

# NEWS

May 2022 / Volume 45 Number 5

for the commercial vegetable, potato and berry grower



**Mission**

To serve Pennsylvania's commercial vegetable, potato and berry growers through education, research, advocacy and promotion.

**Vision**

To be the driving force in ensuring the future viability of the commercial vegetable, potato and berry industries in Pennsylvania.

**PVGA is ...**

... an association of commercial vegetable, potato and berry growers and allied industry personnel dedicated to:

- Providing educational resources and opportunities for its members
- Supporting practical research
- Promoting growers and their products
- Representing the interests of the Pennsylvania vegetable, potato and berry industries
- Providing special services for members



**Education**

Providing educational opportunities for Pennsylvania commercial vegetable, potato and berry growers is the core of PVGA's mission. We provide a weekly email update, a monthly newsletter, and an annual convention and trade show. PVGA also sponsors local grower meetings and a farm market bus tour.

**Research**

Funding practical research on vegetable and berry production issues is also a priority for PVGA. Over the past 33 years, the Association has contributed over \$1.3 million to support research to help keep growers profitable.

**Advocacy**

PVGA is the organized and common voice of the Pennsylvania vegetable, potato and berry industries that seeks to represent the interests of growers to government officials, Penn State University administrators and the general public.

**Promotion**

PVGA supports various promotion efforts for Pennsylvania grown produce. Its food booth at the Pennsylvania Farm Show serves various vegetable and small fruit products to thousands of consumers each year.

## PVGA Website Reconstructed

Over the past year, Gregg Robertson with Conewago Ventures, in cooperation with PVGA staff has been working on reconstructing and improving the PVGA website at [www.pvga.org](http://www.pvga.org). One of the characteristics of a website for an organization like PVGA is that it is never "finished" as new material must be constantly added to keep it up to date and useful. However, we feel we now have the basic structure in place and will be working to keep it current to serve as an informational resource for members and an introduction to the Association for prospective members.

In the main menu across the top, the first selection is "News" which links to listing of recent news posts from the Association – reports from the recent director's meetings, scholarship announcements, etc.

Education ▾ Service

Newsletter

Email Update

Convention

Local Meetings

Farm Market

Tours

Grower Resources

Convention Videos

Virtual Farm Tours

The second selection is "Education" – the Association's top priority – which lists the various educational activities and resources the Association provides to its members and the grower community. First is the "Newsletter" which includes links to all the newsletters for the past ten years. The newsletters from the past year are only accessible to members with the password for the year which was emailed to all members with email addresses on file. The newsletter page also contains a link to a searchable index of all the articles published in the newsletter since 2009.

Next under "Education" is the "Email Update" which contains links to recent copies of the Update. Follow-

ing that is a page describing PVGA's main educational event - the Mid-Atlantic Fruit and Vegetable "Convention" - with links to the main Convention website at [www.mafvc.org](http://www.mafvc.org). The fourth selection describes the "Local Meetings" sponsored by the Association while the fifth reviews the "Farm Market Tours" supported by PVGA.

Sixth is the "Grower Resources" which links to resources for Vegetable Growers (a listing of links to vegetable production information from various universities), Potato Growers (a listing of links to various online potato information and research reports) and Berry Growers (again, a listing of links to various small fruit information resources). We are currently working with Penn State Extension to make additional Extension resources readily available to growers in the Grower Resources section.

Continued on page 3

## GENERAL



*Pennsylvania  
Vegetable Growers  
Association*

*An association of  
commercial vegetable,  
potato and berry growers.*

*President*

**Rita Resick '23**  
*Somerset*

*First Vice President*

**Peter Flynn '24**  
*West Chester*

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**Tina Forry '25**  
*Palmyra*

*Secretary-Treasurer*

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**Christopher Harner '23**  
*State College*

**Barron Hetherington '25**  
*Ringtown*

**Alan Kemmerer '25**  
*Berwick*

**Arthur King '24**  
*Valencia*

**Amy Metrick '24**  
*Butler*

**Michael Orzolek '24**  
*State College*

**Christopher Powell '23**  
*Strasburg*

**John Shenk '23**  
*Lititz*

**Robert Shenot '25**  
*Wexford*

**Jeffrey Stoltzfus '23**  
*Atglen*

**Jonathan Strite '25**  
*Harrisburg*

**Mark Troyer '24**  
*Waterford*

**Joel Weaver '23**  
*Windber*

*Executive Director*

**William Troxell**  
*Richfield*

## In Memory

### Fred "Ted" Dymond



PVGA member and former Director, Fred W. Dymond, 78, of Dallas, passed away, Monday, May 2, 2022, in Geisinger Wyoming Valley Medical Center.

Born in Wilkes-Barre, he was the son of the late Fred and Miriam Moore Dymond and was a graduate of Westmoreland High School, Class of 1961.

Fred was a member of The Orange United Methodist Church and also Dymond Hollow Church. He was the co-owner and operator of Dymond's Farm and Dymond's Farm Market & Bakery. He was also a member of Daddow Isaacs American Legion Post 672, Dallas, and the Dallas Kiwanis where he was past president. He was a supervisor of Franklin Township. Some of his favorite hobbies were hunting, fishing and playing cards. He very much enjoyed morning coffee at McDonald's with friends. He was a devout Christian and a proud patriot. Fred served his country proudly with the Marine Corps in the Vietnam era.

He was preceded in death by his sister, Sherrill "Kay" Redmond; his father, Fred W. Dymond; his mother, Miriam M. Dymond; nephew, Carl Altemus; and nephew, John Reilly; and his two beloved dogs, Missy and Ricky.

Surviving are daughters, Samantha Dymond and Alicia Dymond; brother, Timothy Dymond; sisters, Cinda Dymond; and Kathleen Altemus; and several nieces and nephews.

Donations can be made to Orange United Methodist Church or Dymond Hollow Church. Condolences may be made at [Disquefuneralhome.com](http://Disquefuneralhome.com).

*From the Citizens Voice, May 4, 2022.*

## Sara Hricko Begins as New Extension Educator



Sara Hricko joined the Penn State Extension Horticulture Unit on April 1. She is based in the Columbia County office and is a member of both the Vegetable, Small Fruit, Mushroom and Pollinator team and the Tree Fruit team. She fills the position previously held by John Esslinger, who retired.

As a local tree fruit grower, Sara is thrilled to be joining the Penn State Extension team to use her education and experience to help other growers in the state. From tree fruit to vegetables to mushrooms, Sara Hricko's background is diverse. She holds a bachelor's degree from Penn State in Plant Science and focused on Plant Pathology and mushroom science during her time there. Sara led an undergraduate project which looked at a mushroom's ability to absorb materials present in its environment and whether or not it would cause the mushroom to become toxic. Next, Sara worked on Fusarium Root Rot disease of asparagus and ginseng at Michigan State while pursuing a master's degree in Plant Pathology. Following her education, she moved back to Pennsylvania and co-managed the family fruit farm with her husband. There she focused

on improving IPM strategies as well as implementing precision agriculture tactics for tree fruit thinning and pruning. In addition, she improved retail market management and did lots of tractor driving!

Apart from work and school, Sara is also fluent in French and enjoys cooking and gardening.

PVGA is pleased to have this important extension position for growers in the central Susquehanna Valley and northeastern counties filled.

*The Pennsylvania Vegetable Growers News is the official monthly publication of the  
Pennsylvania Vegetable Growers Association, Inc.,*

*815 Middle Road, Richfield, PA 17086-9205*

*Phone and fax: 717-694-3596 • Email: [pvga@pvga.org](mailto:pvga@pvga.org) • Website: [www.pvga.org](http://www.pvga.org)*

### **Our Mission:**

*The Pennsylvania Vegetable Growers Association serves Pennsylvania's commercial vegetable, potato and berry growers through education, research, advocacy and promotion.*

### **Our Vision:**

*The Pennsylvania Vegetable Growers Association will be the driving force in ensuring the future viability of the commercial vegetable, potato and berry industries in Pennsylvania.*

*Inquiries about membership, this publication or advertising rates should be directed to William Troxell, Executive Director, at the above address.*

## PVGA Website Reconstructed *continued from page 1*

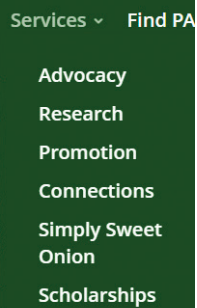
### Email Update



The Association sends its weekly PVGA Update to all members who provide their email address to the Association. The Update features links to information or articles of interest to growers, announcements of upcoming events and a classified section. When needed, such as during the beginning of the COVID-19 pandemic, special Updates are issued mid-week or daily. See recent issues of the PVGA Update below.

May 21, 2022  
May 14, 2022  
May 7, 2022  
April 30, 2022

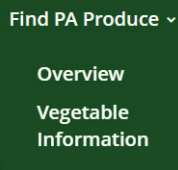
Finally are pages linking to a series of videos of sessions from the 2018 Mid-Atlantic Fruit and Vegetable Convention and three virtual Farm Tours at Janoski Farms in Clinton, Drums Produce in Bloomsburg and Sunrise Acres Produce in Ephrata. These videos are also password protected and only available to PVGA members.



The next selection on the main menu is "Services". This dropdown menu opens pages that outline additional services that PVGA provides to members. The first one is "Advocacy" which provides links to the Association's current legislative priorities and the Policy Resolutions adopted at the Annual Meetings. Second is the "Research" page which lists the current research projects being funded by the Association as well as a link to the research reports from previous years.

Third on the "Services" menu is the "Promotion" page which outlines the Association's direct promotion efforts at the Farm Show and Ag Progress Days as well links to the PAVeggies.org website promotion resources and directories. Next is a "Connections" page with links to various government websites and industry organizations.

