



PVGA Board Meets, Approves \$16,000 for Research High Tunnel

The PVGA Board of Directors held their summer meeting virtually on July 20th and approved a special grant for \$16,000 for a second moveable research high tunnel at Penn State. The summer meeting has been held by telephone conference call or more recently by Zoom for many years simply because the directors are not able to get away for an in-person meeting at this time of year.

While the bulk of the meeting consisted of reports from the various committees, the Board voted unanimously to give \$16,000 to Penn State University for the construction of a second moveable research high tunnel at the Horticulture Farm at Rock Springs. This is in support of research work being undertaken by Dr. Francesco Di Gioia who is working on several areas of high tunnel production issues. The Association had given \$12,000 toward a similar moveable research high tunnel two years ago but Dr. Di Gioia's expected research needs beginning this fall will require two of the tunnels. Rimol Greenhouses, which supplied the first high tunnel and potentially will be supplying the second high tunnel offered a very generous discount on material in both cases that made construction of the high tunnels possible. In addition to Rimol's discount and PVGA support, the College of Agricultural Sciences and the Department of Plant Science are also helping to fund the purchase and construction of the high tunnel.

Penn State has 24 small, identical research high tunnels (17' x 36') constructed for the research of Dr. Michael Orzolek and Dr. William Lamont, both whom are retired, over 20 years ago. However, these high tunnels have different soil conditions in each because different experiments have been conducted in them over the years. The older high tunnels were used by Kathy Demchak in recent years for a large multi-state trial of high tunnel berry production. There the smaller, identical high tunnels were very useful because it allowed different plastic coverings to be compared and

the berries were grown in containers so soil conditions were not a factor.

The new moveable high tunnels are 30' x 96' are more representative of the size tunnels that growers use. They also allow multiple experimental treatments to be compared in the same environmental conditions within the larger tunnel in the same soil conditions. The ability to move the tunnel on a rail system from year to year will allow the soil to be exposed to natural weather conditions when it is not covered by the tunnel, thus providing similar growing conditions for future experiments. The new moveable high tunnels will also have fully automated ventilation systems to maintain more constant environmental conditions which is especially important for experimental work. They will also have supplemental heat to prevent the loss of an experiment on an unusually cold night.

PVGA is committed to supporting vegetable and small fruit research and the Directors felt this was an important investment that needed to be made quickly to allow Dr. Di Gioia's research to proceed on schedule. Naturally, however, they also considered the fact that the Association's income this year is anticipated to only be about a third of its normal amount. They agreed to this grant on the understanding that the Association's vegetable research budget for 2022 would be adjusted downward to reflect this special grant in 2021. The Association's practice of maintaining a large reserve has enabled the Association to carry on nearly all of its activities and functions this year and to make this grant.

The Directors received reports on the plans for a normal in-person Mid-Atlantic Fruit and Vegetable Convention on February 1 to 3, 2022. Pre-convention workshops are set for January 31. In addition, an in-person Farm Show is being planned although the Association's booth will be relocated. The Farm Show

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**Pennsylvania
Vegetable Growers
Association**

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

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is reconfiguring the Food Court as well as making other changes like widening the aiseways to help reduce crowding at the Farm Show. Otherwise, unless pandemic conditions change, there are no other restrictions being anticipated for the Farm Show.

The Succession Planning Committee reported that they are continuing their work to plan for finding a new Executive Director on the retirement of William Troxell expected in late 2023. A draft job description has been developed. The Committee is recommending having a new person on board for a training period of up to a year. The Committee is also exploring the possibility of working with several other organizations for a joint staffing arrangement.

The Strategic Planning Committee reported that the Internal Revenue Service had responded to the Association's application to become a 501(c)3 charitable organization requesting some further information, which is being prepared. The Committee is considering a fundraising effort to allow the Association to fund additional research, establish a new farmer mentorship program and organize a series of on-farm educational meetings. The Committee asked the Board to approve retaining a consultant to train the Committee and Board on fundraising issues but the Board decided not to pursue the training at this point in time.

The Berry Committee reported that their weekly Zoom grower meetings on Monday nights were appreciated by those that attended them – but relatively few growers participated. For the rest of the season, the calls will only be held on the third Monday nights of July, August and September. The Zoom link is <https://us02web.zoom.us/j/83077021881> The call-in numbers are 929 436 2866 or 301 715 8592. The meeting ID is 830 7702 1881. Be aware that calling in by telephone is not toll-free. The PVGA Berry Growers Facebook group has been well received with over 35 members.

It was reported that Glen Bupp had started as a Penn State Extension educator based in Butler County with vegetable and small fruit responsibilities on June 1 and Dr. Karly Regan will begin on September 1 and be based in Cumberland County. A verbal commitment has been received for the Columbia -County-based vegetable and fruit position with the candidate tentatively beginning on October 18.

The next meeting of the Board of Directors will be Tuesday, December 7, in State College.

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

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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.

State News Briefs

Agritourism Civil Liability Reform Signed Into Law

Pennsylvania farm families will have more opportunity to diversify their businesses and connect with their communities around food and agriculture thanks to a new law that addresses a significant legal barrier to offering agritourism activities.

Gov. Tom Wolf recently signed legislation to enact common-sense legal protections for agritourism following its passage by the General Assembly.

Pennsylvania Farm Bureau worked closely with state Rep. Barb Gleim to introduce the legislation, House Bill 101. The state House passed the measure in February with a bipartisan, 142-60 vote. And the bill gained widespread support in the Senate, which passed the bill 48-2 last month.

The law's adoption is a major victory for Pennsylvania agriculture. Farmers have sought for years to secure civil liability limits for agritourism to help family farms remain viable through a changing farm economy and connect with their communities around family fun and local food. PFB led the effort to put momentum behind the measure, making it a priority of the organization's grassroots advocacy campaign and holding a news conference last fall to build support.

"This commonsense legal reform will help Pennsylvania's family farms preserve their futures so they can continue to grow their rural communities and enhance our state's agricultural heritage," PFB President Rick Ebert said. "Farmers prioritize safety; but farms are natural environments and it's impossible to eliminate every hazard. This reform will enable Pennsylvania farm families to safely invite the public to experience agriculture without having to risk their farms' futures or pay cost-prohibitive insurance premiums."

The law offers commonsense legal protection to farms that invite the public onto their property for agritourism activities, such as corn mazes, pick-your-own produce, hayrides, and similar attractions. Specifically, farms that offer agritourism activities will now have reasonable protection from lawsuits that arise from circumstances beyond their control and in which no party is at fault as long as they warn visitors of the inherent risks of being on a farm, such as uneven ground, weather, and unpredictable animals.

At the same time, farmers will still need to take reasonable steps to ensure guest safety. The law does not give farms a free pass from ensuring guest safety and farms can still be held accountable if they fail to fix or warn patrons of obvious and dangerous safety risks. The measure is modeled off similar laws already on the books in at least 20 other states, including New York and Ohio.

The threat of frivolous lawsuits has been a significant barrier for agritourism operations. In addition to putting their farms at risk by inviting the public onto their property, farmers who engage in agritourism have difficulty finding insurance coverage or have to pay high premiums due to the legal risks involved. The new law limiting civil liability seeks to address this challenge.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

Game Commission Gives First Approval to Red Tag Changes

Game Commissioners gave preliminary approval to proposed changes to the Deer Depredation Program, or "Red Tag" at their July 24 meeting.

The program, which is designed to give farmers an extra option to handle deer damage in the early spring and fall, has its drawbacks. The proposed changes come after a review in response to stakeholder requests for modifications, including advocacy from Pennsylvania Farm Bureau.

The commission held meetings and open discussions with various organizations, including PVGA, PFB and the PA Landscape and Nursery Association, to collect recommendations to attempt to improve the program. The agenda outlines that the new program would be called the "agriculture deer control program."

Some of the proposed changes include removing the public access requirement and signage requirements; allowing four permits per person to be consistent with DMAP; changing valid permit dates to Aug. 1 through Sept. 15, and Feb. 1 through April 15; allowing hunters to keep all deer harvested; and removing the landowner reporting requirement, as well as opening participation to non-Pennsylvania residents.

If given final approval the Commission's next meeting, the changes will not take effect until July of 2022.

Adapted from Pennsylvania Farm Bureau.

State Budget Funds Agriculture But Misses Opportunities on Conservation, Broadband

The 2021-2022 state budget will maintain funding for programs important to Pennsylvania farmers, and address two important tax issues, but misses opportunities to make additional investments that are needed to strengthen the state's number one industry and grow rural communities throughout the commonwealth.

The budget includes a 5 percent increase for the Pennsylvania Department of Agriculture's general government operations and would maintain level funding for the Penn State Cooperative Extension, the University of Pennsylvania School of Veterinary Medicine and the Pennsylvania Agricultural Surplus System, which assists in getting excess food from Pennsylvania farms and food processors into the charitable food network. The budget also maintains funding for agriculture programs that had been zeroed out in the proposed budget Gov. Tom Wolf outlined in February and the accompanying tax code bill includes two tax provisions important to agriculture.

However, Pennsylvania Farm Bureau expressed disappointment that the spending plan does not include additional funding to expand broadband internet access in rural communities or to assist with implementation of on-farm practices to protect water quality.

"While we are pleased that this budget maintains funding for many programs that support Pennsylvania agriculture, now is not the time to settle for the status quo," PFB President Rick Ebert said. "After years of a challenging farm economy followed by a crippling pandemic, investment is needed to help family farms and rural communities thrive. Agriculture is the Keystone State's number one industry, powers the economies of our rural communities, and improves quality of life throughout the commonwealth by maintaining open space and providing access to fresh, local food. An investment in our family farms is an investment in all Pennsylvanians."

Specifically, PFB had advocated for using some federal pandemic relief funding allocated to the state to help in areas such as rural broadband expansion and farm conservation.

"Broadband access remains one of the greatest challenges facing rural businesses and residents," Ebert said. "The COVID-19 pandemic laid bare the digital divide that makes growing our rural communities a challenge. High-speed internet is no longer a luxury, it's a necessity for business, healthcare access, education, and daily life. Farmers need broadband access to take advantage of the latest technology to help us farm smarter, more efficiently and with a smaller environmental footprint."

