

How COVID-19 is Affecting Farmers, Agriculture and Daily Life

In mid-March, Gov. Tom Wolf ordered all “non-life-sustaining” businesses in Pennsylvania to close their physical locations. The administration is enforcing this order through the state police and other state agencies.

At the same time, residents across the state are subject to “stay at home” orders, which restrict travel except for certain activities, including those related to life-sustaining businesses and those needed to ensure the health and safety of oneself and one’s family, such as grocery shopping and buying medicine.

Agriculture and many businesses that support it are considered life-sustaining and the Wolf administration has emphasized that farming and agriculture-related activities should continue to operate to ensure the continuation of a safe and accessible food supply. At the same time, farms and other agricultural businesses are being asked to protect themselves, their families, their workers and their communities by changing procedures and taking precautions to prevent the spread of COVID-19.

Though agriculture remains essential, farmers to are experiencing the economic effects and logistical hurdles caused by the COVID-19 response.

The following is important information related to agriculture and daily life in Pennsylvania as of mid-April. As the situation is constantly changing, please visit, www.pfb.com, for the latest updates and additional resources.

Life-sustaining businesses

According to the Pennsylvania Department of Agriculture, examples of essential businesses for a safe and accessible food supply include, but are not limited to, farms, greenhouses and vegetable plants, orchards, pest management services, feed mills and ag supply businesses, agriculture equipment sales and services, animal feed and supply distribution network, transportation system from farm to retail, food and meat processors and manufacturers, veterinary services and supplies, distribution and transportation system from processors and manufacturers to retailers, retailers to include grocery stores and farmers markets, grocery delivery services, laboratories, and inspectors that ensure food safety.

See the full list of which types of businesses are considered life-sustaining online at <https://bit.ly/2UzMA1c>.

PDA has clarified that while construction, in general, is not considered “life-sustaining,” farm construction projects may continue as they relate to a life-sustaining operation. Construction businesses may remain open to serve life-sustaining businesses, such as farms, only.

Businesses can contact the Pennsylvania Department of Community and Economic Development at 866.466.3972 to

clarify whether they are considered life-sustaining.

Learn more about the governor’s order at <https://bit.ly/2X6NFzr>.

Guidance for Agriculture

PDA has issued important safety guidelines for farms and other agriculture- and food-related businesses to help prevent the spread of COVID-19 while continuing life-sustaining work. Some of the guidance related to production agriculture is summarized below. Be sure to visit agriculture.pa.gov/covid for complete guidelines.

All farms and agricultural-related business should:

- Sanitize all contact surfaces and common gathering places on a regular basis.
- Provide guidance for employees on handwashing, handling materials and where they can find handwashing facilities and sanitizing materials. Make sure such guidance is also available in employees’ native languages if they not native English speakers. Stagger lunch times or provide additional space to increase distancing.
- Ensure that all sick employees stay at home and encourage employees to avoid large gatherings and practice social distancing during non-work hours.
- Farms should:
 - Identify a drop-off location for regular deliveries away from on-farm high traffic areas and housing. Drop-boxes are recommended to be placed near the road, before on-farm entry. If a drop-box is unavailable, designate a drop-off location on-site.
 - Create specific instructions for drop-off deliveries including location and procedures needed at the drop-off point. Create signage to easily identify drop-off points. List all points of contacts with contact information to assist with questions leading up to delivery and upon arrival. Practice distancing with delivery drivers by avoiding personal interaction if possible. If face-to-face contact is needed keep at least six feet away and do not shake hands.
 - Log all deliveries and on-farm entries and monitor your personal travel with a personal travel log.
 - Have a continuity of business plans to keep operations running smoothly in case of any disruption.

Agricultural Labor

The U.S. Department of State is expanding the number of H-2A visa applicants allowed to forgo an in-person interview, which will allow more agricultural guest workers to arrive to work on U.S. farms. This change was needed because visa services for immigrants and non-immigrants had been suspended by

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NEWS



**Pennsylvania
Vegetable Growers
Association**

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

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What's Happening on the Farm

Brian Campbell

Wow, another WET cold spring!!

I hope all is well with friends and family as far as COVID 19. Many of us have been concerned with the potential impact the virus may have on our farm workers, especially that have larger groups that may be living in labor camps and hotels. PVGA has been active in trying to develop a platform for minimizing any potential spread of the virus within the farmworker community.

Garden centers across the state have had some difficult times as far as whether they were or were not allowed to open due to the non-essential business ban. After much discussion and gathering information, it seems that in most areas greenhouses that grow their own plants and sell them at the same location have been allowed to stay open.

As far as planting, there was a window of opportunity mid April to plant cole crops and early sweet corn. High tunnel tomatoes are looking good as long as there was supplemental heat. It does look like the weather for May will warm up some in the beginning and allow crops to get in the ground, and the crops that did get in, they should start to grow.

I would like to begin an annual contest for sweet corn and tomatoes. The contest is open for PVGA members only, if you aren't a member then join so you have a chance to win \$100. The first two dozen ears of sweet corn that tastes good and is mature will be the winner. If there are more than one grower with corn on the same day, then the best looking and tasting will win. The first two quarts of tomatoes that are red and ripe and taste good will win. They must be grown in natural soil in the ground, so high tunnels will work. The tomatoes must be slicers in the 8 to 10 ounce range, 4 to 5 in a quart. If you have tomatoes or corn ready before the June newsletter, call the PVGA office at 717-694-3596 for details. If you are able to take a picture to send or email us, that would be helpful.

Be safe and enjoy the spring planting season.

PVGA Member Responses on Dealing with COVID-19

In the weekly email PVGA Update and Special Updates dealing with the COVID-19 crisis, we asked to PVGA members to outline some of the things they are doing to deal with the situation. The following are the responses we received:

One member has been taking orders thru Facebook for greens and such, putting them on the porch of our closed store, and have a sign for the money to be placed in a locked container.

A small produce farm in Chester Co. wrote: *I am wondering what others are doing/have been told about roadside stands. It's a decent part of our income and a few other neighbors have offered their better-positioned roadsides to put up a stand for our veggies. I'd like to continue with our farm's honor system roadside stand, but the guidance has been murky (maybe that gives us wiggle room?). Based on responses on NextDoor, it appears that the neighbors would be happy to buy from us and barring things going completely wonky, we'll have produce to sell.*

Tom Baker from Virginia wrote: *Walmart has announced it will limit the number of shoppers in its stores to five per 1000 square feet. We raise strawberries, so let's put that into the perspective of a PYO strawberry grower. For each one acre of strawberry field, 1 acre x 43,560 sq. ft. / acre = 43,560 sq. ft. or 43.56 units of 1000 sq. ft. Multiply that by 5 pickers per 1000 sq. ft. and you have a "limit" of 218 pickers in the one-acre field at a time. I don't know about you, but I'd say having to impose that "limit" would be a home run. No, make that a Grand Slam home run! Note that we are in Virginia, which considers farms and farm stands to be in the Essential Retail Businesses category of "grocery stores, pharmacies, and other retailers that sell food and beverage products or pharmacy products" (emphasis added). To-date (April 5, 2020), Virginia has imposed no limits on how many customers may patronize farms or farm stands or other businesses in this essential category.*

Rob Shenot from Shenot Farms in Wexford wrote: *Just wanted to share with you what we've been doing here during this mess. We have converted our retail market to a strictly online store. My wife, Leah has been building and maintaining our website for a few years. We were doing some limited*
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The Pennsylvania Vegetable Growers News is the official monthly publication of the Pennsylvania Vegetable Growers Association, Inc., 815 Middle Road, Richfield, PA 17086-9205 phone and fax - 717-694-3596, email - pvga@pvga.org website - www.pvga.org

Our Mission:

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

Our Vision:

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

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

Farmers Face New Challenges Amid COVID-19 Pandemic

Paul Hartman closed out 2019 feeling positive about dairy-ing in 2020. Markets were picking up and, after years of low prices, things were looking better.