The fifth selection is "Simply Sweet Onion" which outlines the Association's trademarked branded onion program. Finally, the last "Service" selection is "Scholarships" which outlines PVGA's Rudolph Grob Memorial Scholarship program.



The "Find PA Produce" main menu selection contains links to consumer information about Pennsylvania vegetables on the PAVeggies.org website maintained by the Pennsylvania Vegetable Marketing and Research Program. While the pvga.org website is designed particularly for commercial growers, PAVeggies.org website is designed

specifically to give consumers information about Pennsylvania vegetables and includes recipes and market directories. Since computer search engines may lead consumers inadvertently to the PVGA website, we wanted to include links to the vegetable website designed for consumers.

The final selection on the main menu is "About PVGA" where the first submenu choice is "Join PVGA". This page details what benefits are available to PVGA members along with a link to the form to actually join the Association online. The second choice is "Leadership" leading to a page describing the Association's structure and links to the lists of the current officers and directors (with pictures and short biographies), the past presidents and

#### About PVGA ▾

Join PVGA  
Leadership  
Awards  
Member Directory  
Ex. Dir. Posting  
Contact

the current committee members. The third selection, "Awards" leads to page where readers can assess lists, pictures and short biographies of people who have received the Young Growers Award, the Annual Award and Life Memberships. Fourth is the link to the Member Directory – a searchable database of current PVGA members accessible only to members with the password.

As a temporary feature, the fifth selection is a link to the job posting for the PVGA Executive Director position. Finally is the

"Contact" link leading to the form where people who want to contact the Association can email their question to PVGA.

Although they are not visible to the average user, the website also contains informational resources for the Convention Planning Committee and the Executive Director Search Committee.

If you have internet access, please take some time to check out the [www.pvga.org](http://www.pvga.org) website. Tell us what you think – and how we can improve it.

## PVGA Executive Director Applications Being Accepted

The PVGA Search Committee is actively reviewing applications for Executive Director. Although a good selection of applications have been received, new ones will still be considered. Candidates with an agricultural /horticultural background and/or experience/familiarity with association management are preferred. If you would be interested in applying yourself, or know someone who would be a good fit for the position, please see the full position description and application instructions at [www.pvga.org/executive\\_director](http://www.pvga.org/executive_director) or call us at 717-694-3596.

## IPM Weekly Update Available

The Pennsylvania Vegetable IPM Weekly Update is a week publication from the Pennsylvania Vegetable Marketing and Research Program that contains current disease control information from Dr. Beth Gugino at Penn State and the current trap counts from the sweet corn insect pest trapping network. A new feature this year will be the Clinic Corner where Jennie Mazzone will review a recent disease diagnosed in the Penn State Plant Disease Clinic. The Update also includes a biweekly review of Current Issues in Vegetables and Berries from Penn State Extension specialists. Growers who wish to receive the IPM Weekly Update directly by regular mail, fax or email should contact PVGA at 717-694-3596 or [pvga@pvga.org](mailto:pvga@pvga.org).

## Weekly Pest Management Teleconference

Steve Bogash of Marrone Bio Innovations is hosting the third season of weekly pest management education teleconferences. These calls are for growers, retailers and crop consultants. The calls will last 30 minutes and begin at 12:30 p.m. The first 15 minutes is reports on seasonal and active pest management challenges in vegetables and small fruit. Then the call is open to discussion and Q & A. The calls will be recorded and accessible thru the playback number below. Guest experts are often be on the calls with a schedule to follow soon.

**Call-In Number:** 681-999-0224, Access Code: 832191

**Playback Number:** 757-841-1091, access code: 832191

## NEWS

## USDA Announces Initiative, Invests \$22.5 Million in Water Quality Improvements in Chesapeake Bay

The U.S. Department of Agriculture (USDA) announced it will invest an additional \$22.5 million in conservation assistance in fiscal year 2022 to help farmers boost water quality improvements and conservation in the Chesapeake Bay watershed. The new Chesapeake Bay States' Partnerships Initiative will support Bay-area farmers, building on a \$1.1 billion investment made by USDA's Natural Resources Conservation Service (NRCS) over the past decade. USDA is also announcing a new task force – jointly with the U.S. Environmental Protection Agency (EPA) – to better quantify the voluntary conservation efforts of farmers in the Bay watershed.

Robert Bonnie, USDA's Under Secretary for Farm Production and Conservation, announced the new initiative, investment, and task force at the Chesapeake Bay Commission's meeting today in Lancaster.

"Farmers in the Bay are voluntarily implementing conservation on their farms that is helping to curb sediment and nutrient loss and improve water quality in the Chesapeake Bay watershed," Bonnie said. "There is still more work to be done and USDA is committed to continuing to support Bay producers and harnessing the power of partnership to ensure meaningful and lasting improvements for the future."

"For farmers here in south central Pennsylvania working to reduce nutrient runoff while facing a challenging economy, this USDA investment is a game-changer for developing practices to improve water quality in the Chesapeake Bay Watershed. Farmers are leading stewards of the land and have a critical understanding of the best way to protect our waterways while simultaneously improving their bottom line," said Sen. Bob Casey. "Thanks to USDA and the funding I secured in the recently-passed spending bill, Pennsylvania farmers will receive increased and targeted conservation assistance, ensuring they prioritize cost-effective practices which restore water quality and improve on-farm resiliency. I'm going to keep working to ensure our state does its part to clean up the Bay, fight the climate crisis and support farmers."

### Chesapeake Bay States' Partnership Initiative

This new initiative exemplifies the approach of voluntary, locally led conservation that the Biden administration has prioritized through the America the Beautiful Initiative. The Chesapeake Bay States' Partnership Initiative will provide a new and innovative framework to leverage USDA conservation financial and technical assistance, locally led conservation, and coordination with state partners.

For fiscal 2022, NRCS is providing \$10 million from the Environmental Quality Incentives Program (EQIP), \$10 million from the Agricultural Conservation Easement Program (ACEP) and \$2.5 million from the Conservation Stewardship Program (CSP).

NRCS will address resource concerns based on a locally led approach and continue to use a targeting process, developed by the NRCS State Technical Committee, to ensure funds are awarded to priority watersheds within the Chesapeake Bay watershed.

Through this Initiative, NRCS will prioritize support of practices that reduce nitrogen and sediment, improve management of livestock and waste, and conserve wetlands, all of which align with the Bay's water quality objectives to reduce nutrient loading, restore wetlands and install riparian buffers. Practices include riparian buffers, cover crops, waste storage facilities, and prescribed grazing, among others.

This funding will allow states to respond to the high demand from Bay area farmers for additional conservation support, as well as offer new and targeted sign-ups. NRCS will also work with USDA's Farm Service Agency (FSA) to identify needs and opportunities for buffer management on acres that may be coming out of the Conservation Reserve Program (CRP).

### Task Force on Crediting Chesapeake Bay Conservation Investments

In addition to the establishment of the new initiative and the additional funding for fiscal year 2022, USDA and EPA are establishing a new federal Task Force on Crediting Chesapeake Bay Conservation Investments. The Task Force will work over the next year to identify improvements to more fully credit farmers' conservation efforts in cooperation with the Bay States and the agricultural community.

"We appreciate USDA's extensive investments that support farm conservation efforts that benefit farmers, local streams, and the Chesapeake Bay," said Adam Ortiz, EPA Mid-Atlantic Regional Administrator. "EPA and USDA are united in our commitment to give farmers the credit they deserve. Together, we will work with our federal, state, and agricultural partners to find solutions that follow the Chesapeake Bay Program partnership's process and accounting protocols."

The Task Force will develop an action plan that is responsive to the needs of the Bay states and agricultural community. Solutions will maintain the scientific integrity of the Chesapeake Bay Program partnership's decision-making process and accounting tools and ensure producer privacy is protected. The Task Force will leverage findings from successful data sharing pilots and look for opportunities to integrate time-saving technologies to identify conservation practice implementation.

### Conservation in the Chesapeake Bay Watershed

Between 2018 and 2020, NRCS helped farmers implement conservation on 1.26 million acres in the Bay watershed. That's the size of Grand Canyon National Park.

Over a decade (from 2006 to 2016), farmers in the Bay watershed made significant increases in the adoption of structural practices, conservation tillage, and cover crops that reduced sediment loss, surface losses of nitrogen and phosphorus from cropland fields and increased per acre carbon stored in cropland soils by 69%.

Application of edge-of-field practices nearly tripled, from 9.6% to 28.3% of cropland acres using a riparian buffer, field border, filter strip, or critical area planting.

Cover crop use increased nearly 11-fold, from 3% to 33% of acres using cover crops in their crop rotation.

No till increased by 52% and conventional tillage decreased by 61%. Conservation tillage of all types were being implemented on 82% of acres in the Bay watershed.

Meanwhile, FSA's Conservation Reserve Enhancement Program (CREP), part of CRP, has enabled conservation partners and producers to provide natural resources benefits in Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia. Currently, more than 155,000 acres are enrolled in buffer, grass, and tree practices designed to improve water quality and wildlife habitat.

### CREP highlights include:

In Delaware, one-tenth of all waterways have a CREP conservation buffer.

In Maryland, acreage enrolled in CREP has annually reduced sediment loading into streams from agricultural lands by more than 28,000 tons in 2021.

In Pennsylvania, acreage enrolled in CREP has annually reduced sediment loading by more than 38,000 tons in 2021.

In Virginia, over 1,745 acres have been enrolled in permanent state conservation easements that extend the benefits of CREP since 2004.

To learn more, visit NRCS' Chesapeake Bay webpage or download fact sheets for CREP, EQIP, ACEP and CSP.

