaging tomato, 2012. Photo by Steve Bogash, Penn State Extension.

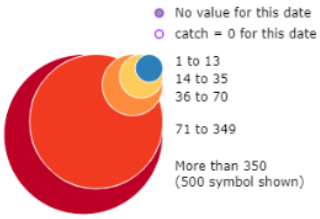
Adult YSAW. Photo Marlin Rice, Iowa State

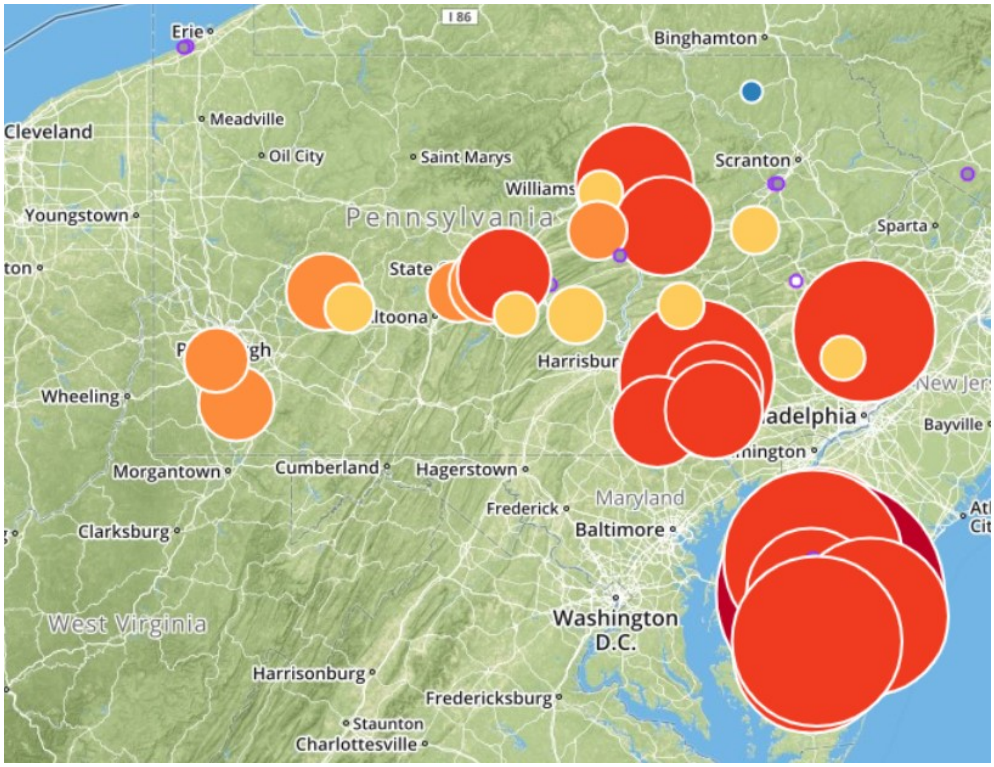
Larva of YSAW, showing strong yellow stripe and pale pink stripe (left, photo B. Lingbeek), and black triangles positioned above the yellow stripes (photo by Steve Bogash). Colors will vary among specimens.

Sweet Corn Insect Pest Monitoring

Shelby Fleischer, Extension Vegetable Entomologist, Penn State University

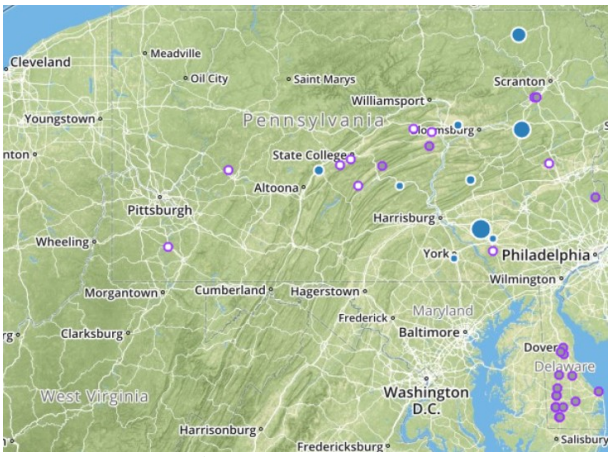
Interactive Maps with Google style view at http://www.pestwatch.psu.edu/sweetcorn/tool/index.html