"I thought 2020 was the year we would get back on our feet, and pay down our debt," Hartman said. "But then this hap-pened."

This, of course, is the worldwide pandemic known as COVID-19.

"Now, we face another period of uncertainty, right at the time where we thought we had passed all of that," Hartman said, as he reflected on price declines and market volatility that farmers have seen since late March. "I fear this year will be another bad year."

For many farmers, the economic ripple of the pandemic has been like a punch in the gut, just as agriculture was begin-ning to recover from several years of price challenges, market volatility, weather challenges and trade complications.

Across agriculture, commodity prices saw a sharp decline amid market disruptions and major shifts in demand and how food is distributed. Some dairy producers, including Hartman, have been told to dump milk as Class I processing plants reach capacity. Temporary closures and delays at processing facilities have left some meat and poultry producers without a market. At the same time, some farmers are facing critical labor shortages at a time when they need workers for planting.

On Alan Kemmerer's fresh-market vegetable farm in Columbia County, it's time to start spring planting.

But delays to visa processing are complicating the arrival of guest workers his operation depends on. Kemmerer typically has 30 workers through the H-2A visa program. Ten arrive in early April for planting, the others for harvest in June.

Kemmerer was encouraged when he learned the U.S. State Department relaxed visa requirements to allow more H-

2A workers to enter the country without in-person interviews. But when he worked with his agent to identify which of his work-ers would be eligible to come, he learned only 10 were eligible and even they would be delayed at least a few weeks. On top of that, some have outstanding passport issues and it's unclear when those can be resolved.

"It pretty much means I'm out of business," Kemmerer said of not being able to access his H-2A workers. "We just can't operate without them."

The complications are especially frustrating, he said, because it's unclear how it's decided which H-2A applicants must be interviewed in person.

"These are the same workers I've had here the last three to five years. They've come and gone every year without a prob-lem," Kemmerer said. "With today's technology, if they do require them to have an interview, they could FaceTime, Skype. These guys all have cell phones."

"I'd much prefer to have those same returning workers," he added. "They know the routine. They know what's expected and we have a good relationship with them."

If he's able to get the workers he needs for planting a few weeks late, Kemmerer can live with delaying his broccoli crop. But he's hesitant to plant without knowing he'll be able to have the help he needs for harvest.

"If I plant all this and then I don't have anyone there to har-vest, I've dug myself a deeper hole," he said.

For now, he's cautiously moving ahead but watching to see what happens. He's heard from many other vegetable growers in the same situation. "If we want an abundant food supply this summer," he said, "we need to correct some things now."

From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, April 2020.

Game Commission Adopts Sunday Hunting and Expanded Concurrent Seasons

The Pennsylvania Board of Game Commissioners gave final approval to hunting and trapping seasons and bag limits for the 2020-21 license year at their meeting on April 7. Some of the highlights include:

- Expanding Sunday hunting opportunities on three days – Sunday, Nov. 15 for archery deer hunting, Sunday, Nov. 22 for bear hunting during the bear firearms season, and Sunday, Nov. 29 for deer hunting during the firearms deer season.
- Adopting a 14-day concurrent firearms deer season for antlered and antlerless deer in 10 Wildlife Management Units (WMUs) and retaining a split-season in the remain-ing 13 WMUs.
- Extending the statewide archery deer season to end Nov. 20, giving bowhunters the opportunity to take advantage of peak and post-rut activity.

The commissioners also set the number of antlerless deer licenses to be allocated for the coming license year.

The board voted to allocate 932,000 antlerless deer licens-es statewide, which is up from the 903,000 licenses allocated for 2019-20. Some Wildlife Management Unit (WMU) increases were tempered by the addition of a 14-day seasons to WMU's containing Disease Management Areas. Allocations by WMU

are as follows, with the allocation from the previous license year appearing in parentheses:

WMU 1A – 49,000 (49,000)	WMU 1B – 41,000 (35,000)
WMU 2A – 46,000 (46,000)	WMU 2B – 49,000 (54,000)
WMU 2C – 58,000 (52,000)	WMU 2D – 60,000 (66,000)
WMU 2E – 39,000 (32,000)	WMU 2F – 36,000 (31,000)
WMU 2G – 27,000 (26,000)	WMU 2H – 7,000 (6,000)
WMU 3A – 21,000 (20,000)	WMU 3B – 33,000 (38,000;
WMU 3C – 49,000 (46,000)	WMU 3D – 36,000 (25,000)
WMU 4A – 49,000 (41,000)	WMU 4B – 33,000 (32,000)
WMU 4C – 32,000 (36,000;	WMU 4D – 45,000 (46,000)
WMU 4E – 37,000 (34,000)	WMU 5A – 26,000 (22,000)
WMU 5B – 60,000 (67,000);	WMU 5C – 70,000 (70,000)
WMU 5D – 29,000 (29,000)	

Hunting licenses for 2020-21 go on sale in mid-June and become effective July 1. After hunters purchase a general hunt-ing license, they may apply for antlerless deer licenses based on staggered timelines, which will be outlined in the *2020-21 Pennsylvania Hunting & Trapping Digest*, to be given free to all license buyers.

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How COVID-19 is... (continued from page 1)

U.S. Consular Operations in Mexico and elsewhere, which affected the arrival of workers through the H-2A program. While this change will improve access to H-2A workers, it does not fully address labor-access concerns and Farm Bureau is advocating for additional solutions.

The U.S. Department of Agriculture and Department of Labor recently announced they will work together to help identify foreign and domestic workers that may be available to transfer to other U.S. agricultural employers.

A new coronavirus-relief bill passed by Congress and signed by the president requires businesses with 500 or fewer employees to offer paid sick leave to employees affected by COVID-19 and expands the Family Medical Leave Act (FMLA). Guidance on these new requirements from the U.S. Department of Labor is available at www.dol.gov/agencies/whd/pandemic.

Transportation

The U.S. Department of Transportation is allowing some flexibility on drug and alcohol testing requirements in areas where testing availability is limited due to COVID-19. Learn more at <https://bit.ly/2xEtXAc>.

The Federal Motor Carrier Safety Administration has issued a waiver from some CDL-related regulations. Find more information at <https://bit.ly/343n2wx>.