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“In addition, greater public investment is needed to share in the cost of farm conservation efforts, especially in high-priority areas like the Chesapeake Bay Watershed,” Ebert continued. “Farmers are already conservation leaders and want to do even more, but we operate on slim margins and cannot afford these expenses on our own. Pennsylvania’s plan to meet its goals for reducing nutrient and sediment pollution in the Chesapeake Bay by 2025 leans heavily on implementing on-farm conservation measures. But significant gaps remain in funding and technical support needed to achieve those goals.”

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

Sunday Hunting Expansion Push Advances in State Senate

A push to further expand Sunday hunting in Pennsylvania and remove the limits imposed by the 2019 law that allowed hunting on three Sundays has taken its first step in the General Assembly.

Pennsylvania Farm Bureau opposes the measure and believes it would result in a significant expansion of Sunday hunting while removing the ability of farmers and other rural landowners to have their concerns heard and addressed through the legislative process.

Senate Bill 607, sponsored by Sen. Dan Laughlin of Erie County, cleared the Senate Game and Fisheries Committee with a 7-4 vote. The measure now heads to the full chamber for consideration.

The bill would grant the Pennsylvania Game Commission full authority to set Sunday hunting rules, taking those decisions away from the General Assembly. While Sunday hunting was previously limited to foxes, crows and coyotes, a 2019 law allowed expanded hunting to occur on three Sundays only and, if on private land, only with written permission from the landowner. The legislation would remove both of those limits.

While PFB has historically opposed Sunday hunting, grassroots members voted in November 2018 to shift PFB policy so that the organization could take a neutral stance on a Sunday hunting bill that met certain criteria. That paved the way for a compromise bill in 2019 that met those objectives: Limiting hunting to three Sundays, requiring written permission, and strengthening trespass laws.

PFB believes that Senate Bill 607 would essentially renege on that compromise by allowing Sunday hunting to be greatly expanded without farmers and other rural landowners having that same opportunity to see their concerns addressed through their elected legislators.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

Tax Provisions on Crop Insurance, MAVs Included in Budget Package

Two tax provisions that will benefit Pennsylvania farmers—one offering flexibility related to state taxes on crop insurance payments and another clarifying when multipurpose agricultural vehicles are exempt from state sales tax—have been adopted as part of the 2021-2022 state budget package.

The measures had been introduced as stand-alone bills but were rolled into the tax code bill that accompanies the budget.

The provision on crop insurance allows farmers to defer crop insurance payments from state income taxes for one year, bringing state tax policy on crop insurance in line with federal rules. The change gives farmers greater flexibility in paying taxes on crop insurance payments at the times when they need it the most. Because crop insurance payments are triggered at times of severe weather and significant crop loss, farmers receive such payments when the year did not go as planned. Greater flexibility

for state income taxes will help farmers manage income and expenses in difficult years.

The other measure clarifies when purchases of MAVs for agricultural purposes are exempt from state sales taxes. Farmers receive a sales tax exemption when purchasing MAVs to be used primarily for farming. However, the state Department of Revenue has a narrow definition of what is considered a farming activity. Many farm chores—maintaining and repairing pasture fencing, for example—fall outside of the department’s definition.

Increasingly, farmers have faced state tax audits after claiming the exemption for MAVs used on the farm and had to pay state sales tax because their use of the equipment did not meet the department’s criteria for farming. The measure expands the scope of activities considered “farming” to include the wide range of ways MAVs can be used on a farm to support the farmer and their business.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

Farm Conservation Bill Advances in General Assembly

A bill that aims to expand funding and technical support to assist with implementing on-farm practices that protect water quality is on its way to being considered by the state Senate.

The Senate Environmental Resources and Energy committee voted unanimously to advance Senate Bill 465. The legislation now heads to the full chamber for consideration.

Pennsylvania Farm Bureau helped develop the legislation along with state Sen. Gene Yaw of Lycoming County, the bill’s prime sponsor; Penn State; and the Chesapeake Bay Foundation.

The legislation would expand opportunities for farmers to partner with conservation district staff in their communities on locally focused projects that protect natural resources and improve water quality by creating a new Agricultural Conservation Assistance Program.

The proposed ACAP would work similarly to the State Conservation Commission’s Dirt and Gravel Roads program. Funding would be distributed to county conservation districts throughout the commonwealth using a formula that benefits all parts of the state while directing additional resources to areas with the greatest opportunity for improvement. Conservation districts would then partner with farmers and landowners in their communities to complete the conservation projects that make the most sense locally. The bill allows the program’s funding to come from multiple sources, including federal and state dollars and private investment.

The push comes as Pennsylvania faces increased pressure to expand farm conservation efforts in the Chesapeake Bay Watershed to meet federally mandated goals to reduce nutrient and sediment pollution by 2025. While Pennsylvania has developed a Watershed Improvement Plan to identify how those goals will be met, additional funding and technical assistance is needed to make it happen.

While all parts of the state would benefit from the ACAP, areas with the greatest need, like the Chesapeake Bay Watershed, would receive additional resources to help with their efforts.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

House Passes Bill to Allow Heavier Loads for Spring Planting

The state House of Representatives has passed legislation that would allow for transportation of heavier loads of spring planting materials.

Representatives voted 122-79 in favor of House Bill 1232, sponsored by Rep. Jason Silvis of Westmoreland County. The measure now heads to the state Senate for consideration.

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The bill would create a seasonal overweight permit for the movement of up to 95,000 pounds of lime, fertilizer and/or seed between March and June. This will help farmers get ready for spring planting with fewer truck trips.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

Bill to Improve Broadband Infrastructure Clears House Committee

A bill that would identify opportunities to expand high-speed internet infrastructure is moving forward in the state House of Representatives.

The state House Consumer Affairs Committee approved Senate Bill 442 with a 23-2 vote, sending the measure to the full chamber for consideration. The state Senate passed the bill in May.

The legislation, sponsored by Sen. Kristen Phillips-Hill of York County, would direct the state Department of General Services to compile a list of state-owned assets that could be used to host technology to expand broadband access.

Increasingly, broadband access is becoming critical to agriculture, business and daily life but many rural areas in Pennsylvania lack adequate service. That digital divide was especially highlighted during the COVID-19 pandemic, when many essential aspects of daily life such as work, education and medicine moved online putting residents in areas where service is lacking at a disadvantage.

Pennsylvania Farm Bureau supports the measure and believes a multi-pronged approach is needed to expand high-speed internet access in Pennsylvania and examining state assets that could assist in broadband deployment is just one of those steps.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

Transportation Bills Advance

A pair of bills that seek to address transportation-related concerns faced by Pennsylvania farmers are moving forward in the legislative process.

The state Senate Transportation Committee voted unanimously to advance Senate Bill 725, which would clarify what type of license farmers need to operate heavier trucks, and Senate Bill 736, which would add flexibility for home delivery of farm products. Both measures now head to the full Senate for consideration.

Senate Bill 725, sponsored by Sen. Camera Bartolotta of Washington County, would clarify that farmers may operate trucks, or truck combinations, with a gross vehicle weight above 26,000 pounds with a Class C driver's license. A 2014 law allows farmers to operate heavier trucks without a commercial driver's license. Pennsylvania State Police have more recently interpreted that law as requiring farmers to hold a Class A license when operating heavier vehicles and have taken enforcement action as a result. The bill would affirm that the General Assembly's intent was for farmers to be able to operate such vehicles with the more common Class C license.

Senate Bill 736, sponsored by Sen. Wayne Langerholc of Cambria County, would allow farmers to use farm-registered vehicles for the home delivery of products they produce on their farms. The state's vehicle code allows farmers to use farm-registered vehicles to transport products to and from a place of business; however, if a farmer wanted to start a home-delivery service

for their products, they would need to obtain a commercial registration for a vehicle. This is challenge for agriculture, especially as more farms expand into home delivery, because many of the exemptions provided to farmers are predicated on them driving a farm-registered vehicle.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

Bill Would Allow Like-Kind Exchanges for State Taxes

Legislation that would allow Pennsylvania farms and businesses to use the tax advantages of like-kind exchanges for state taxes is advancing in the General Assembly.

The state Senate Finance Committee voted 9-2 to send Senate Bill 347 to the full chamber for consideration. The bill, sponsored by Sen. John DiSanto of Dauphin County, would bring state tax law in line with federal policy by allowing businesses and farms to use like-kind exchanges for the purchase of personal property.

Pennsylvania is the only state that does not allow like-kind exchanges at the state level.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

On-Site COVID Vaccine Clinics Available for Farms, Agriculture Businesses

The Pennsylvania Department of Agriculture and Pennsylvania Emergency Management Agency are now offering on-site COVID-19 vaccination clinics for farms and other agricultural businesses throughout Pennsylvania.

The program is part of the ongoing effort to vaccinate farmers and farm workers across the state to slow the spread of COVID-19, protect the agricultural community, and prevent further disruptions to the food supply chain.

If your farm business has ten or more people in need of vaccination and is willing to do an on-site clinic, please visit <https://bit.ly/3ifXiWW> to take a survey. A representative will follow up to schedule or answer questions you may have.

Pennsylvania Farm Bureau has information about the vaccine, including where to find appointments, on our vaccine website. Visit www.pfb.com/vaccine for more information.

Cover Crop Rules for Prevented Planting Updated

The U.S. Department of Agriculture will now allow agricultural producers with crop insurance to hay, graze or chop cover crops for silage, haylage or baleage at any time and still receive 100 percent of the prevented planting payment.

Previously, cover crops could only be hayed, grazed or chopped after Nov. 1, or the prevented planting payment would be reduced by 65 percent.

The change gives producers greater flexibility for the 2021 crop year and into the future.

USDA's Risk Management Agency will not consider a cover crop planted following a prevented planting claim to be a second crop. But RMA will continue to consider a cover crop harvested for grain or seed to be a second crop, and that crop would therefore remain subject to a reduction in the prevented planting indemnity.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

National News Briefs

Farm Bureau Applauds Senate Passage of Growing Climate Solutions Act

Farm Bureau applauded the U.S. Senate for passing the Growing Climate Solutions Act. The act has 55 cosponsors, which makes it the first major piece of bipartisan legislation that would help farmers, ranchers and forest landowners reduce greenhouse gas emissions and build climate resilience through voluntary, market-driven programs. The Growing Climate Solutions Act passed by a vote of 92-8.