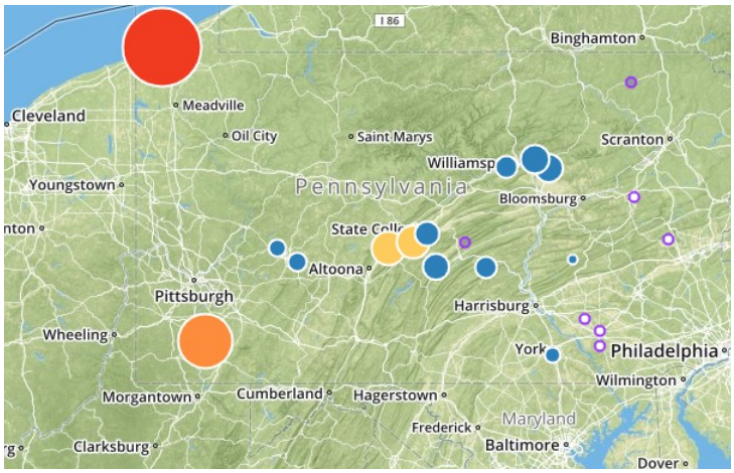


CEW map on Sept. 2. Erie also has high counts from earlier maps. Circle color aligns with CEW thresholds; size is proportional to catch.

Corn earworm (CEW) continue to be above spray thresholds. Almost all sites are, or have recently been, above a spray threshold. About half the sites increased this past week. About a third of the sites suggest spray frequencies of > 1 per week. Pyrethroid resistance can be a problem. Use materials with a low bee toxicity rating ('Bee TR' in the Veg Guide) when bees are working tasels. Along with controlling worm pests, scout for BMSB, sap beetles, or silk-clipping beetles, and consider pyrethroids or a premix of a worm material and pyrethroid (eg., Besiege or Elevest) for those species.



ECB counts are low. The second generation did not materialize.



FAW map from Aug. 31, to also include the high count in Erie. FAW has been increasing in multiple sites – see table, below.

TRAP COUNTS: 7-day moving average: catch/nights-trapping/number-of-nights-with-data, times 7. Gray = no trap for that site. Yellow to brown are sites above CEW threshold or hotspots for ECB or FAW. **Increasing color intensity suggests tighter spray intervals.**

		CEW			ECB			FAW		
County	Trap Name	19-Aug	26-Aug	2-Sep	19-Aug	26-Aug	2-Sep	19-Aug	26-Aug	2-Sep
Blair	Tyrone	14	0	39	0	4	2	5	0	17
Bucks	Bedminster	30	7	210	0	0				
Centre	State College	94	28	90	0	2	0	4	4	11
Centre	Rock Springs	30	13	64	0		0	5	2	22
Clinton	Loganton	24	23	36	0	1	0			
Erie	Fairview	12	23					8	3	
Erie	Lake City	30	51					29	92	
Fayette	Brownsville		64	59		5	0		15	44
Indiana	Brush Valley	118	34	25				6	1	7
Indiana	Creekside	136	17	61	0	0	0	13	8	3
Juniata	Port Royal		55	34		3	2		2	7
Lancaster	Landisville	24	16	247	5	2	9	0	0	0
Lancaster	Neffsville	31	40	98	0	1	1	0	0	0
Lancaster	New Danville	85	61	97	1	3	0	0	0	0
Lehigh	Germansville	4		0	0		0	0		0
Luzerne	Drums	47	18	24	5	12	7	0	0	
Luzerne	Plains	74			0					
Lycoming	Linden	45	32	18				7	0	6
Lycoming	Montoursville	65	82	102				1	2	12
Lycoming	Muncy	87	375	56				3	2	12
Mifflin	Belleville	58	22	20	2	0	0	12	1	12
Montgomery	Souderton	7	25	20						
Montour	Washingtonville	13	14	101	0	5	2			
schuylkill	Tower City		39	22		12	2		0	1
Susquehanna	Montrose	5		5	17		5			
Union	New Berlin	28	56		5	1				
Union	Lewisburg				3	0	0			
Washington	Venetia	183	57	43						
York	York	87	80	85	0	2	1	0	2	4

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			ECB	
	Catch/Week	Spray Frequency		Catch/Week	Spray Frequency
Very very low	1-13	7 – or no spray		<15	7 – or no spray
Very low	14-35	5-6		15-35	6
Low	36-70	4-5		36-70	5
Moderate	71-349	3-4		>70	4
High	>350	2-3			

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