The Federal Motor Carrier Safety Administration has exempted livestock haulers from Hours of Service rules that limit drive time until at least April 12. Additional details are available under the transportation section of our COVID-19 information page on www.pfb.com.

PennDOT Driver License Centers and Photo License Centers will be closed for two weeks. Driver licenses, photo ID cards, learner's permits, vehicle registrations, safety and emissions inspection stickers and disability parking placards that have an expiration date between March 16 and April 30, will be valid until May 31.

Federal Government Operations and Regulations

Congress passed and the president signed the Coronavirus Aid, Relief, and Economic Security (CARES) Act on March 27. The measure will: Replenish \$14 billion of the Commodity Credit Corporation's spending authority; create a \$9.5 billion emergency fund for producers, including dairy and cattle producers, fresh fruit and vegetable growers, and local food systems like farmers markets; provide extra funds for USDA's APHIS, FSIS, AMS and rural development; and provide cash payments to individuals and will reduce or delay taxes paid by many farm and ranch businesses.

USDA Farm Service Agency is relaxing its loan-making process and adding flexibilities for servicing direct and guaranteed loans to provide credit to producers in need. Learn more at www.farmers.gov/coronavirus.

USDA Risk Management Agency is offering flexibility related to crop insurance, including enabling producers to send notifications and reports electronically, extending the date for production reports and providing additional time and deferring interest on premium and other payments. Learn more at www.farmers.gov/coronavirus.

The U.S. Department of Homeland Security has closed the southern border with Mexico but has clarified that agricultural workers and lawful cross-border trade are essential travel that may continue.

USDA Service Centers will serve Pennsylvania farmers by phone appointment and field work only. All service center visitors wishing to conduct business with the Farm Service Agency, Natural Resources Conservation Service or any other USDA agency must call their service center to schedule a phone appointment.

State Government Operations and Regulations

Pesticide applicator exams have been canceled. Private applicators with March 31 expiration dates will be extended to June 1. For those who are currently licensed and need to renew their license, the PDA will be extending the private applicator renewal date to June 1. Private pesticide applicators may purchase and make pesticide applications legally until June 1 and are encouraged to use pesticide online resources to obtain recertification credits and pay for their licenses at www.paplants.pa.gov. Contact 717.772.5231 or pesticides@pa.gov for questions.

Pennsylvania Department of Agriculture regional offices are closed.

Penn State Extension

Penn State has canceled all public events through at least May 15, which will affect Cooperative Extension programs. Registration fees paid for canceled events will be refunded. Some events will be rescheduled and people who registered previously will receive an invitation to attend.

Extension offices are closed but staff remain available to support the agriculture community virtually. Learn more at extension.psu.edu.

Daily Life

U.S. Secretary of the Treasury Steven Mnuchin announced that tax filing deadlines will be extended from April 15 to July 15. All taxpayers and businesses will have additional time to file and make payments without interest or penalties. The deadline for 2019 income tax payments for individuals up to \$1 million and for C corporations up to \$10 million has been extended to July 15.

Pennsylvania has also extended the deadline for filing state personal income taxes until July 15. Some local governments have also extended tax-filing deadlines. Check with your local Earned Income Taxing authority to see if they have extended the filing deadline.

Public schools are closed through the end of the school year.

Pennsylvania's primary election has been postponed to June 2. Voters may apply for mail-in ballots online or by mail. Learn more: votespa.com.

The federal deadline to enforce REAL ID has been extended until October 2021, a one-year extension.

Help Available For Affected Businesses

Assistance and resources are available for farms and businesses that have been financially affected by steps to control the spread of COVID-19.

Small businesses and non-profits that are facing losses due to COVID-19 can apply for low-interest loans to help cover their continued operating costs. Loans of up to \$2 million are available through the U.S. Small Business Administration's Economic Injury Disaster Loan Program. As of mid-April, most

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NEWS

Game Commission Adopts... *(continued from page 3)***Concurrent Deer Seasons Adopted for 10 WMUs**

The Board of Game Commissioners adopted a slate of deer seasons for the 2020-21 license year that will allow concurrent hunting for antlered and antlerless deer through the duration of the firearms deer season in Wildlife Management Units 2B, 2C, 2D, 2E, 4A, 4B, 4D, 5A, 5C and 5D. In these WMUs, the concurrent season will open Saturday, Nov. 28, include a day of Sunday deer hunting on Sunday, Nov. 29, then run from Nov. 30 to Dec. 12. [PVGA Policy supports concurrent antler/antlerless deer seasons.]

In all other WMUs – 1A, 1B, 2A, 2F, 2G, 2H, 3A, 3B, 3C, 3D, 4C, 4E and 5B – a seven-day antlered deer season will be followed by a seven-day concurrent season. The antlered deer season opens on Saturday, Nov. 28, includes a day of Sunday buck hunting on Sunday, Nov. 29, then runs from Nov. 30 to Dec. 4. Antlerless deer hunting begins on Dec. 5 and continues through Dec. 12, concurrent with the antlered deer season.

The commissioners had preliminarily approved a statewide concurrent firearms deer season, but said that the majority of the comments they received were from individuals who opposed the change out of concern it would decrease the deer population. In response to those comments, the Board voted to continue with the split firearm deer season in much of the state for the first week of the rifle deer season. Aside from WMUs 2B, 5C and 5D, the WMUs where concurrent seasons were implemented are Units in which a Chronic Wasting Disease (CWD) Disease Management Area (DMA) has been established, thereby providing hunters in those areas with an additional five days of antlerless deer season in those WMUs.

How COVID-19 is... *(continued from page 1)*

production agriculture operations were not eligible for such loans but many related businesses are, such as restaurant and craft beverage businesses. Farm Bureau is advocating for more agricultural operations to be eligible. Learn more and apply at www.sba.gov/funding-programs/disaster-assistance/coronavirus-covid-19.

Eligible businesses, including farms, with 500 or fewer employees can apply for fully-forgivable Paycheck Protection Program loans from the SBA to continue to pay employees and cover some overhead costs during the pandemic. Sole proprietorships, independent contractors and self-employed people are also eligible. Loan payments will be deferred for six months and no collateral or personal guarantees are required. Farm Bureau is advocating to ensure there are not further restrictions on the program that would limit agricultural participation. Learn more at www.sba.gov/funding-programs/loans/paycheck-protection-program-ppp.

Learn more about state financial resources for affected businesses at dced.pa.gov/funding-programs.

USDA Rural Development has created a resources page for customers affected by COVID-19. Learn more at rd.usda.gov/coronavirus.

The state Office of Unemployment Compensation has important resources available for affected employers. Learn more at <https://bit.ly/2UMmg2O>.

From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, April 2020.

The Game Commission manages deer populations at the WMU level through its antlerless allocations, and made adjustments based on the length of the firearms season within each WMU. Antlerless allocations in WMUs with concurrent seasons are lower than they would have been if a split-season had been approved.

The initially proposed statewide concurrent firearms season was not designed to broadly reduce deer populations across the state, but was intended to allow hunters more time to meet the deer-management objectives in each WMU and take into account the potential for inclement weather to negatively affect hunting opportunities.