# BiO 360

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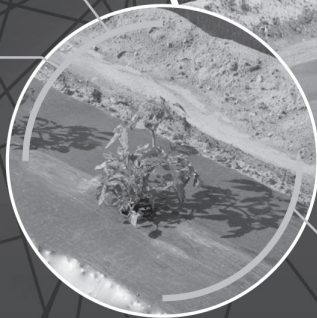
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Several thicknesses available



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 1-844-4BIO360 (1-844-424-6360)



## NEWS

## USDA to Pay \$6 Billion for 20 and 21 Natural Disasters

The U.S. Department of Agriculture (USDA) has announced that commodity and specialty crop producers impacted by natural disaster events in 2020 and 2021 will soon begin receiving emergency relief payments totaling approximately \$6 billion through the Farm Service Agency's (FSA) new Emergency Relief Program (ERP) to offset crop yield and value losses (See <https://www.fsa.usda.gov/programs-and-services/emergency-relief/index>).

On September 30, 2021, President Biden signed into law the Extending Government Funding and Delivering Emergency Assistance Act (P.L. 117-43), which includes \$10 billion in assistance to agricultural producers impacted by wildfires, droughts, hurricanes, winter storms, and other eligible disasters experienced during calendar years 2020 and 2021. FSA recently made payments to ranchers impacted by drought and wildfire through the first phase of the Emergency Livestock Relief Program (ELRP). ERP is another relief component of the Act.

For impacted producers, existing Federal Crop Insurance or Noninsured Crop Disaster Assistance Program (NAP) data is the basis for calculating initial payments. USDA estimates that phase one ERP benefits will reach more than 220,000 producers who received indemnities for losses covered by federal crop insurance and more than 4,000 producers who obtained NAP coverage for 2020 and 2021 crop losses.

**ERP Eligibility – Phase One** - ERP covers losses to crops, trees, bushes, and vines due to a qualifying natural disaster event in calendar years 2020 and 2021. Eligible crops include all crops for which crop insurance or NAP coverage was available, except for crops intended for grazing. Qualifying natural disaster events include wildfires, hurricanes, floods, derechos, excessive heat, winter storms, freeze (including a polar vortex), smoke exposure, excessive moisture, qualifying drought, and related conditions.

To streamline and simplify the delivery of ERP phase one benefits, FSA will send pre-filled application forms to producers where crop insurance and NAP data are already on file. This form includes eligibility requirements, outlines the application process and provides ERP payment calculations. Producers will receive a separate application form for each program year in which an eligible loss occurred. Receipt of a pre-filled application is not confirmation that a producer is eligible to receive an ERP phase one payment.

Additionally, producers must have several other forms on file with FSA within 60 days of the ERP phase one deadline, which will later be announced by FSA's Deputy Administrator for Farm Programs. Most producers, especially those who have previously participated in FSA programs, will likely have these required forms on file. However, those who are uncertain or want to confirm the status of their forms can contact their local FSA county office.

For crops covered by crop insurance, the ERP phase one payment calculation for a crop and unit will depend on the type and level of coverage obtained by the producer. Each calculation will use an ERP factor based on the producer's level of crop insurance or NAP coverage.

- **Crop Insurance** – the ERP factor is 75% to 95% depending on the level of coverage ranging from catastrophic to at least 80% coverage.
- **NAP** – the ERP factor is 75% to 95% depending on the level of coverage ranging from catastrophic to 65% coverage.

Applying ERP factors ensures that payments to producers do not exceed available funding and that cumulative payments do not exceed 90% of losses for all producers as required by the Act.

The ERP payment percentage for historically underserved producers, including beginning, limited resource, socially disadvantaged, and veteran farmers and ranchers will be increased by 15% of the calculated payment for crops having insurance coverage or NAP.

**Future Insurance Coverage Requirements** - All producers who receive ERP phase one payments, including those receiving a payment based on crop, tree, bush, or vine insurance policies, are statutorily required to purchase crop insurance, or NAP coverage where crop insurance is not available, for the next two available crop years, as determined by the Secretary.

**Emergency Relief – Phase Two** - The second phase of both ERP and ELRP programs will fill gaps and cover producers who did not participate in or receive payments through the existing programs that are being leveraged for phase one implementation. When phase one payment processing is complete, the remaining funds will be used to cover gaps identified under phase two.

Through proactive communication and outreach, USDA will keep producers and stakeholders informed as program details are made available.

**More Information** - Additional USDA disaster assistance information can be found on [farmers.gov](http://farmers.gov), including the Disaster Assistance Discovery Tool, Disaster-at-a-Glance fact sheet and Farm Loan Discovery Tool. For FSA and Natural Resources Conservation Service programs, producers should contact their local USDA Service Center. For assistance with a crop insurance claim, producers and landowners should contact their crop insurance agent.

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## Organic Certification Cost Share Available

Agricultural producers and handlers who are certified organic, along with producers and handlers who are transitioning to organic production, can now apply for the U.S. Department of Agriculture's (USDA) Organic and Transitional Education and Certification Program (OTECP) and Organic Certification Cost Share Program (OCCSP), which help producers and handlers cover the cost of organic certification, along with other related expenses. Applications for OTECP and OCCSP are both due October 31, 2022.

"By helping with organic certification costs – long identified as a barrier to certification – USDA has helped producers participate in new markets while investing in the long-term health of their operations," said Farm Service Agency (FSA) Administrator Zach Ducheneaux. "We launched the Organic and Transitional Education and Certification Program to build on the support offered through the Organic Certification Cost Share Program and provide additional assistance to organic and transitioning producers weathering the continued market impacts of the COVID-19 pandemic. This year, in response to stakeholder feedback, we have aligned the signup dates for these two organic programs and encourage producers to work with the local USDA Service Centers and State agencies to complete the applications. The FSA, and the USDA broadly, are committed to making sure our Nation's organic producers and handlers have the tools they need to continue positively shaping our local and regional food systems."

For more information on how to apply for OTECP and OCCSP assistance, view the USDA Farm Service Agency news release at <https://www.fsa.usda.gov/news-room/news-releases/2022/usda-accepting-applications-to-help-cover-costs-of-organic-transitioning-producers>.

Deadline to apply for both programs: October 31, 2022.

## State News Briefs

### PDA Enforcement of Hayride Attractions Will Start in 2023

Recently, the Pennsylvania Department of Agriculture issued a variance for hayride attractions from the requirement that a registered engineer certify such rides, but those attractions would still need to register with the Department and meet other standards, such as insurance coverage and inspection by a qualified person. After an inquiry from Pennsylvania Farm Bureau, the Department confirmed they will not perform enforcement actions of hayrides until 2023, and the Department is open to suggestions on other changes to technical safety standards.

The Department of Agriculture has the ability to regulate hayride attractions under the Amusement Ride Inspection Act. However, until recently, there has not been national standards for the inspection of hayride attractions. After ASTM, an international standards organization, developed those technical standards, the Department of Agriculture started informing operators of those standards and the related requirements under the Amusement Ride Inspection Act.

The Department's decision to start enforcement in 2023 will give operators time to adjust to these standards, and also for suggestions to be made. Pennsylvania Farm Bureau is reviewing these standards and will continue to work with the Department on possible changes, or legislative solutions, as necessary.

*From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, May 2022.*

### DEP Extends Energy Efficiency Rebate Program for Farmers

The Pennsylvania Department of Environmental Protection has extended the deadline for its rebate program for farmers that assists with the cost of energy efficiency projects.

The Agriculture Energy Efficiency Rebate Program is offering rebates to defray the costs of installing LED lighting or variable frequency drives on the farm, which can save energy while saving money on utility bills.

The rebate program has expanded its list of eligible equipment to now include all energy efficient ventilation equipment (including fans, motors, and controls such as variable frequency drives) and milk pumping equipment (including pumps, motors, and controls such as variable frequency drives).

Applications will be accepted through June 30, 2022, on a first-come, first-served basis as long as funding is available. The available rebates will pay for 50% of the equipment costs, up to \$2,000. Total funding to any one applicant will not exceed \$5,000. Interested ag producers should apply for a rebate voucher prior to purchasing and installing the equipment.

DEP has up to \$10,000 available for this program through State Energy Program funding from the U.S. Department of Energy.

All applications must be submitted online through the Electronic Single Application system. For complete program guidelines and application instructions, visit the DEP agriculture and farming energy webpage at <http://www.dep.pa.gov/agricultureenergy>.

*From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, May 2022.*

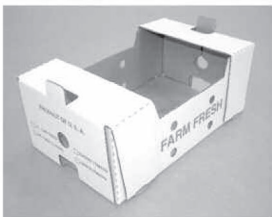
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#### *From Farmers To Repackers*

Whether you are ordering a case or a truck load, you can rest assured that we have the ability and capacity to service your orders quickly.



## GENERAL

## Springtime is Spray Time – Here are Some Tips for Better Spraying

Erdal Ozkan

Applying pesticides requires a high level of skill and knowledge. Increases in the size and complexity of sprayers over the years require even more attention to efficiency, efficacy, and safety. Although each crop requires a slightly different approach to the application of pesticides, some general principles apply to almost all spraying situations. Here are my top 10 recommendations (not in a particular order) that will make spraying efficient and effective resulting in a higher level of biological efficacy expected from pesticides applied:

Select the best nozzle type and size for the job. Although each component of the sprayer plays a role in achieving success in pesticide application, nozzles play the most significant role. Nozzles come in a wide variety of types and sizes. Each type is designed for a specific target and application. Most manufacturers' catalogs and websites have charts showing which nozzle type is best for a specific job. Any of the following factors may be the deciding one when selecting the most appropriate nozzle for the job: Sprayer operation parameters (application rate, spray pressure, ground speed); the type of chemicals applied (herbicide, insecticide, fungicide, fertilizers); mode of action of the chemical (systemic or contact) for spray coverage requirement; application type (broadcast, band, directed, air-assisted); risk of spray drift; and specific nozzle or droplet size requirement given on the product label. Once you determine the best nozzle that will be best for a specific spraying situation, you need to determine the appropriate size of that nozzle that provides the application rates (gal/acre) prescribed by product labels under various operating conditions (spray pressures and travel speeds). More information on selecting nozzle type and size is outlined in Ohio State University (OSU) Extension publication FABE-528, "Selecting the Best Nozzle for the Job." ([ohioline.osu.edu/factsheet/fabe-528](http://ohioline.osu.edu/factsheet/fabe-528)).