“We appreciate lawmakers putting aside their differences to work on bipartisan solutions to the challenges facing farmers and ranchers,” said AFBF President Zippy Duvall. “The Growing Climate Solutions Act acknowledges the potential of climate-smart farming while ensuring farmers would be respected as partners who can build on our strong foundation of environmental stewardship.”

The Growing Climate Solutions Act is supported by more than 75 agriculture, food, forestry and environmental groups that are part of the Food and Agriculture Climate Alliance. The alliance advocates for responsible policies that build on voluntary, incentive-based programs, market-driven opportunities and science-based approaches.

This legislation would provide clarity and guidance for farmers, ranchers and forest landowners interested in voluntary participation in private carbon credit markets. With a growing number of ecosystem service providers, producers seek a trusted source for reliable information. The Growing Climate Solutions Act would create a certification program at USDA to help solve technical entry barriers. Landowner participation and the adoption of practices have been slowed by a lack of access to reliable information about private carbon markets, as well as too few qualified techni-

cal assistance providers and credit protocol verifiers.

“The Growing Climate Solutions Act demonstrates how far we’ve come in climate policy over the past decade,” President Duvall said. “Farm Bureau has worked tirelessly through the Food and Agriculture Climate Alliance and directly with lawmakers to help them understand the importance of working with America’s farmers and ranchers to ensure climate policy remains voluntary and market-driven. We encourage members of the House to follow the Senate’s lead and work in a bipartisan manner to create responsible policy that protects the environment and protects the farmers and ranchers who rely on clean air and water to feed the nation.”

The House is currently working on its version of the Growing Climate Solutions Act.

From Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, July 2021.

EPA, Army Corps Plan to Revise WOTUS Definition

The U.S. Environmental Protection Agency and Army Corps of Engineers have announced plans to once again define what waterways can be regulated by the federal government, prompting concerns from Farm Bureau that the move could result in a return to broader federal regulation of farmland.

The agencies say they plan to begin a new rulemaking process that will reverse the Trump administration’s 2020 Navigable Waters Protection Rule, restore federal oversight of waterways that were federally regulated prior to the Obama administration’s 2015 Waters of the U.S. Rule, and then develop a new rule.

Farm Bureau expressed frustration with the announcement and called on EPA Administrator Michael Regan to make good on his promise to take into account farmers’ concerns over federal water regulation.

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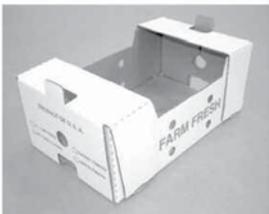
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“The American Farm Bureau Federation is extremely disappointed in the Environmental Protection Agency’s announcement of its intention to reverse the environmentally conscious Navigable Waters Protection Rule, which finally brought clarity and certainty to clean water efforts,” American Farm Bureau President Zippy Duvall said. “Administrator Regan recently recognized the flaws in the 2015 Waters of the U.S. Rule and pledged not to return to those overreaching regulations. We are deeply concerned that the EPA plans to reverse the Navigable Waters Protection Rule, which puts the future of responsible protections at risk.”

The question that the Obama, Trump, and now Biden administrations have sought to answer is how to define “waters of the U.S.” (or WOTUS), which refers to those waterways that fall under the federal government’s jurisdiction to regulate under the Clean Water Act. Farm Bureau led opposition to the 2015 WOTUS rule, which took an overly broad approach to defining federally regulated waterways and would have subjected nearly all of Pennsylvania farmland to federal water regulation. The rule was put on hold by several federal court rulings that expressed agreement with Farm Bureau’s assertion that EPA and the Army Corps overstepped its authority under the Clean Water Act. The 2020 rule was largely welcomed by agriculture as more clearly defining which waterways are subject to federal regulation.

“This is an important moment for Administrator Regan and will be pivotal to his ability to earn the trust of farmers on this and other administration priorities,” Duvall added. “He must keep his word to recognize the efforts of agriculture and not return to flawed, overly complicated and excessive regulations.”

Regan, for his part, expressed interest in developing a new rule that takes into account lessons learned from both the Obama-era and Trump-era regulations, saying the new definition will be developed with “input from a wide array of stakeholders.” EPA’s news release listed as one of the priorities for the new rule “reflecting the experience of and input received from landowners [and] the agricultural community that fuels and feeds the world.”

EPA is planning a two-step process and the Trump rule will remain in effect until the first step is completed. First, EPA plans to repeal the current rule, which will cause the definition of WOTUS to revert back to what it was prior to the Obama rule. The second step is developing a new rule with a revised definition of WOTUS. At the same time, EPA is seeking court action to effectively put on hold lawsuits challenging the 2020 rule as they will be rendered moot.

*From Pennsylvania Agricultural Alliance Issues Update,
Penna. Farm Bureau, July 2021.*

Mental Health Resources Available

Research has found that many farmers are experiencing new stress and mental health concerns as a result of the COVID-19 pandemic, the farm economy and other pressures.

If you or someone you know is struggling or has concerns about their mental health, please know that you are not alone and there is help available.

There are unique factors that affect stress in the farming community as well as unique warning signs that someone is struggling. Those include:

- Change in routines or social activities
- Decline in the care of domestic animals
- Increase in illness or other chronic conditions
- Increase in farm accidents
- Decline in appearance of the farm
- Decreased interest in activities or events
- Signs of stress in children including struggles with school

Help and Resources Available:

National Suicide Prevention Lifeline: Call 1-800-273-TALK (8255) or use the online chat at suicidepreventionlifeline.org/chat 24/7 for free and confidential support and to be connected with a skilled, trained counselor in your area.

Crisis Text Line: Text HOME to 741741 for 24/7 support via text.

PA 211 is a United Way statewide partner which offers trained resource navigators who can tell farmers what services may be available in their area to help with a variety of health and human service needs, from utility or food assistance to mental health support. Visit www.pa211.org, dial 211 from any landline or cell phone, or text your zip code to 898-211.

Avera Health Farm and Rural Stress Hotline: Call 800-691-4336 to be connect with a skilled, compassionate mental health professional.

Substance Abuse and Mental Health Services Administration: Call 1-800-662-HELP (4357) for treatment locators, SAMHSA’s National Helpline, a Disaster Distress Helpline and other important information.

Find additional resources, learn tips for starting important conversations about mental health, and register for free rural resilience training by visiting farmstateofmind.org.

*From Pennsylvania Agricultural Alliance Issues Update,
Penna. Farm Bureau, July 2021.*

USDA Begins Issuing Relief Payments for 2018 Flooding, Excessive Rain

The U.S. Department of Agriculture has begun issuing payments to farmers who applied for relief to help offset crop damage and losses due to natural disasters in 2018 and 2019, including excessive rainfall and flooding that affected 39 Pennsylvania counties in the summer of 2018.

Payments began June 15 to producers who signed up for the Quality Loss Adjustment Program and Wildfire and Hurricane Indemnity Program Plus. USDA accepted applications for the QLA program, provides assistance to crop and forage producers who suffered a quality loss, through April 9 and will be able to pay out 100 percent of the calculated assistance. Producers who applied for WHIP+ previously received 40 percent of their calculated payment due to budget constraints and are now receiving an additional 50 percent, for a total payment of 90 percent of the full amount for which they were eligible.

Pennsylvania counties that were eligible to apply for relief include: Adams, Blair, Bradford, Cambria, Cameron, Centre, Clearfield, Clinton, Columbia, Crawford, Elk, Erie, Fayette, Franklin, Fulton, Greene, Huntingdon, Indiana, Jefferson, Lackawanna, Lancaster, Lebanon, Luzerne, Lycoming, McKean, Montour, Northampton, Potter, Schuylkill, Snyder, Somerset, Sullivan, Susquehanna, Tioga, Washington, Wayne, Westmoreland, Wyoming, York.

The window remains open through Sept. 15 for farmers in northern Pennsylvania who suffered crop damages due to frost and freeze to apply for disaster loans.

*From Pennsylvania Agricultural Alliance Issues Update,
Penna. Farm Bureau, July 2021.*

GENERAL

Food Safety Signs and Posters Available for Printing

Certain signage is required for a Good Agricultural Practices audit or the Produce Safety Rule. Rutgers Cooperative Extension has produced some of the required signs which can be downloaded and printed from their website at <https://onfarmfoodsafety.rutgers.edu/signs/>. Not all the signs listed below are, but hand-washing and visitor signs need to be posted in English and in the language of the workers. For example, if you have a mixture of Spanish and Creole speakers, you will need signs in three languages. The signs available for printing are:

Hairnet, Beard Net and Jewelry Policy
Health and Safety Notice for Visitors,
Safe Handling of Fresh Produce
Cleaning and Sanitizing Food Contact Surfaces,
ADA Service Animal Sign (English),
When Must Hands Be Washed (English),
Large Proper Handwashing Poster (English),
Quick Reference to Foodborne Illness

Printable Signs in Spanish

Cleaning and Sanitizing Food Contact Surfaces (Spanish),
When Must Hands Be Washed (Spanish),
Poster: Handwashing (Spanish)
Poster: Please Put Used Toilet Paper in the Toilet (Spanish),
Poster: Please Use Toilets Provided in the Field (Spanish),
ADA Service Animal Sign (Spanish)

From Rutgers Cooperative Extension.

Consider Becoming a Harvest Host

Harvest Hosts' goal is to connect small businesses and destinations across the US and Canada with its 180,000+ members. In exchange for an overnight stay, members pledge to support the businesses they park at. In 2020, members spent a total of \$25 million across host locations, with that number projected to hit \$40+ million in 2021. On average, well-established hosts saw an additional revenue boost of more than \$13,000 from HH member spending.

Becoming a host is simple – visit <https://harvesthosts.com/>.

What is required to become a host with Harvest Hosts?

NO COST – Harvest Hosts will connect your business with their members and there is no cost for you to participate.

MEMBER PURCHASES – Members are encouraged, as a part of signing the Harvest Hosts member code of conduct, to spend a minimum of \$20 at each host location they visit (average spend is \$50/night)

NO SERVICES REQUIRED – Member vehicles are required to be self-contained. You do not need to provide electricity, water, sewage dump, or wi-fi. If you have any of those, that is a great bonus for members, but they are not required.

OVERNIGHT STAY – Your business is important to you...and to Harvest Hosts. Harvest Hosts limits their members' stay to one day/night. You are more than welcome to extend an invitation for them to stay longer, but that is your choice.