The board retained the antler restrictions that have been in place for adult and senior license holders since the 2011-12 seasons. It remains “three-up” on one side, not counting a brow tine, for the western Wildlife Management Units of 1A, 1B, 2A, 2B and 2D, and three points on one side in all other WMUs. Those exempt from these antler restrictions are mentored youth hunters, junior license holders, disabled hunters with a permit to use a vehicle as a blind and resident active-duty military on leave.

Weekly Pest Management Teleconference Call Scheduled

On Wednesday, April 22 at 12:30 pm EST, Steve Bogash of Marrone Bio Innovations will be starting the first of a season of weekly pest management education teleconferences. These calls are for growers, retailers and crop consultants. The calls will last 30 minutes and will begin at 12:30 PM EST. The first 15 minutes will be reports on seasonal and active pest management challenges in vegetables and small fruit with a guest expert. Then, we will open the call to discussion and Q & A. The calls will be recorded and accessible thru the playback number below.

Scheduled Topics and Guests:

4/22: Dr. Ben Werling, MSU on corn, onion and cabbage maggots

4/29: Tom Ford, PSU EXT on managing botrytis indoors

5/6: Kathy Demchak, PSU EXT on managing early season strawberry diseases, insects and mites

5/13: ??? on Managing indoor insects and mite on tomatoes, peppers, and cucumbers.

Call-In Number: 515-604-9914, Access Code: 832191

Playback Number: 515-604-9875.

This program is organized by Marrone Bio Innovations (MBI), a global supplier of bio-based plant health and pest management solutions. While MBI products may be mentioned, the teleconferences will be focused on pest management education and solutions.



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 noltsproucesupplies.net
 For other regions, contact us
 1-844-4BIO360 (1-844-424-6360)



NEWS

State COVID-19 Guidelines for Farmers Markets and On-Farm Markets

Farmers markets and on-farm markets are encouraged to follow the COVID-19 guidance for farm and distribution preparedness, in addition to the following recommendations developed for farmers markets.

Prepare market and individual stands

- Consider delivery or pick up options
- Consider pre-packaging bags of fruits, vegetables, other items to limit shoppers' handling of food and to keep customers moving quickly along.
- Consider alternate locations that could allow drive through or pick up.
- Consider putting up signs and information on websites and social media to explain any changes, delivery options, or extra precautions taken to limit exposure to COVID-19. Ex: Instruct customers not to handle food. Package cheese and eggs for customers, even if the cheese and eggs are individually packaged. Open egg cartons for customers to see the eggs they are getting instead of having them handle multiple cartons.
- Separate stands if possible, to limit crowds – try to separate stands at least six feet apart. Possibly consider limiting the number of customers within your market at one time in the case of “panic shopping”.
- If possible, have a different person handle products and handle money or wash hands or sanitize in between these tasks.
- Remove tablecloths and sanitize tables regularly.
- Eliminate samples.
- Eliminate eating areas and gently direct customers to take prepared foods home to avoid crowds.

Prepare workforce

- Provide guidance for handwashing (like time intervals) and handling materials.
- Stagger lunch times or provide additional space to increase distancing of employees.
- All sick employees need to stay at home.
- Inform employees where they can find sanitizing materials throughout on-farm contact points.
- Encourage employees to practice social distancing and avoid large gatherings to avoid risks for potential exposure during off hours.
- Encourage employees not to handle customers' reusable bags and let customers pack their own bags.

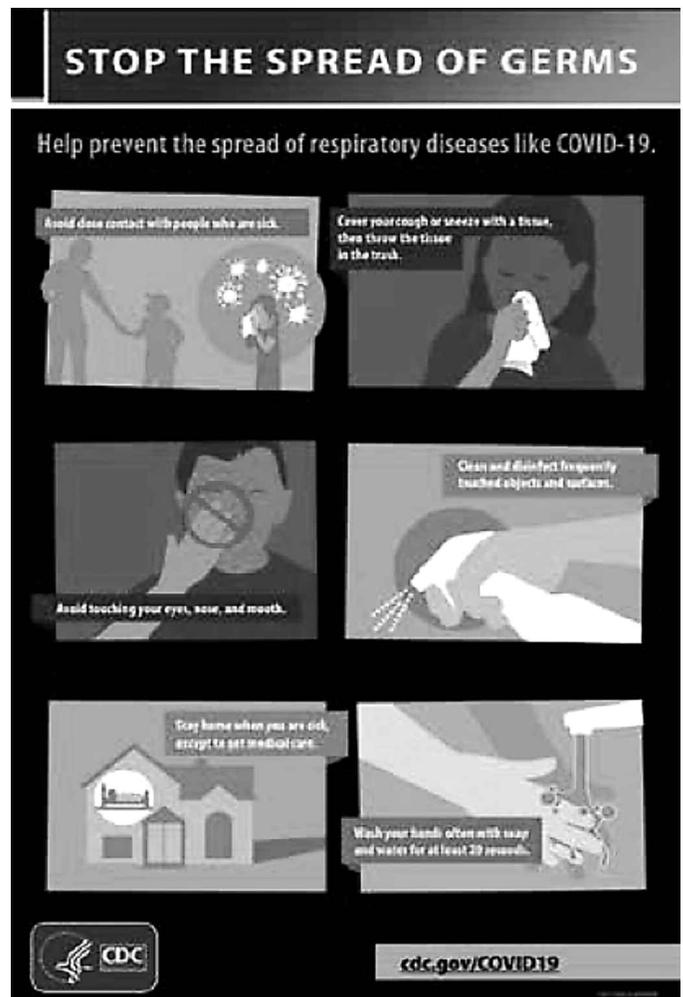
Sanitation

- Require all customers to wear masks while on-premises. However, individuals who cannot wear a mask due to a medical condition (including children under the age of 2 years per CDC guidance) may enter the premises and are not required to provide documentation of such medical conditions.
- Frequently disinfect all door handles and knobs, credit card machines, shopping baskets, etc. at a regular pre-established time intervals.
- Frequently sanitize common gathering places – restrooms, etc.

If you are considering opening an on-farm stand, for raw produce, shelf stable packaged foods like jams and jellies or baked goods, or a farm's own eggs, you do not need a food safety license for an on-farm stand. Please visit the PDA website for more information about retail food licenses at https://www.agriculture.pa.gov/consumer_protection/FoodSafety/Retail%20Food/Pages/default.aspx

If you are relocating a farmers market temporarily due to COVID-19, the PA Department of Agriculture will not need to issue a new food safety license. If it is a permanent relocation, the application is on our website at https://www.agriculture.pa.gov/consumer_protection/FoodSafety/Retail%20Food/Pages/default.aspx.