Carefully read and follow the specific recommendations provided in sprayer operator's manuals and labels of pesticides applied. For example, the labels of 2,4-D or Dicamba herbicides include specific requirements for nozzles and operating pressure ranges. If you use any other type and size of nozzle and operate them outside the pressure range requirements given by the pesticide manufacturers, you are violating the pesticide label, and therefore the law. Remember, the label is the law!

Keep spray drift in mind when spraying. Although complete elimination of spray drift is impossible, problems can be significantly reduced by awareness of the major factors that cause drift, while taking precautions to minimize their influence on off-target movement of droplets. The nozzle you select and the weather conditions at the time of spraying are the two most influential factors affecting generating as well as reducing spray drift. Keep nozzles as close to the target as possible while still producing a uniform distribution of spray on the target. If weather conditions (wind speed and direction, humidity, temperature, inversions) are not favorable, and there is concern about spray that might result in drift, wait until there is no longer that element of doubt. Extensive information related to factors influencing spray drift, is in OSU Extension publication FABE-525, "Effect of Major Variables on Drift Distances of Spray Droplets." ([ohioline.osu.edu/factsheet/fabe-525](http://ohioline.osu.edu/factsheet/fabe-525)).

Maximize pesticide deposit and coverage on the target which may be different part of the crop canopy. For example, when applying a fungicide to manage Fusarium head blight or "head scab," on small grains, the target is the head, not the leaves. On the other hand, when spraying for soybean sclerotinia stem rot (white mold), the most critical area that needs to be treated with fungicides is where flowering takes place. Nozzle selection has a

significant influence on whether or not the droplets reach the specific target location in the canopy. For example, the twin-pattern nozzles or a single flat-fan nozzle tilted at a forward angle of 30 to 45 degrees down from the horizontal is definitely best for the application of fungicides for wheat head scab. It is, however, the worst setup for soybean insects and diseases, such as aphids and white mold, respectively.

Slow down when spraying. Spray coverage is usually improved at slower speeds. The higher the travel speed, the greater likelihood of spray drift.

Calibrate the sprayer. A sprayer can only be effective, efficient, and safe if properly checked and calibrated well before the sprayer is taken to the field, and periodically during the spraying season. Some may argue that most sprayers are now equipped with sophisticated rate controllers and ground speed sensors, and calibration is not necessary. Unfortunately, not all electronic controllers can detect flow rate changes on each nozzle on the boom, and none can detect changes in spray pattern. The primary goal with calibration is to determine the actual rate of application in gallons per acre, and then make adjustments if the difference between the actual rate and the intended rate is greater or less than 5% of the intended rate. There are several ways to calibrate a sprayer. One easy method is explained in the OSU Extension publication FABE-520, "Calibrating Boom Sprayers." ([ohioline.osu.edu/factsheet/fabe-520](http://ohioline.osu.edu/factsheet/fabe-520)). Be safe. Wear protective clothing, goggles and rubber gloves, and respirators if required on the label, when calibrating the sprayer, doing the actual spraying, and cleaning the equipment.

Check uniformity of application. How uniformly the chemical is deposited on the target is as important as the amount applied. Maintain uniform deposition of spray material on across the entire width of the target area. Non-uniform coverage results from using misaligned or clogged nozzles, using nozzles with different fan angles, or from uneven nozzle height across the boom. These common problems result in streaks, untreated areas, or over-application of chemicals.

Understand how to calculate the amount of chemical product to mix in the tank. Although your sprayer may be in good condition and calibrated frequently, if the correct amount of chemical is not put into the tank, it can still result in unsatisfactory pest control. Detailed information on how to calculate the proper amount of chemical to add to the spray tank is provided in the OSU Extension publication FABE-530, "How Much Chemical Product Do I Need to Add to my Sprayer Tank." ([ohioline.osu.edu/factsheet/fabe-530](http://ohioline.osu.edu/factsheet/fabe-530)).

Take advantage of technological advancements in spray technology, such as GPS, automatic guidance systems, and independent control of nozzles using the PWM (Pulse Width Modulation). Update and upgrade your sprayer with these technologies that can be easily integrated in your existing sprayer.

Consider using a sprayer that is equipped with air-assisted boom when coverage in lower parts of the canopy is essential for control of some insects and diseases especially under full, dense canopy conditions, such as soybeans sprayed in late season.

For more information on this topic, please read the OSU Extension publication FABE-532, "Best Practices for Effective and Efficient Pesticide Application." ([ohioline.osu.edu/factsheet/fabe-532](http://ohioline.osu.edu/factsheet/fabe-532)). Don't hesitate to contact me if you have a specific question that was not addressed in this and other OSU Extension publications I mentioned in this article.

Happy spraying!



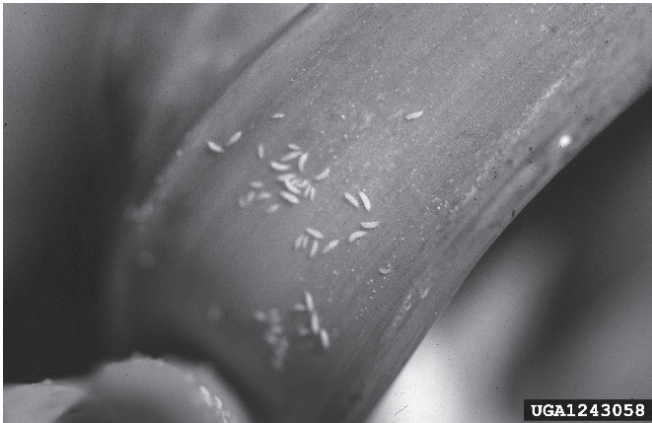
## Current Vegetable Issues

Beth Gugino and Shelby Fleischer

This article contains excerpts from updates from May 12 and May 24.

### 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.



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

### 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 (*Baccillus thuringiensis* var. *kurstaki*) could be used to spot treat if needed. **Onion maggot** has also been reported.

### 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

Continued on page 10

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## VEGETABLE PRODUCTION

## Current Vegetable Issues continued from page 9

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 farinosa* 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 commingle 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.

Management options include Conserve or Spear-T Biological Insecticide/Miticide. High aphid populations were also observed in one tomato high tunnel. One recommendation is to consider spot treating with a product such as Venerate that contains the biocontrol organism *Burkholderia* spp.

Other sightings in high tunnels or the field include wireworm damage on high tunnel lettuce; flea beetles on cole crops; slug damage on turnip; Fusarium basil rot on garlic; and tobacco mosaic virus on pepper and eggplant.

Cooler weather and high relative humidity in high tunnels and greenhouses are making conditions perfect for **Botrytis/Gray mold** to develop on most crops. Botrytis is favored by cool temperatures and the high relative humidity that comes from poor air circulation due to overcrowding of plant material. This can either result from tight plant spacing or crop overfertilization leading to lush crop canopies that limit air movement and promote leaf wetness. It commonly starts on damaged plant tissue or senescing flowers and then progresses onto the fruit. Fungicides such as Decree, Botran, and Scala can limit disease spread and are registered for greenhouse/high tunnel use on certain commonly grown greenhouse vegetable crops. Improving air circulation is also beneficial.



Figure 2. Zonate brown necrotic lesions are typical of *Botrytis* on tomato in a high tunnel. Photo: Beth Gugino, Penn State

### 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.

### Resources With the Latest Information

The 1-800-PENN-IPM hotline had expanded its menu options starting with 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.

Sign-up with Penn State Extension at <https://extension.psu.edu/vegetable-small-fruit-and-mushroom-team-sign-up> to receive the latest news and information on vegetable and small fruit

## VEGETABLE PRODUCTION

### Current Vegetable Issues *continued from page 10*

crop production as well as pest and disease management either electronically or by USPS (1-877-345-0691).

Cucurbit downy mildew alerts can be obtained by email or text message by signing up on the Cucurbit Downy Mildew Forecasting website at <https://cdm.ipmpipe.org/alerts/>. You can specify the distance from your farm for which you would like to receive reports.

The New 2021-2022 Mid-Atlantic Fruit and Vegetable Production Recommendations contains the latest information to help commercial vegetable and strawberry growers in the mid-Atlantic regional make production and pest management decisions. The hardcopy can be purchased either online or by calling 1-877-345-0691. Individual sections are also available for download by going to <https://extension.psu.edu/mid-atlantic-commercial-vegetable-production-recommendations-sections>.

Penn State Extension Informational Kiosks are available at many of the produce auctions across the state. Throughout the season they will provide both education material as well as timely pest and disease forecasting information. Three additional locations are being added this year. <https://www.psu.edu/news/impact/story/penn-state-extension-kiosks-produce-auctions-provide-information-growers/>

The MyIPM app is available for free from the Apple Store and Google Play, and covers strawberries, blueberries, and blackberries in addition to tree fruit crops. The App is updated with current pests and cultural and chemical controls. More info can be found on the MyIPM Smartphone App Series website at <https://www.clemson.edu/extension/peach/commercial/diseases/myipmsmartphoneappseries.html>.