HOST DASHBOARD & MEMBER REVIEWS – Hosting is made simple with access to your online Host Dashboard, where you can manage your profile details. You can also see reviews of Members who have stayed with other Hosts or add a review of a Member who stayed with you.

REQUEST A STAY SERVICE - a service provided on each host profile to allow members to see your location's availability without having to call you. Hosts can block dates and control hours of availability. The system automatically captures the member's name, number, and information to create an even easier booking process for you!

Currently, there are over 25 Pennsylvania farms in the Harvest Host network; they are excited to expand their presence and think members of PVGA would be a great fit!

Should you have any questions or want to learn more about the program, please contact Hailey Earp (Account Executive, Host Relations) at hailey@harvesthosts.com or 217.552.2418.





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VEGETABLE PRODUCTION

Watch Your Pumpkins and Squash for Squash Vine Borers

Jerry Brust



Figure 1. Adult squash vine borer at rest

I have gotten several emails and calls from growers in different areas of the state reporting they are seeing the beginnings of squash vine borer problems in their pumpkins or squash crops. If you rotated at least ¼ mile from your squash/pumpkin fields of last year you should be OK, however I know some growers either could not rotate or they could not rotate very far from last year's crop.

Squash vine borer adults, *Melittia cucurbitae*, are moths that look like wasps. They are about ½ inch long with an orange abdomen and black dots (Fig. 1). These moths are day flyers and can easily be spotted flitting about a squash or pumpkin field. The adults emerge in mid or late June in our area. Adults lay most of their eggs in the first 12-15 inches of the stem. Pumpkins, zucchini and summer and winter squash are preferred plants, rarely have I seen them in watermelon, cucumber or cantaloupe. The eggs hatch in about one week at which time larvae bore directly into stems and feed. The large cream-colored larvae are 1-1.5 inches long (Fig. 2). Their feeding blocks the flow of water to the rest of the plant. Larvae feed for 4-6 weeks, then exit the stems and burrow into the soil to pupate, where they overwinter.



Figure 2. Squash vine borer larvae (4) in stem

The first symptom of a borer attack is the wilting of plants, which usually occurs in July. The wilting may occur at first only when in direct sun, but the plants will eventually die. At the base of the plant you can find greenish-yellow sawdust like material (frass) and a scarred swollen stem (Fig. 3).

Squash vine borers can be difficult to manage once larvae are in the stem, as it is too late to do much. When squash vines begin to run or you see adults you can treat the base of the stem (the first 15-18 inches of stem) with a pyrethroid insecticide (or any other recommended pesticide in the Mid-Atlantic Vegetable recommendation guide) every 7-10 days, over the next 21-30 days. You could also use Bt insecticide (it is OK but not great) or Entrust which is better and both are OMRI approved.



Figure 3. Frass (arrow) and pumpkin stem damaged by borers

Dr. Brust is the IPM Vegetable Specialist at the Univ. of Maryland. From the Weekly Crop Update, Univ. of Delaware Extension, Vol. 29, Issue 14, June 25, 2021.

Monthly FSMA Conference Calls Scheduled

This year the Food Safety Modernization Act (FSMA) will require many small food producers, growing \$28,000 to \$250,000 in produce, to receive their first inspection. But many growers still have questions on how this will impact their operation. What will an FSMA inspection involve? What needs to happen to be in compliance? How is FSMA like GAP audits?

The calls will be the first Monday of each month starting May 3 at 8:00 p.m. Join Farm Food Safety Educator Jeff Stoltzfus in a conference call to unpack FSMA. Learn what "educate while you regulate" means. Get current FSMA updates. And have Q&A time to ask your questions about the act and ongoing inspections. Monthly conference calls are free to attend! Call: 425-436-6321 Use access code: 5348473 Pre-registration is not necessary There is no cost but it is not a toll-free number.

Pollen-sized technology protects bees from deadly insecticides

By Krishna Ramanujan

A Cornell-developed technology provides beekeepers, consumers and farmers with an antidote for pesticides, some of which may kill wild bees and can contribute to beekeepers losing around a third of their hives every year on average.

An early version of the technology – which detoxified a widely-used group of insecticides called organophosphates – is described in a new study, “**Pollen-Inspired Enzymatic Microparticles to Reduce Organophosphate Toxicity in Managed Pollinators**,” published May 20 in *Nature Food* <https://www.nature.com/articles/s43016-021-00282-0>. The antidote delivery method has now been adapted to effectively protect bees from all insecticides, and has inspired a new company, **Beemmunity**, (<https://www.beemmunity.co/>) based in New York state.

Studies show that wax and pollen in 98% of hives in the U.S. are contaminated with an average of six pesticides, which can potentially lower a bee’s immunity to devastating varroa mites and pathogens. At the same time, pollinators provide vital services by helping to fertilize crops that lead to production of a third of the food we consume, according to the paper.



Abraham McCauley/Provided

Beemmunity sugar bars that contain microsponges, for use with a bee feeder that is under development.

“We have a solution whereby beekeepers can feed their bees our microparticle products in pollen patties or in a sugar syrup, and it allows them to detoxify the hive of any pesticides that they might find,” said James Webb, M.S. ‘20, a co-author of the paper and CEO of Beemmunity.

First author Jing Chen is a postdoctoral researcher in the lab of senior author Minglin Ma, associate professor in the Department of Biological and Environmental Engineering in the College of Agriculture and Life Sciences (CALS). Scott McArt, assistant professor of entomology in CALS, is also a co-author.

The paper focuses on organophosphate-based insecticides, which account for about a third of the insecticides on the market. A recent worldwide meta-analysis of in-hive pesticide residue studies found that, under current use patterns, five insecticides posed substantial risks to bees, two of which were organophosphates, McArt said.

The researchers developed a uniform pollen-sized microparticle filled with enzymes that detoxify organophosphate insecticides before they are absorbed and harm the bee. The particle’s protective casing allows the enzymes to move past the bee’s crop (stomach), which is acidic and breaks down enzymes.

Microparticles can be mixed with pollen patties or sugar water, and once ingested, the safe-guarded enzymes pass through the acidic crop to the midgut, where digestion occurs and where toxins and nutrients are absorbed. There, the enzymes can act to break down and detoxify the organophosphates.

After a series of in vitro experiments, the researchers tested the

system on live bees in the lab. They fed a pod of bees malathion, an organophosphate pesticide, in contaminated pollen and also fed them the microparticles with enzyme. A control group was simultaneously fed the toxic pollen, without the enzyme-filled microparticles.

Bees that were fed the microparticles with a high dose of the enzyme had a 100% survival rate after exposure to malathion. Meanwhile, unprotected control bees died in a matter of days.

Beemmunity takes the concept a step further, where instead of filling the microparticles with enzymes that break down an insecticide, the particles have a shell made with insect proteins and are filled with a special absorptive oil, creating a kind of micro-sponge. Many insecticides, including widely-used neonicotinoids, are designed to target insect proteins, so the microparticle shell draws in the insecticide where it is sequestered inert within the casing. Eventually, the bees simply defecate the sequestered toxin.

The company is running colony-scale trials this summer on 240 hives in New Jersey and plans to publicly launch its products starting in February 2022. Products include microparticle sponges in a dry sugar medium that can be added to pollen patties or sugar water, and consumer bee feeders in development.

“This is a low-cost, scalable solution which we hope will be a first step to address the insecticide toxicity issue and contribute to the protection of managed pollinators,” Ma said.

Jin-Kim Montclare, a researcher at New York University’s Tandon School of Engineering, is a co-author.

The technology is licensed through Cornell’s Center for Technology Licensing (CTL). Ma and McArt are advisors for Beemmunity.

The study was funded by the U.S. Department of Agriculture’s National Institute of Food and Agriculture, the National Institutes of Health and the National Science Foundation.

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VEGETABLE PRODUCTION

Fusarium Crown Rot in Squash

Jerry Brust

A county agent sent pictures of squash that were turning yellow and wilting (Fig. 1). This was found to be Fusarium crown rot caused by the fungus *Fusarium solani* f. sp. *cucurbitae* with a little Anthracnose caused by *Colletotrichum orbiculare* mixed in with it. In the field, Fusarium crown rot is generally a problem in summer and winter squash, and some pumpkin cultivars, but most cucurbits have been found to be susceptible.



J Lewis, University of Maryland

Figure 1. Squash plants turning yellow and wilting

Early symptoms of Fusarium crown rot consist of stunting and wilting of the plant. The symptoms first observed at the crown include light colored water-soaked areas that become increasingly darker. A characteristic dark brown necrotic rot of the crown and at times the upper portion of the tap root develops soon after initial symptoms (Fig. 2). Infected plants break off easily at or just below the soil line. During typical summer weather (hot and humid), white or pink mycelial growth can be seen on the lower stem. While the roots of a plant can become infected, this pathogen is most often found in the stem just above the soil line or possibly in the fruit of the plant. If fruit are attacked there is a dry (not mushy) rot that develops. These rotted areas can develop a bull's-eye pattern. Other soil borne pathogens can make Fusarium crown rot even worse and the occurrence of anthracnose in these particular plants did not help matters.



J Lewis, University of Maryland

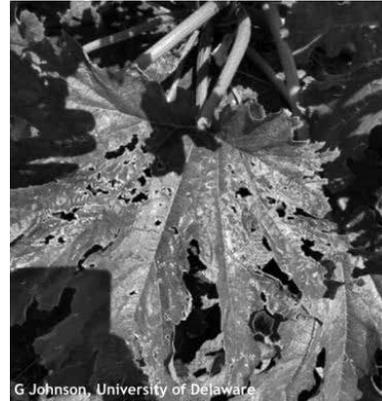
J Lewis, University of Maryland

Figure 2. Rotted base of stem of squash from Fusarium crown rot

Leaf Aging in Cucurbits

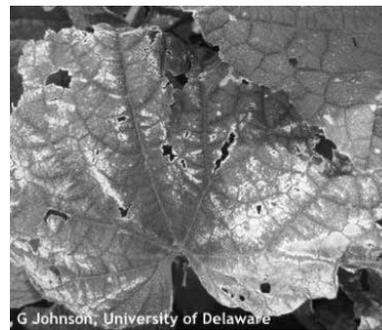
Gordon Johnson

We are starting to see the oldest leaves (crown leaves) in watermelons, cantaloupes, squash, cucumbers, and pumpkins with large areas that are discolored (white, tan, or bronze). These leaves will be brittle to the touch and may start to tear or shred with high winds and storms.