Operators of farmers markets should also adhere to Secretary Levine's worker safety order at <https://www.governor.pa.gov/wp-content/uploads/2020/04/20200415-SOH-worker-safety-order.pdf> and also the Department of Agriculture's guidance for Sanitization and Diagnosed Employees at <https://www.agriculture.pa.gov/foodforthought/Pages/Article.aspx?post=78>



Posters like this one are available in many different languages from the CDC. For printable posters see <https://www.cdc.gov/coronavirus/2019-ncov/communication/print-re-sources.html>

COVID-19 and Wholesale Produce Farms

Gordon Johnson

COVID-19 will pose additional challenges for produce growers this season. The good news is that there is no evidence of the spread of the virus in food and with produce specifically. However, potential transmission of the virus with employees and contract workers is of great concern.

Protecting Against Transmission in the Labor Force

Labor on produce farms is often complicated. There are family members and year-round employees. There are seasonal employees that may be directly hired by the farm, contracted directly by the grower through labor brokers, or contracted by produce brokers. Housing may be provided on the farm, or more commonly, seasonal labor lives in off-farm locations. There are H2A workers coming from Mexico or other countries just for the season then returning home.

No matter what the labor situation, growers and brokers should educate workers on COVID-19 symptoms, how it spreads, and how to reduce the spread of the disease.

It is very important to instruct workers to stay home if they are sick (coughing, sore throat, fever, diarrhea, vomiting, etc.). Housing may be more important as workers often live together in close quarters where COVID-19 could spread rapidly. Where possible, arrange for housing that allows for distancing. Train employees on how to reduce the spread of COVID-19 in housing and personal activities.

Some employees may need reassurance that they will not be punished for missing work due to illness, while others may

be unwilling to miss a paycheck due to illness. Have a plan and communicate in advance for how you will address these individuals (paid sick leave). Government programs may be of assistance so keep current with available funding for agriculture and small businesses.

Monitoring Employee Health for COVID-19

Businesses should follow CDC and FDA guidance for screening employees who have been exposed to COVID-19. Pre-screen employees for symptoms (fever, dry cough) before starting work. Employees with fever and symptoms should be advised to see a doctor for evaluation. There are health care screening organizations that serve the migrant farmworker communities on Delmarva.

Keep informed of current COVID-19 testing in your area and if testing becomes more widely available, have workers tested as appropriate.

Enhanced Training, Personal Protection, Hygiene

Enhanced training on personal hygiene and sanitation should be performed. All employees must wash their hands with soap and water for 20 seconds, frequently throughout the day. This includes when they arrive to work, before handling food, after breaks/using the restroom, and after any contamination event.

Train employees so they do not touch eyes, nose and mouth throughout the day. Discourage employees from sharing

(continued on page 10)

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NEWS

Farmers Market Food Safety Online Course Offered

Selling food at farmers' markets is popular and profitable. This online course teaches vendors and producers about food safety and preventing foodborne illness.

This online course is presented by Martin Bucknavage, Senior Food Safety Extension Associate, in seven sessions lasting a total of 4 hours and offers a certificate of completion.

With the continued popularity of eating healthy, access to fresh fruits, vegetables, and other freshly made products is more popular than ever. Farmers' markets are attracting more customers — and vendors. Ensuring food safety at farmers' markets is an important responsibility of the vendors.

Through a combination of videos and reading, this course focuses on teaching new and established farmers' market vendors the basics of food safety and sanitation.

Food safety begins at product harvest, and continues through processing, preparation, transportation, and point of sale. In this course, you will learn about controlling food safety risks from "farm to fork." The topics covered include: equipping food-safe facilities; sourcing and purchasing ingredients; product handling and preparation; sales and service at the farmers' market; and record keeping, traceability, and liability.

Printable handouts to help control risk from farm to fork are included including: biological contaminants, manual cleaning, types of cleaners, types of soil, solubility characteristics, and recommended cleaning procedures, hand-washing, good sanitary practices, and food cooking requirements. A useful Event Checklist is also provided to help you, as a vendor, prepare for and set up your farmer's market stand.

This course is designed for existing farmers' markets vendors and those interested in becoming a vendor. You will learn how to:

- evaluate potential risks related to food safety at farmers' markets from harvest through sale of the food product
- equip and operate food safe facilities
- source and purchase ingredients
- handle and prepare food properly
- identify on-site food safety procedures
- know what is needed for proper record keeping, and food or ingredient traceability
- recognize potential liability issues.

For further information and to register, go to: <https://extension.psu.edu/farmers-market-food-safety-online>

COVID-19 and... (continued from page 9)

vehicles. If employees must travel together, they should wear face masks. Discourage employees from sharing phones, tools, utensils, dishes, drinking glasses, cups, eating utensils, towels, or bedding.

Single-use gloves should be provided to all workers handling produce in packing areas and should be changed when contaminated (when hands touch skin or the ground). When gloves may interfere with a worker's ability to do their assigned task (harvesting, applying stickers, etc.), handwashing or hand sanitizer should occur frequently.

Workers should wear cloth face coverings while working in close proximity with others. Workers should be instructed on how to wear them properly to prevent illness or injury.

Workforce Organization, Distancing

Instruct workers to keep 6 feet away each other. Limit one employee per vehicle at a time and instruct drivers to disinfect frequently touched surfaces within the vehicle before their shift ends.

When physical distancing is not an option, consider dividing workers into teams that only work with members within that team for the duration of the outbreak. For example, divide your packing crew into two groups that only show up for their groups designated shift. Have the first shift clean and sanitize their works areas and equipment at the end of their shift, and give a buffer of 15 to 30 minutes between the end of the first shift and beginning of the next shift to ensure employees are not in contact with each other during shift changes.

Operations may want to consider having designated harvest and packing crews, the members of which never cross paths during the workday. Employees in the same household should be assigned to the same crew. Working in designated crews reduces the risk of losing your entire workforce.

In some packing areas, plexiglass barriers may also be used to separate workers.

Cleaning and Disinfecting

Cleaning and disinfecting are two separate steps and should be done in order. Cleaning removes dirt and soil and often requires the use of a soap/detergent and water. Disinfecting uses a chemical to inactivate virus on the surface.

Shared tools should be cleaned and disinfected between uses by a different employee. Clean harvest baskets, bags, aprons, knives, etc. after each use. Apply a disinfectant to non-porous produce contact surfaces. Disinfect frequently touched surfaces, including door handles, steering wheels, keyboards, touch screens, etc. throughout the day.

CDC is recommending use of disinfectants on the EPA list found at: <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>.

Cloths, uniforms, and other laundry used in produce handling should be washed in hot water.

This article was adapted from the fact sheet "HANDLING COVID-19 – PRODUCE FARMS AND PACKINGHOUSES" from NCState and University of Georgia Extension.

*Dr Johnson is the Extension Vegetable & Fruit Specialist at the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 28, Issue 6, April 24, 2020.*

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Paraquat Training for Certified Applicators Now Available in Spanish

The EPA-approved paraquat certified applicator training online module was released in Spanish yesterday. Training in either English or Spanish accessible at the link provided on paraquat product labels or <http://www.usparaquattraining.com/>. You will be prompted to create a user account to take the training. Upon successful completion of the training, your online account can be accessed anytime to print the Certificate.