### Sunburn on Vegetable Leaves

Gerald Brust

I know it may seem odd to see an article about sunburn on leaves with the week of overcast rainy skies we have had, but pictures of damage to crops came in the last few days after some bright but brief sunshine. Plant leaves turning a papery white or tan can indicate sunburn or sunscald on plants (Figs. 1 and 2). These symptoms on vegetable plants also can be caused at times by cold or wind damage as discussed by Gordon Johnson in a previous article. Sunscald on plants can occur when plants are set in the field after coming straight out of the greenhouse or off the trailer without being thoroughly hardened off. Only certain parts of the leaf will be scalded (these are the areas that had direct sunlight on them for an extended period of time) and the tissue next to the scalded area is still bright green (Fig. 1). In the transplant production house plants are exposed to filtered light so they grow leaves that are good at absorbing as much light as possible. The problem with taking a plant straight from this type of environment to the field is that the plants at times are not ready for the extra UV rays they are going to receive. The epidermal layers of leaf tissue desiccate (burn) with the intense sun exposure, causing light tan to white discoloration on the leaves and stems of tender plants. At times even established plantings can experience this as can be seen with the Swiss chard in figure 2. Once leaves are damaged, all that can be done is to support the plant until it manages to grow new leaves. Hardening off the transplants would have prevented the sunscald on the new transplants, but I rarely do this myself and have not had much of a problem for not doing so. Make sure

*Continued on page 14*

*Dr. Gugino is with the Penn State Dept. of Plant Pathology and Environmental Microbiology and Dr. Fleischer is retired from the Penn State Dept. of Entomology. From Penn State Extension, <https://extension.psu.edu/2022-pa-vegetable-and-berry-current-issues-for-may-16> and <https://extension.psu.edu/2022-pa-vegetable-and-berry-current-issues-for-may-24>, May 16 and 24, 2022.*

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Tomatoes	3-6	0.77 fl. oz./gal. (0.6% v/v)	Initial fruit set & every 2 weeks until harvest
Berries	3-4	0.6%-0.9% v/v	Flowering/fruit initiation through final fruit development



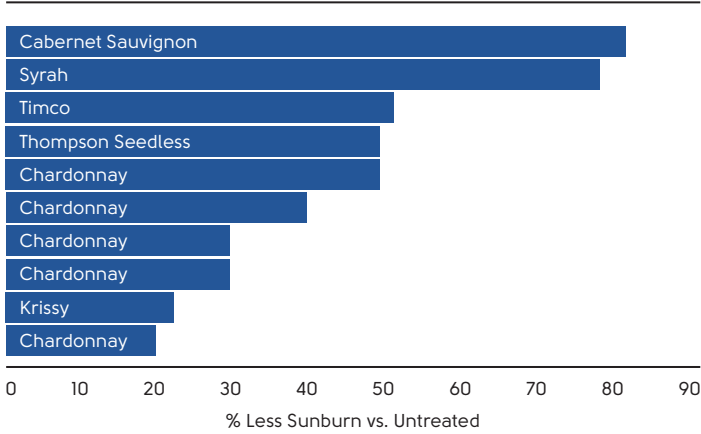
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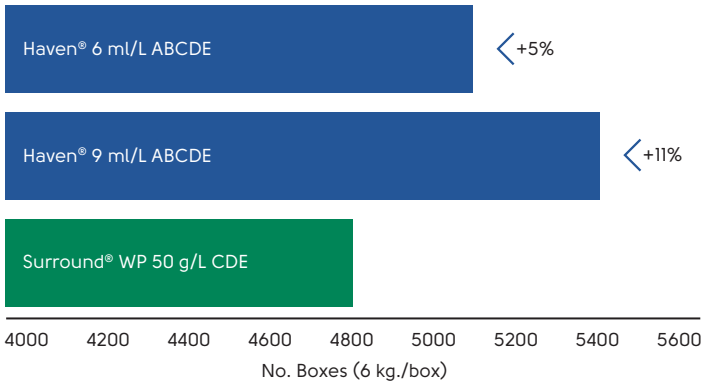


Untreated Tomatoes with Sunscald

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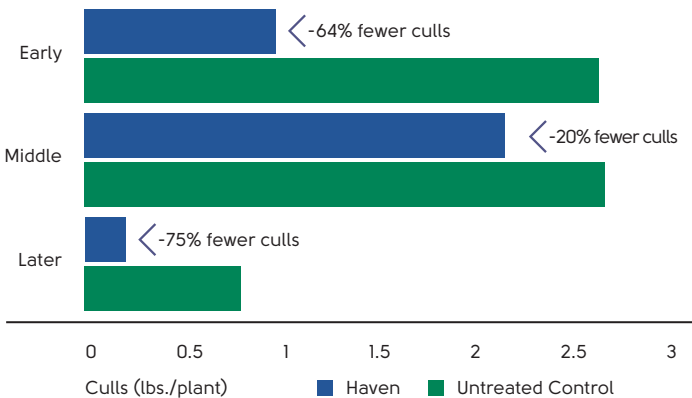


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50	0.5	0.45	0.375	0.3	38.40
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VEGETABLE PRODUCTION

### Sunburn on Vegetable Leaves

*continued from page 11*

to appropriately water and feed plants that have sunscald while they are recovering and watch for any secondary foliar infections in the damaged tissue.



C Bowers

Figure 1a. Sunscald on a crucifer leaf



B Klein

Figure 1b. Sunscald on a bean leaf



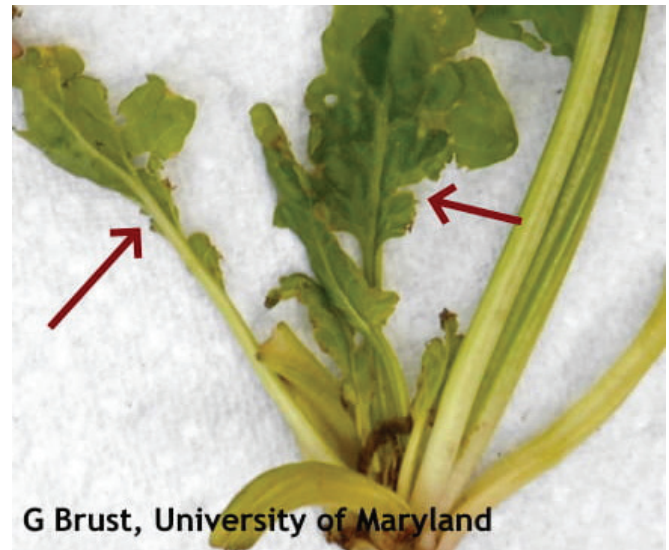
T Ogun, Owl's Nest Farmers

Figure 2. Sunscald leaf of Swiss chard

### Spinach Crown Mites in Spinach

Gerald Brust

Spinach crown mites *Rhizoglyphus* sp. feed within the folds of new leaves in the crown of spinach plants. This feeding causes the new leaves to become deformed as they grow (Figs.1 and 2). Crown mite adults are extremely small bulbous nearly transparent mites that also may have a yellow-beige body color with reddish-brown legs (Fig 3). A good characteristic to look for to identify these mites is the sparse long hairs mostly found on the back end of the mite (Fig. 3). Crown mite eggs are spherical and clear



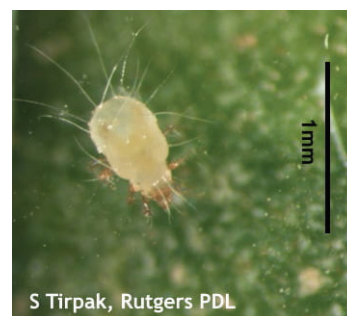
G Brust, University of Maryland

Figure1. Crown leaves fed on by spinach crown mites are misshapen and ragged with necrotic margins as they expand.



A Radin, UMASS

Figure 2. In the field the crown leaves are distorted and wrinkled in appearance.



S Tirpak, Rutgers PDL

Figure 3. Spinach crown mite adult with sparse long hairs over its body

Dr. Brust is the IPM Vegetable Specialist at the Univ. of Maryland. From the **Weekly Crop Update**, Univ. of Delaware, Vol. 30, Issue 9, May 20, 2022.

# Food Safety in High Tunnel Can Have Co-Benefits

Robert Hadad

We talk a lot about reducing risk of bacterial contamination for produce inside of wash/pack facilities at great length. There is also discussion on reducing risk in the field. Let's not forget to mention reducing risks in high tunnels.

Bacterial contamination can enter the high tunnel in a number of ways. First there is bringing in manure or manure-based compost that hasn't gone fully through the composting process. These get tilled into the soil but depending on how "fresh" the manure is and how thoroughly these soil amendments are turned into the soil can pose a threat. Touching the soil then the crops, especially before harvest can pass contaminants.

**Solution:** use manure that has gone through a composting treatment. Use manure only for long season crops like tomatoes or peppers or with staked/trellised crops like tomatoes, peppers, eggplant, and cucumbers. Use fully composted soil amendments. Use mulch to reduce the chances of hands touching the soil and then plants. Avoid fresh manure when growing short season crops or crops close to the ground like greens.

**Co-Benefit:** reducing touching the soil then touching crops can reduce plant diseases.

Soil preparation when using fresh manure or manure-based products can spread contamination under certain conditions. If the soil and the soil amendments are dry, tilling can kick up a lot of dust. The dust could carry contaminants that can land on food contact surfaces inside the tunnels (much more of a problem if harvest containers are stored inside tunnel or if there is a wash/pack set-up in the tunnel).

**Solution:** cover harvest bins and other food contact surfaces before tilling. Wetting down soil a day or two before tilling might also reduce the dust kicking up. Do the soil prep earlier in the morning or later in the day when it isn't too hot out and keep

the tunnel sides rolled down to prevent wind from blowing dust around. Rinse off tunnel interior plastic with hose or power washer to remove dust after soil prep. Spraying on a sanitizer after the water rinse might be helpful too. Removing algae is also helpful.

**Co-Benefit:** reduces organic matter on plastic which might be less attractive for snails to eat climbing up on the tunnel walls and ceilings. Removing algae can reduce slug/snails from climbing sides/ceiling and also lets more light in when late season sun is less intense already.