G Johnson, University of Delaware

Wind damage to Zucchini leaf. This damage will lead to premature aging of the leaf.



G Johnson, University of Delaware

Cucumber crown leaf showing leaf aging likely initiated by wind damage.

This condition is common in cucurbit crops and can be due to a number of leaf aging factors including mineral nutrient scavenging (export of mobile nutrients from oldest leaves to newer leaves), ozone air pollution damage, chemical phytotoxicity, repeated stress cycles, and wind injury.

Leaf cells that die will leak their contents, releasing enzymes and oxidizing chemicals affecting nearby cells thus accelerating the "aging" process. This results in large patches of dead leaf cells that then dry, making the leaf feel brittle. If leaf veins are damaged, water and food transport will be compromised, accelerating leaf decline. This leaf aging is not to be confused with damage from mite feeding which is also concentrated on oldest leaves or any of number of foliar diseases caused by plant pathogens.

Dr. Johnson is the Extension Vegetable and Fruit Specialist at the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 29, Issue 14, June 25, 2021

Inoculum can come from the soil or the seed. Inoculum from the soil comes from previously infected plants incorporated into the soil. From seed, Fusarium crown rot can be internally or externally seedborne. It is found in the seed coat and between the seed coat and cotyledons, however, it generally does not infect the cotyledons or reduce seed viability of seeds. It remains viable in seeds for 1-2 years. This pathogen is host-specific and occurs as races.

Fusarium crown rot occurs sporadically in most areas, and disease severity is determined by the amount of soil moisture and inoculum density. Because the fungus survives in the soil for 2-3 years as chlamydospores a 4-year rotation is often effective for disease control. Planting fungicide-treated seed also helps in reducing the occurrence of the disease that is introduced from infected seed.

Dr. Brust is the IPM Vegetable Specialist at the Univ. of Maryland. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 29, Issue 16, July 9, 2021.

VEGETABLE PRODUCTION

Pumpkin Disease Control

Gordon Johnson

I was recently asked about disease control programs for pumpkins. The following was modified from an article by Dr. Kate Everts in 2019 that I have added updated fungicide recommendations and additional information about certain diseases.

A frequent question that I get from growers is “what is the best spray program for my pumpkin crop (and other ornamental squashes)?”. It is a challenging question to answer, in part because each field/farm may have different disease pressure, and Ag Chem suppliers may only stock some fungicides. With that in mind, I have come up with the following step by step procedure to use as a guide in designing an individualized pumpkin program. The numbers in parenthesis that follow the fungicide name are the Fungicide Resistance Action Committee (FRAC) code for the product. Except for the broad- spectrum fungicides chlorothalonil, mancozeb and copper, always alternate other fungicides with different FRAC codes to avoid disease resistance buildup.

Step 1

Use all available cultural practices to reduce disease pressure, including planting disease resistant varieties when possible, using good rotations, and using no-till mulch based systems. If possible, modify your spray equipment to get excellent fungicide coverage on both the upper and lower surfaces of leaves.

Step 2

Learn to identify key diseases: powdery mildew, downy mildew, Plectosporium blight, gummy stem blight/black rot and bacterial leaf spot.

Step 3

Begin a basic preventative spray program with a chlorothalonil or mancozeb product. Spray every 7 to 14 days, beginning when vines run. (Organic alternative: copper). This will give protection against most foliar diseases.

Step 4

Use predictive models or scout for disease presence and if the following diseases occur or are predicted, use the following guidelines:

Gummy Stem Blight/Black Rot and Anthracnose

Alternate chlorothalonil with Rally (3), tebuconazole (3), Procore (3), Proline (3), Rhyme (3), Inspire Super (3+9), Aprovia Top (3+7), Switch (9+12), or Miravis Prime (7+12).

Bacterial Leaf Spot

Add a copper product to the basic preventative program (applied every 7 to 10 days).

Powdery Mildew

Powdery mildew control is critical to maintain quality of pumpkins and maintain strong “handles”. Some varieties have resistance or tolerance to powdery mildew and should be used when possible. Powdery mildew generally occurs from mid-July until the end of the season. Development on tolerant varieties will vary from year to year. Planting tolerant varieties will help delay the development of powdery mildew and improve the performance of fungicides.

Continued on page 14

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Pumpkin Disease Control *continued from page 13*

Make first application when powdery mildew is observed in the area or is detected by scouting (one lesion on the underside of 45 old leaves per acre). Add powdery mildew specific products to basic preventative program. Alternate FRAC codes.

Select one of these: Vivando (50), Luna Experience (3+7), Torino (U06), or Quintec (13).

And alternate with one of the following: Rally (3), tebuconazole (3), Proline (3), Rhyme (3), Inspire Super (3+9), Luna Experience (3+7), Aprovia Top (3+7), Magister(39), Miravis Prime (7+12) or Pristine (7+11).

(Organic alternative: Regalia, Micronized Wettable Sulfur)



Powdery mildew on pumpkin leaves.



Shriveled pumpkin handles are common with powdery mildew infections.

Downy Mildew

Only apply if the disease is predicted in the region. Strains of downy mildew that infect cucumbers and cantaloupe may not affect pumpkins and winter squash. If found in the region, add downy mildew specific product to the basic preventative program. Select two downy mildew products with different FRAC codes and alternate them. *Downy mildew products include:* Orondis Ultra (U15+40), Orondis Opti (M5+U15), Ranman (21), Previcur Flex (28), Presidio (43), Elumin (22), Zing! ((M5+22), Ariston (M5+27), Tanos (11+27), Curzate (27), Forum (40), and Zampro (40+45).

Plectosporium Blight

Chlorothalonil is good on Plectosporium blight. Full coverage will be needed for control.



Plectosporium lesions on pumpkin fruit.

Step 5

Special cases:

Phytophthora Fruit Rot.

Avoid planting pumpkins in a field with a history of this disease. To manage Phytophthora fruit rot, select two of the following Phytophthora products that are in different FRAC code groups and rotate them. Phytophthora fruit rot products include Orondis Ultra (U15+40), Orondis Opti (M5+U15), Ranman (21), Presidio (43), Elumin (22), Zing! ((M5+22), Forum (40), and Zampro (40+45).

Fusarium Fruit Rot

This disease is especially destructive in fields where pumpkins are grown every year. Once the pathogen is established in a field, loss can be significant. Fruit rot is caused by several Fusarium spp., and fungicide applications are not effective. Hard rind cultivars are less susceptible to Fusarium fruit rot than other cultivars. Production of pumpkin on a no-till cover crop mulch layer such as winter rye plus hairy vetch has been shown to help reduce disease incidence. Greater disease reductions will occur when the mulch layer is thicker.

Viruses (WMV, PRSV, ZYMV, and CMV)

The most prevalent virus in the mid-Atlantic region is WMV, followed by PRSV, ZYMV, and CMV. For control use varieties with virus resistance whenever possible. Reduce aphid transmission of viruses with insecticide programs.

This information was adapted from <https://sites.udel.edu/weekly-cropupdate/?p=14260> by Kate Everts, Vegetable Pathologist, University of Maryland and the MidAtlantic Commercial Vegetable Production Recommendations: <https://www.udel.edu/content/dam/udelImages/canr/photography/extension/sustainable-ag/NFP-2020-F-Pumpkin.pdf>. Dr. Johnson is the Extension Vegetable and Fruit Specialist at the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 29, Issue 16, July 9, 2021

Cabbage Aphid

We have been seeing low levels of infestation of cabbage aphids in some brassica fields for at least a month now. This pest has been a significant problem in some years and less so in other years. Infestations can stunt plants and reduce yield but the physical presence of the aphids in Brussels sprouts buds or on leafy greens is often the biggest concern. The best control is achieved by scouting early in the season and treating crops when populations are small and isolated. Cabbage aphids will feed on any brassica crop but Brussels sprouts are particularly hard hit, as aphids have a long time to build up and they get into the buds where they can't be reached by insecticide sprays.



Cabbage aphid colony

Identification.

Adults, both winged and wingless, and nymphs are grayish-green with a dark head and short, dark cornicles, but appear more grayish-white because the body is covered with a fine, white, powdery secretion. Dense colonies may develop.

Life cycle.

Only crops and weeds in the brassica family are suitable hosts for cabbage aphid. Cabbage, cauliflower, broccoli and Brussels sprouts are most severely affected, but other crops may become infested. Aphids tend to be more of a problem in fall plantings, but this year we saw low levels of infestation in spring plantings. They overwinter as eggs, which are laid on the undersides of leaves of the same crops or weeds that were fed on during the summer. This differs from the life cycle of many aphid pests of vegetables, where eggs are laid and overwinter on alternate hosts outside the field. Eggs typically hatch in April. Nymphs feed and develop into reproductive females who produce live young without mating. Winged adults disperse with wind and infest new crops. There are multiple summer generations and potential for huge population growth, especially where long-season crops (e.g. Brussels sprouts) are infested early.

Damage.

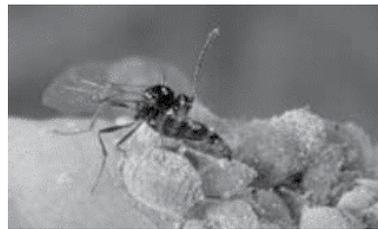
Cabbage aphids prefer to feed on young leaves, flower buds, or seed stalks in the upper part of the plant and also feed in developing Brussels sprout buds. Feeding injury includes wrinkled and downward-curling leaves, yellow leaves, and reduced growth. Contamination of marketable parts of the plant with aphids is frequently the biggest problem, as is contamination of the plant with aphid honeydew. (a sugary, sticky secretion produced by the aphids). Cabbage aphids can also transmit cauliflower mosaic and cabbage ring spot virus, among other viruses; transmission is non-persistent, with virus particles passed to new plants by probing.



Yellowing caused by cabbage aphids feeding on the underside of the leaf. Photo: B. Sideman



Toxomerus marginatus (left), a common species of syrphid fly, whose larvae feed on cabbage aphids (right). Photos: G. Higgins



Diaretetiella rapae laying an egg within a cabbage aphid. Photo: B. Chaubet

Biological control.