Some users have reported difficulty accessing the Spanish module when using Google Chrome as a browser. If this occurs for you, simply load the link <http://www.usparaquattraining.com/> using another browser such as Internet Explorer, or Microsoft Bing. The course host is working on a solution that will allow the training to be accessed with any browser.

The use of paraquat, which is a restricted use pesticide, is restricted to certified pesticide applicators only; noncertified persons working under the supervision of a certified applicator are prohibited from using paraquat, including mixing, loading, applying the pesticide, and other pesticide-related activities.

Paraquat product labels require applicators to take an EPA-approved training every 3 years in order to mix, load, apply, or handle paraquat. This online course reinforces how to properly and safely use paraquat.

The EPA-approved training module can be accessed at <http://www.usparaquattraining.com/>. This training was developed by paraquat manufacturers as part of EPA's 2016 risk mitigation requirements and has been approved by EPA.

(continued on page 30)

RESTRICTED USE PESTICIDE DUE TO ACUTE TOXICITY

FOR RETAIL SALE TO AND USE ONLY BY CERTIFIED APPLICATORS ONLY—NOT TO BE USED BY UNCERTIFIED PERSONS WORKING UNDER THE SUPERVISION OF A CERTIFIED APPLICATOR.

Gramoxone SL 2.0 Restricted Use Statement

Always follow the directions on the pesticide label of the product in your possession that you will be using. The restricted use statement of paraquat products produced for sale this season (see example from Gramoxone SL 2.0 label above) requires that noncertified persons working under the supervision of a certified applicator are prohibited from using paraquat, including mixing, loading, applying the pesticide, and other pesticide-related activities. See more details at bottom of original post below (in red).

As required by EPA's Paraquat Dichloride Human Health Mitigation Decision and amended* paraquat dichloride (a.k.a. paraquat) product labels, **certified applicators must successfully complete an EPA-approved training program before mixing, loading, and/or applying paraquat.** The training provides important information about paraquat's toxicity, new label requirements and restrictions, and the consequences of misuse.

Product Package Safety Requirements

NEVER TRANSFER THIS PRODUCT INTO FOOD OR BEVERAGE CONTAINERS OR CONTAINERS NOT EXPLICITLY INTENDED FOR PESTICIDES.	NUNCA TRANSFERIA ESTE PRODUCTO A RECIPIENTES PARA COMIDA O DE BEBIDAS O RECIPIENTES NO EXPLICITAMENTE PREVISTOS PARA PLAGUICIDAS	
ONE SIP CAN KILL.	UN SORBO PUEDE CAUSAR LA MUERTE.	
CONTACT WITH SKIN MAY RESULT IN POISONING.	EL CONTACTO CON LA PIEL PUEDE CAUSAR ENVENENAMIENTO.	
EXPOSURE TO EYES MAY CAUSE SUBSTANTIAL EYE INJURY.	EXPOSICIÓN A LOS OJOS PUEDE CAUSAR LESIONES SUBSTANCIALES EN LOS OJOS.	
PARAQUAT SHOULD ALWAYS BE STORED TIGHTLY CLOSED IN ORIGINAL CONTAINER, AND IN A LOCKED PLACE AWAY FROM CHILDREN AND ANIMALS.	EL PARAQUAT DEBE ALMACENARSE SIEMPRE CERRADO EN SU RECIPIENTE ORIGINAL, Y EN UN LUGAR CERRADO, ALEJADO DE NIÑOS Y ANIMALES.	
READ ENTIRE LABEL PRIOR TO USING THIS PRODUCT.	LEA LA ETIQUETA COMPLETA ANTES DE USAR ESTE PRODUCTO.	

Paraquat Safety Requirements Label Graphics

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NEWS

National News Briefs

Broadband Data Bill Becomes Law

A bill that will improve data on broadband availability so that resources to expand service can be better targeted is now law.

President Donald Trump signed the Broadband Deployment Accuracy and Technological Availability Act last month, after the Senate voted to approve minor changes to that were made in the House.

The bill would require internet service providers to report more specific data on coverage, giving policymakers better information about where coverage exists and where funding to expand coverage would be best spent. The current coverage maps do not accurately assess broadband availability, especially in rural areas, because they consider an entire Census block served even if only one property in the whole Census block has service.

“Reliable access to broadband is no longer a luxury but a necessity for farmers, ranchers and their rural communities,” American Farm Bureau Federation President Zippy Duvall said. “This legislation will create a more accurate National Broadband Map, which will help ensure resources are targeted to the areas that need it most.”

From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, April 2020.

MSC Business Services Gives Tax Advice With Deadline Extension

Even though the state and federal government have extended the tax filing deadline to July 15, farmers and small business owners should plan on filing their taxes as soon as possible, according to MSC Business Services.

The Internal Revenue Services is still processing refunds at their typical pace—usually in about two weeks. If taxpayers expect that they will be owed a refund, filing as soon as possible will ensure that critical cash on hand is received quickly.

But even if taxpayers expect that they will owe taxes, filing sooner rather than later is still a smart strategy. Tax payments

will not be due until July 15. Filing as soon as possible will let taxpayers know how much they owe, but still give them until July 15 to gather funds to make the payment.

Waiting to file or complete the paperwork will only add to that uncertainty.

“There is a lot of business uncertainty right now. The last thing that farmers and small business owners need is further uncertainty around their tax liability,” said Michael Volinskie, manager of MSC Business Services. “Even if you have to make a payment, the best strategy is to file now and give yourself extra time to collect money for that payment.”

MSC Business Services staff are busy filing taxes and meeting with clients to discuss their taxes and options. To learn how MSCBS can help your farm or small business visit: mscbusiness.net.

From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, April 2020

Canada On Track to Ratify USMCA

Canada’s parliament has voted to ratify the U.S.-Mexico-Canada Agreement, essentially clearing the way for the new North American trade pact to take effect.

Pending administrative action needed to finalize the Canadian legislative process, Canada will become the third and final nation to ratify the trade deal, following the United States and Mexico. That would allow the deal, reached between the three nations in late 2018, to go into force. That’s expected to happen this summer.

USMCA is expected to increase U.S. agriculture exports by \$2 billion and result in a \$65 billion increase in gross domestic product. It provides new market access for U.S. dairy and poultry, while maintaining the zero-tariff platform on all other agriculture products, and gives U.S. dairy greater access to Canada’s protected market.

From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, April 2020.

State News Briefs

Spotted Lanternfly Quarantine Area Expands

The Pennsylvania Department of Agriculture has added 12 counties to the quarantine area intended to control the spread of the invasive spotted lanternfly.

New counties in the quarantine area include Allegheny, Beaver, Blair, Columbia, Cumberland, Huntingdon, Juniata, Luzerne, Mifflin, Northumberland, Perry, and York. The added counties are not completely infested yet, according to PDA, but have a few municipalities with a known infestation.

The additions bring the total number of quarantined counties to 26. Counties that were already in the quarantine zone include Berks, Bucks, Carbon, Chester, Dauphin, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Philadelphia, and Schuylkill.