If soil preparation occurs later in the year, such as getting ready for late season/winter greens production, contaminated dust can stick to the tunnel plastic (interior). There is concern that condensation dripping from the ceiling can carry contamination onto the greens below. **Solution:** hose down interior tunnel plastic with hose or power washer. Removing algae is helpful. Spraying a solution of sanitizer can be an extra step.

**Co-Benefit:** reduces organic matter on plastic which might be less attractive for snails to eat climbing up on the tunnel walls and ceilings. Removing algae can reduce slug/snails from climbing sides/ceiling and also lets more light in when late season sun is less intense already.

Reducing snail and slugs inside the tunnel. Snails and slugs that comes into contact with manure may carry contamination onto plants and spread it onto tunnel plastic. From the plastic, contamination may fall off possibly contaminating crops below.

**Solution:** remove vegetation from around outside/inside perimeter of high tunnels. Don't store anything on the perimeters of the tunnels where snails/slugs can hide. Use slug/snail bait along the perimeter of the tunnel. Remove mulch from the inside perim-

*Continued on page 16*



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## VEGETABLE PRODUCTION

## Poor Stands and Plant Vigor in Fresh Market Sweet Corn

Gordon Johnson

Growers are reporting issues with stands and vigor in sweet corn fields in 2022, especially in early planted fields. There can be many causes for stand loss and weak seedlings: surface compaction and crusting, birds, soil insects, slugs, cold soils that delay emergence, soil diseases affecting seeds or seedlings, wet soils, fertilizer injury, deep planting, and herbicide injury are just a few examples. We also have had losses in 2022 due to sand blasting.

Seedcorn maggot damage to sweet corn in 2022 has been heavier than in previous years. David Owens, UD Extension Entomologist recorded a YouTube video discussing seedcorn maggot which can be accessed here: <https://www.youtube.com/watch?v=nDhj8QTz8hw>.

When checking sweet corn fields with vigor and stand problems, it is important to dig up seeds and affected plants and examine the seed remnants, roots, and mesocotyl (stem that pushes the seed leaf to emerge above the ground). Corn seedling survival and early vigor is directly tied to a healthy seed kernel and mesocotyl from planting through the six-leaf stage. Any damage to the seed or mesocotyl during this period can lead to stunted or weak seedlings, and in severe cases, seedling death. This is because the corn seedling depends on the seed for food to grow for several weeks after emergence until sufficient leaf area has been produced and nodal roots have become established. The seed kernel provides the means for early roots to grow and these food reserves are also mobilized and transported through the mesocotyl to grow the first stalk and leaf tissue. The mesocotyl also serves to transport water and mineral nutrients from the seedling roots.

Sweet corn is more susceptible to stand loss and poor vigor problems than field corn because the seed has less food reserves. Shrunken types (supersweet, sugary enhanced, augmented shrunken, synergistic varieties) have even less stored food than "normal" types and therefore are more susceptible to stand problems.

I have looked at sweet corn fields with stand loss and vigor problems (uneven growth) over the years. Often, when digging up

the seedlings and examining the seed remnants and mesocotyls, the kernels will be disintegrated and there will be darkening at the mesocotyl attachment. This means that the seeds deteriorated prematurely and the full content of the food reserves in the seed were not available for seedling development, leading to the stand and vigor issues. Premature seed deterioration and/or poor vigor seedlings can be due to diseases that cause seed rots, seedling blights and/or root rots. Soil insects can cause seed deterioration by feeding on seed contents or creating entrance wounds for disease organisms. In addition, certain soil insects and slugs can feed on the mesocotyl causing seedlings to collapse. Sweet corn that takes more than 10 days to emerge is at great risk of injury due to insects and diseases as seed treatments dissipate.

Cold stress and cold soils are common stress factors leading to poor stands. Often growers are pushing the limits and are planting sweet corn very early. While field corn will start to germinate at 50°F, many types of sweet corn need much warmer soils. This is especially true of supersweet varieties and other shrunken types, which perform best at higher soil temperatures (above 60°F). When soil temperatures are below 55°F, germination is greatly extended. Food nutrients are mobilized in the seed but are not being utilized rapidly by the plant. The seed then becomes a perfect food source for many soil microorganisms. On a positive note, many of the newer sweet corn varieties have much more cold tolerance and emerge more rapidly in cold soils.

Stand issues are often related to the inherent poor vigor of sweet corn. Work with seed suppliers to obtain their best lots with the largest seed sizes. Obtain varieties that perform better under cold stress. When possible, obtain reports from sweet corn trials to assess which varieties are the most cold tolerant. Request seed treatment information and select treatments with the best protection potential. There are in-furrow fungicide options; however, research is limited with sweet corn in our region.

Growers often face the decision on whether to keep plantings with poor stands. This is most often a marketing decision based on the need for and value of early sweet corn for that farm. An estimate of potential marketable ears will be based on stand counts of full vigor plants from 20-40 sites throughout the field. This stand count information then can be used to estimate the value of the field as is versus the value of a later planted full stand crop.

*Dr. Johnson is the Extension Vegetable and Fruit Specialist at the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware, Vol. 30, Issue 10, May 20, 2022.*

## Spinach Crown Mites in Spinach

*continued from page 14*

and laid on the creased leaf surfaces in the crown area. Some reports state that crown mites can act as vectors for plant pathogens such as *Pythium* and *Rhizoctonia*, but this is not definitive.

The spinach crown mite is most damaging in soils high in organic matter and under cool moist conditions – plants grow a little more slowly and the mites proliferate in this type of environment. Because these mites can consume organic matter, they can survive in soils after the crop has been removed. This is one reason they are difficult to control as they can survive for fairly long periods of time with no crop being present. The other reason they are difficult to 'control' is we do not realize they are causing the problem until it is too late.

Most control recommendations include sanitation and crop rotations as being important, as are fallow periods. Pyrethroids are a possible chemical control as is Neem; any chemical control has to get down into the crown of the plant to have any chance of working. There has been little research conducted on the most efficacious material for these mites. Mostly what is needed are warm sunny days where spinach can grow well and the environment is not so conducive to the mites, which reduces their ability to injure the crop.

*Dr. Brust is the IPM Vegetable Specialist at the Univ. of Maryland. From the **Weekly Crop Update**, Univ. of Delaware, Vol. 30, Issue 8, May 13, 2022.*

## Food Safety in High Tunnel Can Have Co-Benefits

*continued from page 15*

eter of the tunnel. Be sure to pull away any manure from the tunnel edges and incorporate into the soil.

Co-Benefit: Snails and slugs feed on crops causing damage. This opens crops to disease. Feeding damage reduces the quality of the crops lessening the market value.

Prevent contamination from rodents entering the tunnel and taking up residence. Rodents can carry a variety of pathogens. Especially in the late fall through the winter when food is scarce, a high tunnel can be attractive to voles, mice, and rats.

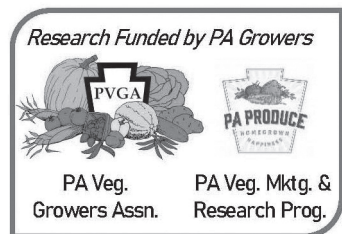
*For more information on farm food safety practices, contact Robert Hadad, CCE Cornell Vegetable Program, [rgh26@cornell.edu](mailto:rgh26@cornell.edu), 585-739-4065.*

*Mr. Hadad is with Cornell Cooperative Extension, Cornell Vegetable Program; From **VegEdge**, Cornell Cooperative Extension, Vol. 18, Issue 5, April 27, 2022.*



# HPPD Herbicides for Weed Control in Sweet Corn

John M. Wallace, Dwight D. Lingenfelter and Mark Van Gessel



Full season weed control is needed to prevent yield loss and maintain harvest efficiency in sweet corn production. Postemergence herbicide applications are often necessary to maintain full season control, even if soil-applied residual herbicides were used at planting. Postemergence herbicide

use relies heavily on HPPD-herbicides (group 27). There are four HPPD-herbicides currently labeled for sweet corn: Callisto (mesotrione), Impact or Armezon (topramezone), Laudis (tembotrione), and Shieldex (tolpyralate). These HPPD herbicides are primarily tank-mixed with atrazine, which has been shown to improve weed control efficacy and broaden the weed control spectrum. They are similar in chemistry but can differ in herbicide efficacy, weed control spectrum, and label restrictions. For example, the newest HPPD in the sweet corn market, Shieldex, has a similar weed control spectrum to Callisto but has significantly shorter replant intervals than the other HPPD products. The rotation to most cucurbits, including pumpkins, is 9 months for Shieldex, while the rotation is 18 months for the other three herbicides. Consideration of rotation restrictions is one of the primary factors that limit use of post-emergence HPPD herbicides in sweet corn production. Additional factors may include concerns for carryover injury to post-harvest seeded cover crops.

We conducted experiments to improve management recommendations for use of postemergence HPPD herbicides in sweet corn production. Our experiment was designed to evaluate how

postemergence HPPD herbicides (1) differ in weed control efficacy; (2) differ in weed control efficacy and weed control spectrum when applied with and without atrazine; and (3) and impact establishment rate of various post-harvest seeded cover crop species.

## Materials and Methods

Experiments were conducted at two locations: (1) the Russell E. Larson Agricultural Research Farm in Centre County and (2) the University of Delaware Research and Extension Center in Sussex County. Herbicide treatments included mesotrione (Callisto), tembotrione (Laudis), topramezone (Impact or Armezon) and tolpyralate (Shieldex) applied at a 1X rate with and without atrazine and a 2X rate to improve evaluations of carryover potential to post-harvest seeded cover crops (Table 1). Herbicides were applied with label-recommended adjuvants.