Natural enemies can suppress cabbage aphid populations, but may not be able to prevent or control high densities that can occur in cool fall weather. Predators of cabbage aphids include syrphid fly larvae and ladybugs. The tiny ichneumonid wasp, *Diaretetiella rapae*, is a parasitoid of cabbage aphid—female wasps lay eggs within the aphids and the resulting larva consumes the aphid from within, creating a round, bronze-colored “mummy”.

Continued on page 16

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VEGETABLE PRODUCTION

Cabbage Aphid continued from page 15

These natural enemies can be attracted to brassica fields by planting flowers that provide them with nectar and pollen. Research done at both UMass and the University of New Hampshire in 2018-20 found that the flowers of sweet alyssum, dill, cilantro, and *Ammi majus* attracted a high number of syrphid flies and *D. rapae*.

Cultural controls include those listed below. If cabbage aphids are present on your farm, each of these tactics alone will likely not prevent infestation of your crop. If these cultural control practices are implemented along with early, regular crop scouting, outbreaks can be controlled.

- Incorporate crop residues immediately after harvest or, for late-fall brassicas, as early as fields allow the following spring.
- Control brassica weeds in or near fields.
- Check transplants to be sure they are aphid-free. Early-season aphid infestations may originate from greenhouse infestations.
- Use reflective mulch to repel aphids.
- Scout for cabbage aphids weekly beginning in early June. If isolated patches of infested plants are found, removing those plants from the field and destroying them can help avoid their spread.

Chemical control: Use selective products when controlling other brassica pests to conserve beneficial insects, including predators and parasitoids of cabbage aphid (e.g. use *Bt* products to control caterpillar pests). If cabbage aphids are a consistent problem on your farm, systemic insecticides used at planting or sidedress may eliminate early infestations. Scout weekly to determine % infested plants, starting before harvested portions of the plant form. Treat if >10% of the plants are infested with aphids, especially after heads or sprouts begin to form. Or select 10 leaves at 10 sites for 100 leaves per field, and treat if >20% have aphids. Spray coverage of all leaf surfaces, buds, and new growth is key. Include a spreader-sticker to prevent insecticides from beading up and rolling off of waxy brassica leaves. Waiting until there are heavy outbreaks or until just before harvest makes it hard to prevent loss of marketable yield.

Research from the University of New Hampshire showed that cabbage aphid control using OMRI-listed materials can be achieved but you must spray early, when population levels are still low, and often. Azera (azadirachtin + pyrethrins) and M-Pede (insecticidal soap) used in a tank mix or in rotation has been found to be the most effective organic program for controlling cabbage aphids. Azera is a pre-mix of azadirachtin and pyrethrins; it could be replaced with an azadirachtin product alone (e.g. Azatin O, AzaGuard, Neemix, others) or with a tank mix of azadirachtin and Pyganic. Horticultural oils (e.g. SuffOil-X, JMS Stylet Oil, others) will also function to smother aphids—Dan Gilrein of Cornell Cooperative Extension recommends a solution of 2% horticultural oil + 0.5% M-Pede. All of the above insecticides work by contact, so thorough coverage is essential.

For conventional products, Dan Gilrein writes: “Movento was particularly effective in one cabbage trial at the Long Island Horticultural Research and Extension Center. Fulfill and Beleaf are also highly effective and specific aphid materials – all three have helpful translaminar or systemic activity. Alternatives include Assail and Admire Pro/generic spray. Note that the Bravo Weather Stick label prohibits tank mixing with DiPel, Latron B-1956, or Latron AG-98 and warns about combinations with other pesticides and surfactants unless a test shows the mix is safe. Cabbage aphids affected by treatment may not quickly appear to be dead – check after 2 days to verify efficacy.”

Adapted from the 2016-2017 New England Vegetable Management Guide by the Univ. of Mass. Extension Vegetable Program.

From the Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Mass. Extension, Vol. 33, No. 13, July 15, 2021.

Managing Powdery Mildew in Protected Tomatoes

By Genevieve Higgins and Margaret McGrath



Tomato powdery mildew. Photo: G. Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood

Powdery mildew has emerged as the most common disease of high tunnel tomatoes over the last decade or so. High tunnels provide protection from rain, which allows leaves to remain dry; we therefore usually see lower levels of foliar diseases like Septoria leaf spot and early blight in high tunnels than in the field, as these diseases require leaves to be wet to infect. Powdery mildew, on the other hand, does not require leaf wetness to infect, and so is able to thrive in the high tunnel environment. We are seeing widespread and severe powdery mildew infections at this time of the year, across the region, in tunnels where the disease is not being managed. Severe infections will lead to reduced yields and defoliation, which in turn can lead to sunscald of fruit.

Powdery mildews are host-specific pathogens, meaning that the powdery mildew fungus that causes disease on tomato (*Oidium neolycopersici*) is different from the fungus that causes powdery mildew on cucurbits or lettuce or various ornamental crops. The various powdery mildews cause similar symptoms on their host crops though – white, powdery sporulation on both the tops and undersides of leaves, in round spots that begin small but expand and converge and can eventually cover an entire leaf. Spores are dispersed by wind and spores take about one week to infect, grow, and produce new sporulation.

Cultural controls

Cultural controls can help reduce powdery mildew severity but will likely not prevent the disease. Although *O. neolycopersici* does not require high humidity to infect, the pathogen thrives in humid environments (up to 95% relative humidity).

Removing lower leaves and increasing plant spacing will improve air circulation and can improve spray coverage. Those practices, in combination with **providing adequate ventilation**, will reduce humidity in tunnels. (These two resources, one from the UVM Agricultural Engineering Program and the other from UConn, provide good background information and specifics about how to achieve adequate ventilation and air circulation.) *Oidium neolycopersici* is an obligate parasite, meaning that it requires a living host to survive, so it is not able to overwinter in crop residue in the soil and crop rotation is not a useful tactic in managing tomato powdery mildew. The pathogen likely overwinters in year-round tomato operations and on solanaceous weed hosts. **Control solanaceous weeds** in and around the high tunnel that may be acting as weed hosts for the pathogen.

VEGETABLE PRODUCTION

Managing Powdery Mildew in Protected Tomatoes *continued from page 16*

Chemical Control

Fungicides are the primary management tool for managing powdery mildew. Fungicides are not curative in plants, so they must be applied preventatively, before or just after symptoms begin developing. Micronized sulfur (e.g. Microthiol Disperss) and mineral oil (e.g. JMS Stylet-Oil) are the most effective products for organic production, and are also good choices for conventionally produced crops. Apply sulfur at its lowest labeled rate because plants grown in protected culture tend to be more sensitive to phytotoxicity than field-grown plants. Also, without rain or overhead irrigation, fungicide residue will remain longer on plant tissue. As stated on the labels for these fungicides, if you are using both sulfur and oil to manage powdery mildew, there needs to be a gap of 2 or 3 weeks between applications of these products because oil can move sulfur into the leaf resulting in damage. Applications of sulfur especially during the harvest period may leave visible residue on fruit, which can be easily wiped off. An option to minimize visible residue is to use sulfur for the first applications until fruit start to mature, switch to another product for an application or two, then start applying oil.

Other OMRI-listed products that are not oils include:

- MiiStop (potassium bicarbonate) and Cease (a *Bacillus subtilis* strain) - these two are recommended to be used together
- Double Nickel (*Bacillus amyloliquefaciens*)
- M-Pede (potassium salts of fatty acids – an insecticidal soap) - apply at ¾ rate to avoid phytotoxicity
- Regalia (extract of giant knotweed, *Reynoutria sachalinensis*)

Conventional fungicides labeled for powdery mildew and permitted for use in protected culture include those listed below.

Unless otherwise noted, you must rotate FRAC groups after making a maximum of 2 consecutive applications of any of these products.

- Switch (FRAC Groups 9 & 12)
- Emblem (Group 12)
- Luna Tranquility (Groups 7 & 9) – disease suppression only
- Fontelis (Group 7)
- K-Phite (Group 33) – no limit on consecutive applications
- Revus Top (Groups 3 & 40)
- Trionic (Group 3) – max 4 total applications per crop
- Vivando (Group U8) – max 2 consecutive applications before rotating FRAC groups, max 3 max applications per year

Written by Ms. Higgins with the Univ. of Massachusetts Extension Vegetable Program with excerpts from Dr. McGrath with the Long Island Horticultural Research & Extension Center of Cornell Univ. From the Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Mass. Extension, Vol. 33, No. 15, July 29, 2021.



An example of graphic resources available to growers under the Farmer Resources tab of www.paveggies.org.

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- HOMEMADE SALSA**
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- CAPRESE SALAD**
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- BLTs OR TOMATO SAMMIES**
Do these classic sandwiches really need an explanation?
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If you're planning on cooking them later, just freeze them raw then enjoy all winter long in soups, stews, and more.

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An example of graphic resources available to growers under the Farmer Resources tab of www.paveggies.org.

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VEGETABLE PRODUCTION

Bacterial Diseases of Tomato (and Pepper)

Three bacterial diseases commonly affect tomato crops: Bacterial spot, bacterial speck, and bacterial canker. Bacterial spot and speck are less damaging than bacterial canker—spot and speck will less frequently take out an entire tomato planting whereas canker can cause total crop losses. Tomato pith necrosis is a less common bacterial disease that can be confused with bacterial canker. These diseases can affect foliage, fruit, and stems and can also increase incidence of sunscald on fruit as foliage is lost.

In general, bacteria do not survive well on their own, outside of a host plant or crop debris. Thus, the most common starting place for any bacterial disease is in the seed itself, so starting with clean seed or hot water treating your seed is very important. If you are buying transplants, ask your supplier about their bacterial disease control strategies—greenhouses are ideal places for growing and spreading bacteria, as they thrive in warm, humid conditions. Other sources of bacteria may be infested crop residues in the soil and equipment, especially wooden tomato stakes. If you've had bacterial diseases in past years, do yourself a favor and replace your stakes or invest in metal stakes which are easier to disinfect each year.

Once bacteria are present, they are spread mainly by movement of water or plant sap—this means rain splash or driving rain, wind-driven sand, or by movement of workers or equipment (tractors, pruning shears etc.) through a wet field, and even in aerosols in humid air. Bacteria infect plants passively, via open stomates and hydathodes, or wounds. Bacteria thrive in warm (around 75-90°F), moist or humid conditions. Management of bacterial diseases is difficult once they are established, so preventing disease from starting by using good sanitation practices is key. Good sanitation practices include buying clean seed, hot water treating seeds, controlling weeds, sanitizing equipment, and rotating crops is essential to preventing disease.