Businesses that operate within or cross through the quarantine counties must obtain a permit demonstrating that they can identify the spotted lanternfly and will take steps to stop its spread. An invasive pest native to Asia, the spotted lanternfly was first discovered in Berks County in 2014. It poses a major threat to agricultural commodities, including grapes, tree fruit, hops and hardwood.

From the Pennsylvania Agricultural Alliance Issues Update, Penna. Farm Bureau, April 2020.

Disaster Assistance Available to Help Recovery from 2018 Losses

Some Pennsylvania farmers will be able to sign up later this month for an additional round of disaster assistance that aims to help offset losses producers faced as a result of excessive rainfall and flooding in 2018.

A federal spending bill adopted in December allocated an additional \$1.5 billion for farm disaster assistance on top of the \$3 billion made available through a disaster relief package last summer. Sign up for the new round of assistance, through the U.S. Department of Agriculture’s Wildfire and Hurricane Indemnity Program Plus (WHIP+) begins March 23.

With the new expansion of the program, producers can now file claims to help offset financial losses incurred when marketing crops that had reduced quality as a result of excessive moisture.

Producers in the following Pennsylvania counties are eligible for the disaster assistance: Adams, Blair, Bradford, Cambria, Cameron, Centre, Clearfield, Clinton, Columbia, Crawford, Elk, Erie, Fayette, Franklin, Fulton, Greene, Huntingdon, Indiana, Jefferson, Lackawanna, Lancaster,

(continued on page 29)

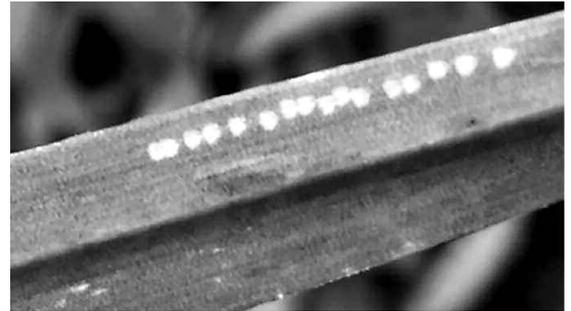
Allium Leafminer Adults Emerging Now in Southeastern Pennsylvania

Timothy Elkner, Shelby Fleischer, Brandon Lingbeek



Allium leafminer adult.
Photo: Brandon Lingbeek, Penn State

Note the linear white dots caused by the female allium leafminer. Photo: Brandon Lingbeek, Penn State



In past years, allium leafminer (ALM) emergence started around April 18, and this year we used a model that predicted emergence would start in southeastern PA by April 6, based on temperatures that had occurred until March 6, plus climatological averages projected beyond that date. We were updating this model with real-time temperatures and lower baseline thresholds, which was moving the date earlier (as early as March 29). However, we confirmed adult activity in Lancaster, York, and Perry counties on March 17—a month prior to results from recent years, and 12 days earlier than our current models.

The first signs of ALM are the linear series of round white dots on allium leaves. You can also distinguish the adult fly by the orange patch on the head, and the wings folded horizontally over its back. The flies tend to be found at the tips of the leaves in the morning.

ALM attacks plants in the Allium genus including high-value crops such as onion, garlic, leek, scallions, shallots, and chives. ALM has two generations per year. It overwinters as a pupa in leaf tissue or adjacent soil, emerges in the spring, and adult flight occurs over 4-5 weeks.

The white dots are made by the female with her ovipositor. Both males and females feed on leaf sap, and egg-laying occurs at this same time. Larval development progresses to the pupal stage but is then delayed as the pupa undergoes summer aestivation (a resting period with little to no development), and they do not emerge again until late September for another 5-7-week flight.

Control measures are only needed during the adult flight period to target adults and developing larvae, and very shortly after to target any remaining developing larvae. Control can be achieved with row covers during the adult flight, or insecticides. We've obtained good control with both conventional and organic options.

Among the organic options, using approximately weekly applications, Entrust has worked well. Aza Direct has also given some control, but not as consistently as Entrust. Avoid Pyganic – we've seen it result in higher infestations than untreated controls.

Among conventional options, Scorpion, Exirel, and Radiant have all given excellent control, with fewer applications. Alliums have a very waxy leaf, so including a spreader-sticker, or a soap product for organic production, is a good idea.

However, you may be able to escape damage in the spring, depending on the crop and timing of both the crop and pest.

(continued on page 14)

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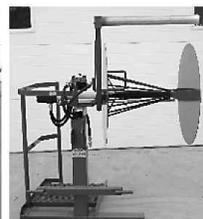
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VEGETABLE PRODUCTION

Excess Water Raises Disease Issues in Vegetables

Thomas Butzler

What will weather conditions look like for 2020? Tough to say but the past two years were pretty rough on many growers, especially during the growing season. The biggest issue was water—too much!

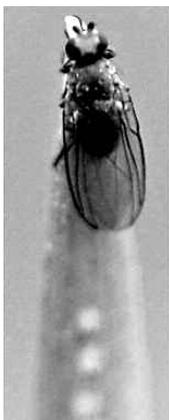


Phytophthora blight fruit rot, white fungal growth of Phytophthora capsica on cucumber fruit. Photo: Tom Butzler, Penn State

The National Weather Service stated that “2018 was the wettest year on record in Pennsylvania.” This past 2019 summer was looking like another wet year, but the rains shut off mid-summer.

Excess water can be problematic in that it can lead to soil compaction (if worked while wet), soil erosion, and loss of nutrients. It can also create an ideal environment for several diseases such as phytophthora blight. The disease thrives in low-lying, poorly drained areas of a field, which was prevalent in the past two years. While there are some fungicides labeled, this is a problem that can be addressed by other means, and planning starts NOW!

Allium Leafminer... (continued from page 13)



Allium leafminer on scallion. Note the yellow patch on the head and the white dots indicating egg-laying activity. Photo: Brandon Lingbeek, Penn State

We've not seen much damage into the bulbs with sweet onions if the egg-laying is limited to the outer leaves that will become the scale leaves at harvest. Scallions seem to be preferred, and since you are marketing the leaf tissue, scallions are at risk of economic damage. We've seen egg-laying scars and leaf-mining to garlic and have had grower reports of significant crop loss to garlic.

A good place to look for signs of ALM is on wild garlic, and on actively growing scallions if you have them on your farm.

Dr. Elkner is with Penn State Extension in Lancaster Co. while Dr. Fleischer and Mr. Lingbeek are with the Department of Entomology at Penn State Univ. From Penn State Extension.

When scientists and extension educators talk about Phytophthora blight (caused by *Phytophthora capsica*), we generally refer to it as a fungus. But in reality, it is a totally different organism and classified as an oomycete. These are close relatives of algae. A certain portion of its life stage is spent as a swimming spore. Those wet, low-lying fields serve as a 'swimming pool' for this organism as it searches out for a host.

Knowing the lay of your land and its history can help determine the planting location of susceptible crops. If that is not an option, then anything that can be done to increase the draining of your soil is a benefit. It could be something as labor and money intensive as installing subsurface drainage to something more passive like a yearly cover crop program. An additional step might be planting on raised or dome-shaped beds to help provide better soil drainage. These are just a few of the options available to address poor drainage/standing water issues. In addition, consider the movement of footwear and equipment through these areas. Mud stuck to surfaces can easily spread the organism from infested to clean field.