Herbicide treatments were evaluated in a randomized complete block design with three replications. The plots were four rows by 25 feet long and a representative sweet corn variety was used. Standard tillage and seed bed preparation was used followed by an application of a set-up pre-emergence herbicide program across the study site within 2 days of planting. Weed control and crop injury were visually evaluated 2 and 4 weeks after application of postemergence herbicide treatments and just prior to harvest. Following sweet corn harvest, plots were mowed and three cover crop species (cereal rye, crimson clover, forage radish) were be drill-seeded in each plot in separate rows by modifying seed boxes to direct individual cover crop species to different drill units. The same variety of cover crop species was used at both experiment locations. Cover crop establishment rate and injury were evaluated

*Continued on page 18*

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## VEGETABLE PRODUCTION

HPPD Herbicides for Weed Control in Sweet Corn *continued from page 17*

4 and 8 weeks after application.

Treatment	Rate (per ac)
Callisto 4SC	3 fl oz
Callisto 4SC + atrazine	3 oz + 1 pt
Callisto 4SC (2X)	6 fl oz
Shieldex 400SC	1.25 fl oz
Shieldex 400SC + atrazine	1.25 oz + 1 pt
Shieldex 400SC (2X)	2.5 fl oz
Impact 2.8SC	1 fl oz
Impact 2.8SC + atrazine	1 oz + 1 pt
Impact 2.8SC (2X)	2 fl oz
Laudis	3 fl oz
Laudis + atrazine	3 oz + 1 pt
Laudis (2X)	6 fl oz
Untreated check	--
Weed-free check	--

## Results

At the Delaware location, postemergence control of Palmer amaranth was higher in Shieldex, Impact and Laudis treatments compared to Callisto when averaged across treatments (Table 1). However, the opposite trend was observed for control of annual morningglory, where control levels were higher in Callisto treatments compared to other HPPD programs when averaged across treatments. Tank-mixing atrazine with each HPPD herbicide consistently increased broadleaf weed control levels compared to applying HPPDs alone at 1X rates and were comparable or greater than 2X rates applied alone. Annual grass control was generally poor across treatments, with Impact providing the greatest efficacy (63 – 76%) among HPPD herbicides.

Herbicide treatments significantly impacted post-harvest establishment of cover crops at the Georgetown DE location (Table 2). However, the range of observed levels of biomass reduction were low to moderate (< 15%) and unlikely to impact the conservation benefits produced by the cover crop. Forage radish biomass reduction was higher in Laudis treatments compared to other HPPDs and crimson clover biomass reduction was lower in Shieldex treatments compared to others. No differences in cereal rye biomass reduction were observed among HPPD herbicides. Tank-mixing atrazine with HPPD inhibitors did not significantly affect cover crop injury levels compared to HPPDs applied alone.

At the Pennsylvania location, Callisto and Shieldex resulted in higher levels of common lambsquarters control compared to Impact and Laudis when applied alone (Table 3). Tank-mixing with atrazine improve lambsquarters control for each HPPD herbicide.

Tank-mix combinations resulted in high levels of control (> 95%) and did not differ among HPPD herbicides.

The effect of herbicide treatments on cover crop establishment at the Pennsylvania location was species specific. No injury or biomass reduction was observed in postharvest established cereal rye and forage radish. Standard rates of Callisto, Shieldex and Laudis applied alone or combination with atrazine resulted in minimal injury to crimson clover establishment, whereas Impact treatments resulted in crimson clover biomass reduction levels (18 – 22%) that may impact cover crop performance.

## Summary & Conclusions

Results demonstrate that HPPD herbicides available for post-emergence use in sweet corn differ in their selectivity. Each HPPD herbicide provided acceptable control of small seeded broadleaf species but varied in control of large seeded (annual morningglory) and annual grass (fall panicum) species. Importantly, tank-mixing atrazine improved total weed control levels for each HPPD herbicide and at each location, which demonstrates the utility and value of HPPD + atrazine combinations.

The effects of HPPD herbicides on establishment of cover crop species varied across locations, with minimal impacts observed on the establishment of cereal rye and forage radish. The use of Impact reduced crimson clover establishment at one location. Carry-over potential of HPPD herbicides is mediated by soil type, rainfall after application, and the duration to cover crop seeding. Additional field trials will be needed to fine tune recommendations for cover crop establishment following post emergent use of HPPDs in sweet corn but results of these field trials suggest that post-harvest cover crop seeding is compatible with HPPD post emergence use.

**Table 1.** Herbicide treatment effects on weed species 30 days after application (30 DAA) at the Georgetown, DE location. Means followed by the same letter are not significantly different ( $P > 0.05$ ).


Treatment	Palmer amaranth	Annual morning glory	Fall panicum
	----- % control (30 DAA) -----		
Callisto 4SC	66 c	50 de	33
Callisto 4SC + atrazine	94 a	88 a	40
Callisto 4SC (2X)	73 bc	80 ab	40
Shieldex 400SC	87 ab	33 f	50
Shieldex 400SC + atrazine	94 a	71 bc	56
Shieldex 400SC (2X)	95 a	40 ef	68
Impact 2.8SC	88 ab	47 def	63
Impact 2.8SC + atrazine	97 a	68 bc	71
Impact 2.8SC (2X)	98 a	60 cd	76
Laudis	84 ab	43 ef	20
Laudis + atrazine	98 a	93 a	33

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VEGETABLE PRODUCTION

HPPD Herbicides for Weed Control in Sweet Corn *continued from page 18*

Laudis (2X)	87 ab	60 cd	43
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**Table 2.** Herbicide treatment effects on cover crop establishment and visual reduction biomass 60 days after planting (DAP) at the Georgetown, DE location. Means followed by the same letter are not significantly different (P > 0.05).

Treatment	Cereal rye	Forage radish	Crimson clover
	% biomass reduction (60 DAP)		
Callisto 4SC	7 bc	2 bc	2 b
Callisto 4SC + atrazine	11 ab	2 bc	12 a
Callisto 4SC (2X)	13 a	9 a	10 a
Shieldex 400SC	3 cd	7 ab	0 b
Shieldex 400SC + atrazine	0 d	2 bc	2 b
Shieldex 400SC (2X)	12 ab	12 a	0 b
Impact 2.8SC	11 ab	0 c	0 b
Impact 2.8SC + atrazine	3 cd	2 bc	9 a
Impact 2.8SC (2X)	0 d	12 a	9 a
Laudis	15 a	10 a	9 a
Laudis + atrazine	13 a	9 c	2 b
Laudis (2X)	9 ab	0 c	2 b

**Table 3.** Herbicide treatment effects on weed species 30 days after application (30 DAA) at the Rock Springs, PA location. Means followed by the same letter are not significantly different (P > 0.05).

Treatment	Common lambsquarters	Common dandelion
	% control (30 DAA)	
Callisto 4SC	92 bc	75 bcd
Callisto 4SC + atrazine	99 a	84 a
Callisto 4SC (2X)	96 ab	80 ab
Shieldex 400SC	94 ab	79 abc
Shieldex 400SC + atrazine	99 a	83 a
Shieldex 400SC (2X)	98 ab	82 a
Impact 2.8SC	83 de	63 f
Impact 2.8SC + atrazine	95 ab	70 de
Impact 2.8SC (2X)	82 e	62 f
Laudis	79 e	66 ef
Laudis + atrazine	98 ab	74 cd

Dr. Wallace and Mr. Lingenfelter are with the Penn State Plant Science Dept. and Dr. VanGessel is with the Univ. of Delaware de. of Plant and Soil Sciences. This project was funded by PVGA and the Pennsylvania Vegetable Marketing and Research Program.

Laudis (2X)	88 cd	66 ef
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**Table 4.** Herbicide treatment effects on cover crop establishment and visual reduction biomass 60 days after planting (DAP) at the Rock Springs, PA location. Means followed by the same letter are not significantly different (P > 0.05).

Treatment	Cereal rye	Forage radish	Crimson clover
	% biomass reduction (60 DAP)		
Callisto 4SC	0	0	3 cd
Callisto 4SC + atrazine	0	0	10 c
Callisto 4SC (2X)	0	0	7 cd
Shieldex 400SC	0	0	3 cd
Shieldex 400SC + atrazine	0	0	4 cd
Shieldex 400SC (2X)	0	0	20 b
Impact 2.8SC	0	0	18 b
Impact 2.8SC + atrazine	0	0	22 b
Impact 2.8SC (2X)	0	0	45 a
Laudis	0	0	5 cd
Laudis + atrazine	0	0	2 d
Laudis (2X)	0	0	2 d

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## VEGETABLE PRODUCTION

## Cold Effects on Early Transplanted Vegetables

Gordon Johnson

The frost we had last week should remind growers that as you try to get a jump on the growing season, cold weather effects need to be considered. Over the years, many of our early plantings of summer vegetables have suffered because of cold damage and inadequate provisions to protect plants.

Earliest plantings of watermelons, summer squash, and tomatoes began last month. First transplanting of crops such as cantaloupes, peppers and eggplant will begin in early May. One of the characteristics that all of these crops have in common is that they are warm season vegetables that are sensitive to cold temperatures, both in the root zone and above ground.

Transplanted warm season vegetables vary in their ability to tolerate adverse weather after being set out. Tomatoes will stop growth but will grow out without much damage once warm weather returns. Summer squash also handles adverse conditions fairly well. Watermelons will hold if they have been hardened off properly. Cantaloupes can be permanently stunted if exposed to excessively harsh early conditions. Peppers and eggplants will not put on any root growth until temperatures are warm enough.

Rate of root growth or regeneration is temperature dependent with cool season vegetables such as cabbage or lettuce being able to produce new roots at much lower temperatures than warm season vegetables such as eggplant or watermelon. In soils that are below critical temperatures (60-65°F for watermelon and cantaloupes for example) roots do not grow into the soil bed and transplants will be subject to desiccation losses as soils dry

around the root ball. The smaller the root ball (the smaller the tray cell size), the more quickly desiccation and plant loss can occur.