Bacterial leaf spot on pepper

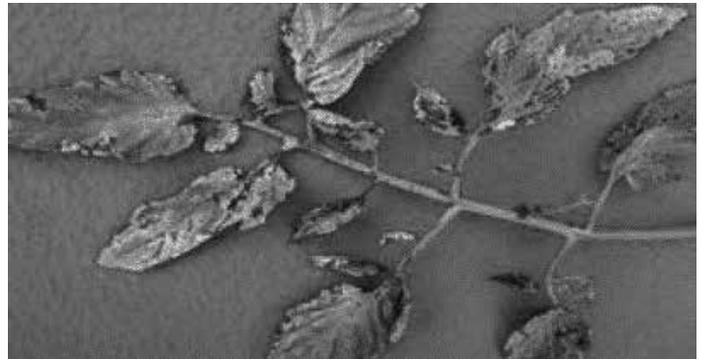
Below, symptoms of the most common bacterial diseases of tomato (and pepper in the case of bacterial leaf spot) are described:

Bacterial spot caused by *Xanthomonas campestris* pv. *vesicatora* (Xcv) affects both tomato and pepper and is one of the most devastating diseases of these crops in warm, humid environments. There are several different strains of Xcv that vary in their pathogenicity to tomato, pepper, and solanaceous weeds. Some strains infect only pepper, some infect only tomato, and some can infect both pepper and tomato.

Pepper cultivars are available with resistance to bacterial spot, however they are usually resistant to specific races of Xcv so controlling this disease with resistant varieties effectively requires knowing what races of the pathogen are likely to be present.

On leaves, symptoms start as small yellow-green spots that quickly turn brownish-red and may have a greasy, water-soaked appearance. Bacterial spot lesions do not have concentric rings or a prominent halo. When conditions are optimal for disease development, spots can coalesce to form long, dark streaks. On tomato plants, a general yellowing may appear on foliage with many lesions giving the plants a scorched appearance, and the plants may exhibit severe bending and twisting. On pepper plants, affected flowers, fruits, and leaves drop prematurely. This can reduce yield directly and severe defoliation of plants can lead to sunscald of surviving fruit. On tomato fruit, discrete, minute, slightly raised blisters

occur on green fruit only. Initially, lesions have a yellow halo that resembles the birds-eye spot caused by bacterial canker. As fruit lesions enlarge, they lose their halo and become brown, raised, and scab-like on ripe fruit. On pepper fruit, spots begin as pale-green, water-soaked areas, which eventually become raised, brown, and roughened. Spots may provide entrance points for various fungi and bacteria that cause secondary fruit rots. The bacterial spot pathogen alone does not cause fruit rot.



Bacterial speck on tomato. Photo: M.T. McGrath

Bacterial speck (*Pseudomonas syringae* pv. *tomato*) causes a fruit spot and foliar blight on tomato only, not pepper. It is found wherever tomatoes are grown. Lesions are indistinguishable from those caused by bacterial spot—small, greasy or water-soaked spots which develop a halo over time. Spots may coalesce, killing large areas of tissue. On fruit, small (1/16 inch), dark spots or specks develop with the tissue around them often more intensely green than unaffected areas. These tiny, dark spots are not raised or scabby at all like those caused by bacterial spot. Only green fruit is susceptible to infection.



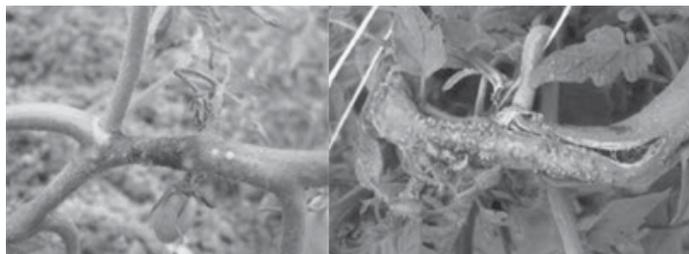
Signs of bacterial canker: marginal necrosis (left) and vascular discoloration (right) Photos: S.B. Scheufele (left) and R.L. Wick (right)

Bacterial canker (*Clavibacter michiganensis* pv. *michiganensis*) is one of the most destructive tomato diseases in Massachusetts. Symptoms are different in the greenhouse versus in the field. Infections arising from contaminated seed or seedlings

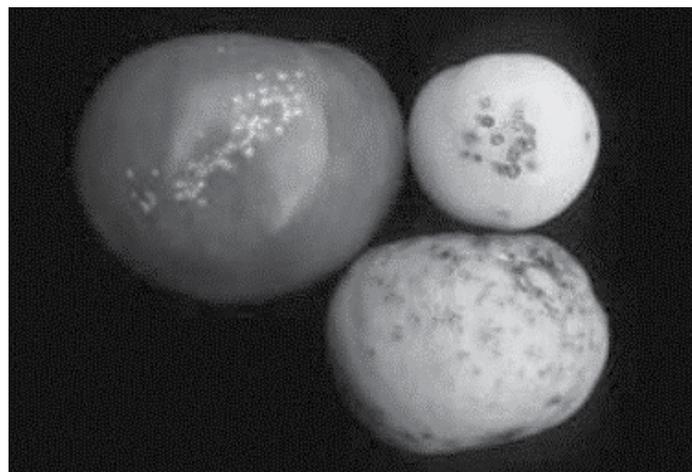
VEGETABLE PRODUCTION

Bacterial Diseases of Tomato (and Pepper) *continued from page 18*

result in systemic spread of the bacteria within the plant, and seedlings can be affected early on in the greenhouse. This type of systemic infection (known as primary infection) causes stunting, wilting, vascular discoloration, open stem cankers, and fruit lesions. If an infected stem is cut lengthwise, a light brown discoloration may be present in the vascular tissue, which is just inside the stem skin. Vascular discoloration is most noticeable at nodes and just above the soil line. Secondary infections occur in the field when bacteria are spread from plant to plant by splashing rain, driving winds, workers and equipment, or in aerosols under humid conditions. Secondary infection often results in marginal scorch where leaf edges are brown to black with a yellow border on the leaf interior. Spots also occur on green fruit and are very characteristic—white to yellow spots, 3-4 mm in diameter, with raised brown centers and white haloes, known as “bird’s eye spots.”



Signs of pith necrosis: stem lesion (left) and adventitious roots and hollow stem (right). Photos: S.B. Scheufele



Clockwise from upper left: bacterial canker, spot, and speck on tomato fruit. Photo: R. L. Wick

Tomato pith necrosis is caused by *Pseudomonas corrugata* and other soil-borne species of *Pseudomonas*. While high tunnels and greenhouses provide ideal conditions for the growth of early season tomatoes, the high tunnel environment is also ideal for the development of pith necrosis. This disease generally occurs on early-planted tomatoes growing when night temperatures are cool, humidity is high, and plants are growing vigorously because of excessive nitrogen levels. The disease is also associated with prolonged periods of cloudy, cool weather. The initial symptoms of pith necrosis are yellowing and wilting of young leaves; this often appears just as the first fruit clusters reach the mature green stage. Serious infections can result in yellowing and wilting of upper portions of plants, with brown to black lesions forming on infected stems and petioles. When stems are cut longitudinally, the center of the stem (pith) may be extensively discolored, hollow, and/or degraded. Stems may be swollen, numerous adventitious roots can form, and infected stems may shrink, crack, or collapse. The epidemiology of this disease is not well understood; it is possible that the bacteria are seed-borne and most certainly survive in the soil in association with infected tomato debris.

Preventive measures to minimize the occurrence of **pith necrosis** in high tunnels include:

- Provide adequate ventilation to avoid high humidity levels (especially during cloudy weather)
- Avoid excessive nitrogen levels to prevent unnecessarily vigorous plant growth. The nutrient recommendations for high tunnel tomatoes were updated in the most recent edition of the New England Vegetable Management Guide—see the outdoor tomato section for details.
- Incorporate crop debris to speed decomposition of residue and associated bacteria
- Use crop rotation

There is no effective treatment for this disease. Affected plants may recover if environmental conditions improve (warm, sunny weather) but if not, affected plants should be removed from the field to prevent spread of the disease.

Preventing losses to bacterial diseases:

- **Start with certified, disease-free seed or treat seed with hot water.** See the fact sheet entitled Managing Pathogens Inside Seed with Hot Water (<https://www.vegetables.cornell.edu/pest-management/disease-factsheets/managing-pathogens-inside-seed-with-hot-water/>) for further details.
- **Resistant varieties:** Pepper varieties are available with resistance to various strains of bacterial leaf spot. There are a few tomato varieties with resistance to bacterial speck, but none with

Continued on page 20

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BERRY PRODUCTION

Blackberry Damage and Disorders

Gordon Johnson

Blackberries are being harvested throughout the region currently. The blackberry is a composite fruit with many tiny berries (drupelets) attached to a receptacle. These drupelets are subject to damage during the ripening period.

The following are some common problems with blackberries during fruiting:



G Johnson, University of Delaware

Stinkbug damage in blackberry.

Stink Bug Damage

Stinkbugs feed on the fruit receptacle (the white part at the center of the fruit) and in doing so damage drupelets as they insert their mouthparts. Stinkbugs may feed on green, red or black fruit.

Feeding results in only localized damage to one or two drupelets most commonly. A secondary type of damage can occur if the stink bug injects its “stink”

into the fruit while it is feeding. This may result in a blackberry fruit that can “taste like a stink bug smells”.



Sunscald in blackberries.

Sunscald

Sunburn of fruit is commonly seen when daytime temperatures exceed 90 °F. At these temperatures fruit in direct sunlight may reach temperatures that exceed the air temperature by several degrees. When this occurs the fruit is essentially boiled by the sun. Symptoms include drupelets that look “blanched” or “cooked”.

Most commonly, symptoms are present on only the side of the fruit exposed to the sun and the shaded side of the fruit will not have any damage.

Prevention methods include closely picking berries every few days, encouraging good plant health so that there is sufficient leaf cover to protect berries from the sun and orienting the trellis to shade the fruit for most of the day.