For Solanaceous crops tolerance to cold soil is as follows Tomatoes > Peppers > Eggplant. For cucurbits tolerance to cold soils is in this order Cucumber > Summer Squash > Watermelon > Muskmelon.

All of these vegetables are susceptible to frost damage and will be killed by a late freeze. Many areas on Delmarva had temperatures as low as 25 °F on April 29.

In years with cold, cloudy, windy weather after transplanting, we have had large losses of transplants in the field. In many fields considerable hand labor was used to replace dying plants and in some cases whole fields were replanted. It is critical to have warm soil conditions after transplanting to allow roots to grow out into the bed quickly. What happens in cold, cloudy conditions is that plants shut down physiologically. Little root growth occurs and the existing roots on the transplant do not function well. If there is any wind, plants lose more water than they can take up and they die due to desiccation. This is accelerated when the sun does come out – the first sunny day after an extended cold, cloudy period is when you will see the most wilting of weakened transplants.

Later on in the growth cycle, cold weather during flowering can lead to problems with pollination and fruit formation resulting in reduced fruit set and malformed fruits.

*Dr. Johnson is the Extension Vegetable and Fruit Specialist at the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware, Vol. 30, Issue 8, May 6, 2022.*



*Watermelon plant with dead growing point due to freezing weather. Buds at the cotyledon are intact. However, without any leaves, the plant may not have enough energy to regrow.*



*Watermelon plant with dead leaves and damaged growing point but with live buds at the leaf axil and cotyledons. This plant is marginal on the potential for regrowth.*



*Watermelon plant with live growing point and only one leaf damaged. This plant will regrow.*



*Watermelon plant with minimal damage will continue to grow.*

G Johnson, University of Delaware

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## Current Berry Issues

Kathleen Demchak and Margarita López-Uribe

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.



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.

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 [following article]. 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.

Continued on page 22



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## BERRY PRODUCTION

## Be on the Lookout for Neopestalotiopsis on Strawberries

Kathleen Demchak

The hot humid conditions we had on May 20th and 21st in the region along with heavy downpours were perfect conditions for *Neopestalotiopsis*, a new strawberry disease in the region. So far, the number of plantings known to have it are very limited in the Mid-Atlantic, but given the speed with which this disease can spread under the right conditions, it is best to remain on the lookout.

The farms with Neopest issues obtained their plants from at least 2 different plug plant producers, but the runner tip source was the same for both. Symptoms were apparent last fall if plants were badly infected, but if a low level of inoculum was present or only a few plants were affected, symptoms may have been easy to miss then.

While the disease progresses more slowly on some cultivars than others, no cultivar is resistant. The main symptom to watch for is tan leaf blotches that rapidly invade leaves under warm moist conditions. These look like some other leaf spots. The disease seems not to progress much, if at all, when weather remains cool.

If you see strawberry leaves with suspicious symptoms, put a few of them in a plastic bag with a wet paper towel in location with moderate temperatures (70-ish degrees). Lesions that engulf most of the leaf in a few days, followed by black dots (pycnidia) appearing near where the lesion first started forming, and tendrils of spores growing out of the pycnidia afterwards are diagnostic. These tendrils of spores are easily knocked off the leaf, so are not likely to be seen in the field. Just one tendril can contain hundreds of spores, but they can only be seen under high magnification. The spores are very unique looking (to me) and look more like a silverfish minus its legs than a fungal spore.

The disease also causes a dark brown crown rot which causes plants to collapse and die, and a fruit rot that could be mistaken for other diseases, except for the black sporulation in the center of the fruit lesion.

So, what can you do? Infected plants can be pulled out at any point if you wish, but remove them from the field and destroy them - don't just leave them lying in the field or a cull pile, because

## Current Berry Issues continued from page 21

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>



Discolored and malformed new strawberry leaves affected by cyclamen mites. 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.

Growers continue to report '**Flavorfest**' plant collapse; this is thought to be due to *Phytophthora* crown rot that may have



Figure 4. Tarnished plant bug nymph on strawberry fruit and adult on strawberry blossom. Photo: Kathy Demchak, Penn State

been transported with the plants, as even plantings on new ground have had this issue. More information on this disease appears in the article, Disease Management Recommendations for Fall-Planted Strawberry Plug Plants at <https://extension.psu.edu/disease-management-recommendations-for-fall-planted-strawberry-plug-plants>. At this time of the year, treatments are limited to products with short PHIs (Aliette, Phostrol, Prophyte, etc.).

As was the case last year, windy conditions have resulted in **leaf rubbing on strawberries**; symptoms are a brown bruising of plant tissue which could be easily mistaken for a foliar disease. This type of damage can be differentiated from foliar diseases in that symptoms are present primarily on the uppermost leaves, and any discoloration is only on the surface. Brown markings on petioles are not sunken as with anthracnose.

**Tarnished plant bug** nymphs are present in strawberry plantings; however, insecticide applications should be avoided until bloom is complete. The threshold for making an insecticide application is 1 tarnished plant bug nymph per 4 blossom clusters, so it is recommended that growers scout as soon as bloom is over and be ready to make an application if needed. This may need to be done by variety to avoid misshapen fruit. Tarnished plant bug nymphs look very different from adults and do not fly. It is easiest to find the nymphs by tapping blossom clusters over a light-colored surface such as a sheet of paper, as they quickly try to hide once they detect movement. The adults fly away very quickly, so brushing the foliage and identifying them once they land elsewhere usually works best.

Ms. Demchak is with the Penn State Dept. of Plant Science and Dr. Uribe is with the Penn State Dept. of Entomology. From Penn State Extension, <https://extension.psu.edu/2022-pa-vegetable-and-berry-current-issues-for-may-16> and <https://extension.psu.edu/2022-pa-vegetable-and-berry-current-issues-for-may-24>, May 16 and 24, 2022.

BERRY PRODUCTION

**Be on the Lookout for Neopestalotiopsis on Strawberries** *continued from page 22*

they will either just lie there and sporulate, or the crowns will dry out and persist.

When working in the field, be sure to work in areas of the field that have disease symptoms last, especially if foliage is damp. The tendrils of spores fall off in tiny pieces that look like black pepper grains, and they are easily picked up and moved around on your hands or clothing especially when surfaces are wet. There are also some suspicions that this disease has been moved around in water from heavy storms draining from one field to the next in Florida, or by workers, though exact circumstances resulting in the migration of the disease are unclear.

Fungicides will be of some help, but only provide only partial control. Thiram and Switch are best, but because Switch is used for other diseases, it is best to rely mainly on thiram, as the likelihood of resistance development to it (from any disease) is less. Multiple sprays will be needed at weekly intervals, but be aware that the PHI for thiram is 2 days.

Dry weather during harvest should help in many ways and with many diseases, but of course, this is something you can't control unless you are using high tunnels or greenhouses. The fact that foliage and fruit remain dry in them is one reason why fruit-rotting diseases tend to "disappear" when they are used.

Once you are finished with harvest, we recommend not carrying over any infected plantings. Plow under the strawberry crop as soon as possible after harvest. There are indications that this disease (and anthracnose) persists in fields in mummified crowns, possibly for multiple years. So, plowing under the crowns while they are still green rather than killing off the plants and letting the crowns dry out and then plowing may have benefits if the tissue degrades more rapidly. Be sure to clean off your equipment afterwards so you don't accidentally inoculate a new field later.

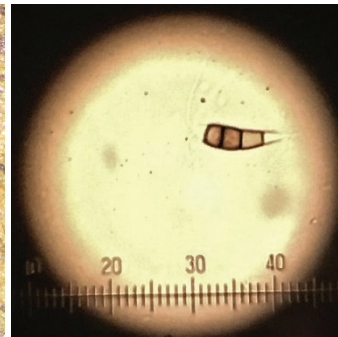
While we do not have a complete list of other plants that can host this disease, a logical guess would be that annual grains, which host few other diseases in common with small fruit, might be safer rotational crops than some others. Rotate to a new field staying out of strawberries for a minimum of three full years, and longer if at all possible.

Thanks to Dr. Natalia Peres from the Univ. of Florida for diagnosis of field samples from Pennsylvania, for her background work on understanding the life cycle and genetics of this disease, and for conducting field trials related to fungicide efficacy. Also thanks to Dr. Mengjun Hu at the University of Maryland for further work on understanding and managing this disease.

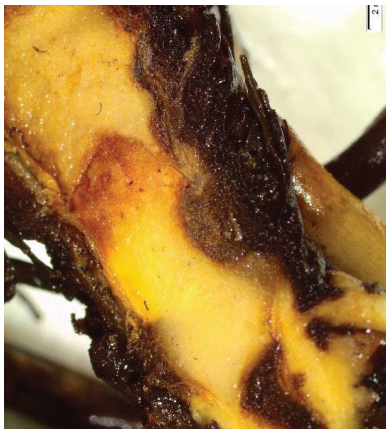
*Ms. Demchak is with the Dept. of Plant Science at Penn State Univ. From Penn State Extension.*



*Caption: At first symptoms could be mistaken for any number of common diseases (left), but invasion of healthy tissue progresses rapidly under warm wet conditions (right). Photos: Carly Regan, Penn State Extension*



*Numerous black pycnidia and tendrils of spores growing from them that were confirmed to be Neopestalotiopsis. A single spore under high magnification is in the photo to the right. Photos: Kathy Demchak, Penn State*



*Dark brown areas of rotting crown tissue can be seen towards the sides and base of the crown (left), and the fruit rot phase (right). Photos: Kathy Demchak (left); Dr. Mengjun Hu, Univ. of Maryland (right).*

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