G Johnson, University of Delaware

White drupelet disorder.

White Drupelet

White drupelet is associated with a drop in humidity and an increase in temperature. As this happens there is less moisture in the air to deflect solar radiation from directly contacting the berries. This increased solar radiation is blamed on individual or groups of drupelets turning first white and then later brown in color.

This disorder is often a problem early on in the season and may lessen as the season progresses. Orienting the trellis to shade the fruit for most of the day is a method to prevent this disorder on susceptible varieties.

Information in this article is from What Is Going On With My Blackberry Fruit? by Amanda McWhirt – June 22, 2017, University of Arkansas <https://www.uaex.edu/farm-ranch/crops-commercial-horticulture/horticulture/ar-fruit-veg-nut-update-blog/posts/fruitdisorders.aspx>

Bacterial Diseases of Tomato (and Pepper) continued from page 18

resistance to spot, canker, or pith necrosis. Cornell Cooperative Extension has compiled lists of resistant varieties at <https://www.vegetables.cornell.edu/pest-management/disease-factsheets/disease-resistant-vegetable-varieties/disease-resistant-pepper-varieties/>.

- **Rotate** out of tomatoes (and peppers, for bacterial leaf spot) for at least 2 years. Control for solanaceous weeds to prevent the pathogens from surviving on weed hosts.
- **Use new tomato stakes every year or sterilize stakes before reusing.** See the article How to Disinfect Stakes Before Reuse from University of Delaware Extension for more info (<https://cpbus-w2.wpmucdn.com/sites.udel.edu/dist/f/9280/files/2021/05/Volume29Issue7.pdf>).
- **Reduce moisture and increase airflow in the crop.** In high tunnels, heat and vent to reduce moisture and remove lower leaves to increase airflow. In the field, increasing spacing can increase air flow. Control weeds in both settings.
- **Control bacterial diseases in transplant production.** Inspect transplants before planting out into the field or high tunnel and do not plant suspect transplants. But be aware that young infected transplants may be asymptomatic.
- **Use drip instead of overhead irrigation.** If you must use overhead irrigation, irrigate at midday on sunny days so foliage dries out before going into an overnight dew period.

- **Sanitize shears or change gloves at the end of each row if pruning.**
- **Avoid working in fields when bacterial diseases are present and foliage is wet.**
- **Promptly incorporate crop debris after harvest.** If you have confirmed, widespread bacterial disease in a high tunnel, removing the crop residue from the tunnel may be more effective.
- **Chemical control:** In general, bacterial diseases of field crops are difficult to control with pesticides. If chemical control is going to be effective, it must be implemented early on, when symptoms first appear; when a significant amount of disease is present, pesticides are usually not effective. Copper products are most effective, and the addition of mancozeb products can increase their efficacy. Streptomycin (e.g. Agri-mycin 17) is an effective product that may be used only in the greenhouse before transplanting to the field. Biological disease control products that have shown efficacy in some trials on bacterial diseases in tomato include Actigard or Regalia (both plant defense activators). Do not use air blast sprayers to apply fungicides as they can spread the bacteria through the field.

Prepared by the Univ. of Massachusetts Extension Vegetable Program. From the **Vegetable Notes for Vegetable Farmers in Massachusetts**, Univ. of Mass. Extension, Vol. 33, No. 14, July 22, 2021.

BERRY PRODUCTION

Spotted Wing Drosophila – A 2021 Update for Berry Growers

Kathleen Demchak

This is the time of year when spotted wing drosophila populations can rapidly increase in Pennsylvania, making efforts to control this pest a necessity for most berry crop growers.

Updated info can be found through The Sustainable Spotted Wing Drosophila Project web site, found at <https://swdmanagement.org/>. If you haven't found this web site, take some time when you can to browse the site, and see what is there.

Of particular interest to many growers is the insecticide efficacy ranking compiled by this group. Ratings are provided by project entomologists, growers and crop consultants with experience with spotted wing drosophila from across the country and are compiled by Phillip Fanning (Univ. of Maine) and Rufus Isaacs (Michigan State Univ). The article summarizing the results and other important points can be found here: <https://swdmanagement.org/wp-content/uploads/2021/05/SWD-rankings-document-2021.pdf> The article includes a graph that makes relative efficacy rankings easy to see, and a second graph that color-codes products by chemical class to make it easy to rotate chemistries. Rotating product chemistries is important, as resistance has already been found in some spotted wing drosophila populations.

It should be noted that some of the rankings are based on limited data, and sometimes there is variation in the ratings assigned by different contributors. If no error bar appears on top of the vertical bar indicating efficacy for a particular product, that means that only one rating was received. If the error bar is large, this is an indication of variability in how well different contributors thought the product worked, so the rating should be taken with a "grain of salt". A small error bar means more consensus in the rating.

As a supplement to the information provided on the project web site, an updated table appears below that also lists active ingredients of each product rated, IRAC codes, berry crops on which these products can be used on, and the days-to-harvest and re-entry intervals for each.

Note that spotted wing drosophila does not appear on the labels of all products listed; when that is the case, whether the material can be used for spotted wing drosophila depends on regulations in each state. Not all products are registered for use in all states. If from outside of PA, consult the label and your state's registrations for products that may be used in your location. (R) following the pesticide name indicates that the material is a restricted-use pesticide.

Continued on page 22

Spotted Wing Drosophila - A 2021 Update for Growers continued from page 21

Ranking in graphs	Rating*	Product Name	Active Ingredient(s)	IRAC code (chem. class)	Pre-harvest interval (d = days; h = hours; --- = not labeled for use on this crop). See individual product labels for details				Re-entry interval (h = hours; d = days)
					Strawberry	Brambles	Blueberries	Ribes	
1 <i>(limited data)</i>	E <i>(limited data)</i>	Cormoran	novaluron + acetamiprid	15 + 4A	1d	---	8d (highbush); 1d (lowbush)	8d	12h
2	E	Lannate (R)	methomyl	1A	---	---	3d	---	48h for blueberries
3	E	Mustang Maxx (R)	zeta-cypermethrin	3A	---	1d	1d	1d	12h
4	E	Danitol (R)	fenpropathrin	3A	2d or 3d (see label)	3d	3d (highbush); 2d or 3d (lowbush)	21d currants; 3d gooseberry	24h
5	E	Imidan	phosmet	1B	---	---	3d	---	24h highbush; 3d lowbush
6	E-G	Diazinon (R)	diazinon	1B	5d	---	7d	---	5d blueberry; 3d strawberry
7	E-G	Asana (R)	esfenvalerate	3A	---	7d	14d	---	12h
8	E-G	Verdepryn	cyclaniliprole	28	1d	1d	1d	1d	4h
9	E-G	Brigade (R)	bifenthrin	3A	0d	3d	1d	1d	12h
10	E-G	Exirel	cyantraniliprole	28	1d	1d	3d	3d	12h
11	E-G	Malathion	malathion	1B	3d	1d	1d	1d currants; 3d gooseberry	12h
12	E-G	Delegate	spinetoram	5	---	1d	1d or 3d	1d or 3d	4h
12**	E-G	Radiant**	spinetoram	5	1d	---	---	---	4h
13	E-G	Hero (R)	zeta-cypermethrin + bifenthrin	3A + 3A	---	3d	1d	---	12h
14	G	Entrust	spinosad	5	1d	1d	3d	3d	4h
15	G	Baythroid XL (R)***	beta-cyfluthrin	3	---	---	---	---	12h
16	F	Apta	tolfenpyrad	21A	1d****	1d****	3d****	3d****	12h
17	F	Assail	acetamiprid	4A	1d	1d	1d	1d	12h
18 <i>(limited data)</i>	F <i>(limited data)</i>	Spear-T	GS-omega/kappa-Hxtx-Hv1a	32	0d	0d	0d	0d	4h
19	F	Sevin	carbaryl	1A	7d	7d	7d	7d	12h

*E = excellent, G = good, F = fair, W = weak, N = Little to no efficacy

**Radiant was not rated in the original document, but was assigned the same ranking as Delegate based on active ingredient.

***Baythroid is not labeled for berry crops but may be used on cherries and grapes. Veratran D is not allowed for use on any berry crops, but is labeled for use on certain crops grown in warm climates.

****As of this writing, directions for use on berry crops appear only on supplemental labels.

Table continued next page

Spotted Wing Drosophila - A 2021 Update for Growers continued from page 22

Ranking in graphs	Rating*	Product Name	Active Ingredient(s)	IRAC code (chem. class)	Pre-harvest interval (d = days; h = hours; --- = not labeled for use on this crop). See individual product labels for details				Re-entry interval (h = hours; d = days)
					Strawberry	Brambles	Blueberries	Ribes	
20	F	Grandevo	<i>Chromobacterium subtsugae</i> strain PRAA4-1 ^T and spent fermentation media	not applic.	0d	0d	0d	0d	4h
21	F	Movento	spirotetramat	23	---	---	7d	7d	24h
22 (limited data)	F (limited data)	Pyganic	pyrethrins	3A	0d	0d	0d	0d	12h
23	F-W	Veratran D ^{***}	Sabadilla alkaloids	not applic.	---	---	---	---	12h
24	F-W	Altacor	chlorantraniliprole	28	---	3d	1d	1d	4h
25	F-W	Venerate CG	Heat-killed <i>Burkholderia</i> spp. strain A396 cells and spent fermentation media	UnB	0d	0d	0d	0d	4h
26	F-W	Azera	azadirachtin + pyrethrins	Un + 3A	0d	0d	0d	0d	12h
27	W	Jet-Ag	hydrogen peroxide + peroxyacetic acid	not applic.	not spec.	not spec.	not spec.	not spec.	Until sprays dry in field; 4h in greenhouses
28	W	Azanguard	azadirachtin	Un	0d	0d	0d	0d	4h
29	W-N	Rimon	novaluron	15	1d	---	8d highbush; 1d or 8d lowbush	8d	12h
30	W-N	Sivanto	flupyradifurone	4D	see label	0d	see label	see label	4h or 12h (see label)
31	W-N	Admire Pro	imidacloprid	4A	7d (foliar); 14d (soil)	3d (foliar); 7d (soil)	3d (foliar); 7d (soil)	3d (foliar); 7d (soil)	12h

*E = excellent, G = good, F = fair, W = weak, N = Little to no efficacy

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