Crown rot, Phytophthora blight can cause crown rot in pumpkins. Photo: Tom Butzler, Penn State

As with any disease, the rotation of crops is a critical management tool. Unfortunately, the disease has a large number of susceptible vegetable species. Rotation from pumpkins (*Cucurbitaceae*) to peppers (*Solanaceae*) to snap beans (*Leguminosae*) wouldn't work as all three are susceptible. Crops in the grass family would fit into the rotation for Phytophthora blight management.

Fungicides should be a choice of last resort. Once the disease starts and gets a toehold on the crop, it can be very difficult to control. Many of the labeled fungicides are effective if applied preventatively or as close to the start of the initial disease. Depending on weather conditions, there is a possibility that several fungicide applications might be needed to finish off the season. This strategy will require scouting, weather patterns, and attention to field conditions.

Below are tables from the 2020/2021 Mid-Atlantic Commercial Vegetable Production Recommendations Guide for the most *Phytophthora capsica* susceptible crops.

Mr. Butzler is with Penn State Extension in Clinton Co. From Penn State Extension, <https://extension.psu.edu/excess-water-raises-disease-issues-in-vegetables>, April 25, 2020.

(continued on page 16)

Improving Early Fruit Set in Seedless Watermelon

Gordon Johnson

The first watermelons will be planted at the end of April across the Delmarva region. Markets for early watermelons are normally the strongest so early planting is often more profitable. However, fruit set is often below desired levels in the earliest plantings and crown sets in early plantings often have quality issues such as higher levels of hollow heart. The following are some considerations for managing watermelons to maximize early fruit set:

Get plants off to a good start with a minimum of stress. In early plantings always plant on a warming trend where temperatures are expected to increase and skies are mostly clear. Black plastic mulch will then allow soils to accumulate heat and roots will be able to establish more quickly. Use every row rye windbreaks (or row covers if windbreaks have not been planted) to reduce heat losses and protect plants.

Plant well hardened off plants and train transplanting crews to handle plants carefully with a minimum of damage. Provide adequate water at planting and avoid putting excess starter fertilizers in transplant water which can cause salt stress on plants. Manage early fields more intensively by monitoring irrigation and fertigation programs so that stress is reduced throughout the growing period. Extra nitrogen can delay flowering so there is a fine balance between promoting growth and initiating flowering.

Avoid practices that put extra stress on plants and be careful of phytotoxicities with misapplication of foliar fertilizers, fungicides (such as copper products), and herbicides (proper shielding when spraying row middles, follow label guidelines for her-

bicides). Manage insecticide applications so that bees are not affected during flowering (see pollinator protection information on labels).

Manage pollinizer-seedless combinations for maximum pollination potential. Loss of pollinizers after planting will reduce fruit set. This has been a problem in the past when pollinizers were not hardened off properly because they were seeded later in the greenhouse. In-row or co-planted pollinizers should be used to achieve best early fruit set. Pollinizers should be chosen so that they are flowering adequately as the seedless come into flower. Pollen is the key for early fruit set and earlier flowering pollinizers should be used to improve crown sets.

A case can be made also for increasing the number of pollinizer plants for the earliest plantings. A 1:3 ratio of pollinizer to seedless should be the minimum used and extra pollinizers that flower early could be planted at intervals to provide additional pollen. Another issue is the vigor of pollinizers. Make sure that pollinizers have good disease packages. In fields with a history of Fusarium wilt, Fusarium resistance in both pollinizers and seedless is needed. Place early plantings in fields with little or no history of watermelon production to avoid soil borne disease stress.

Manage pollinators (bees) so that pollen is transferred effectively and in adequate quantity. Consider placing extra hives in early plantings. Have hives set when pollinizers are 10% in bloom so bees start to work fields immediately. If there

(continued on page 17)

HEALTHY PREDATORS, PARASITES ON PATROL

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VEGETABLE PRODUCTION

Excess Water Raises... (continued from page 14)

Cucumbers: Fungicide recommendations for *Phytophthora* crown and fruit rot of cucumber. Tables from 2020/2021 Mid-Atlantic Commercial Vegetable Production Recommendations

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following fungicides. Rotate fungicides with different FRAC codes and tank mix with a fixed copper (exception: do not tank mix Ranman 400SC with copper).						
49+40	Orondis Ultra 2.33SC	5.5 to 8.0 fl oz/A	oxathiapiprolin + mandipropamid	0	4	--
49+M05	Orondis Opti 3.37SC	1.75 to 2.5 pt/A	oxathiapiprolin + chlorothalonil	0	12	--
40	Revus 2.08F	8.0 fl oz/A	mandipropamid	0	4	--
40 + 45	Zampro 525SC	14.0 fl oz/A	dimethomorph + acetochradin	0	12	--
22	Elumin 4SC	8.0 fl oz/A	ethaboxam	2	12	--
43	Presidio 4SC ¹	3.0 to 4.0 fl oz/A	fluopicolide	2	12	L
M03+22	Gavel 75DF	1.5 to 2.0 lb/A	mancozeb + zoxamide	5	48	--
M05+22	Zing! 4.9SC	36.0 fl oz/A	chlorothalonil + zoxamide	0	12	N
21	Ranman 400SC	2.75 fl oz/A (plus a non-ionic or organosilicon surfactant; see label for additional precautions)	cyazofamid	0	12	L
40	Forum 4.17SC	6.0 fl oz/A	dimethomorph	0	12	N

¹Presidio may also be applied through the drip irrigation (see supplemental label). Soil drench followed by drip application has given good results in some trials on crown rot caused by *Phytophthora capsici*.

Peppers: Fungicide recommendations for *Phytophthora* blight of peppers. Tables from 2020/2021 Mid-Atlantic Commercial Vegetable Production Recommendations

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
For control of the CROWN ROT phase of <i>Phytophthora</i> blight, apply one of the following at transplanting and 30 days later.						
4	MetaStar 2E AG	4.0 to 8.0 pt/A ¹	metalaxyl	7	12	N
4	Ridomil Gold 4SL	1.0 pt/A ¹	mefenoxam	--	--	N
4	Ultra Flourish 2E	1.0 qt/A ¹	mefenoxam	--	--	N
21	Ranman 400SC	2.75 fl oz/A ^{2,3}	cyazofamid	0	12	L
43	Presidio 4SC	3.0 to 4.0 fl oz/A ³	fluopicolide	2	12	L
49 + 4	Orondis Gold 1.67SC	See labels ^{1,2,4}	oxathiapiprolin + mfenoxam	0	4	--
For prevention of the AERIAL STEM AND FRUIT ROT phase of <i>Phytophthora</i> blight, tank mix one of the following with fixed copper and alternate with Ridomil Gold Copper 65WP at 2.5 lb/A (PHI 7 d, REI 48 h).						
21	Ranman 400SC	2.75 fl oz/A	cyazofamid	0	12	L
40	Forum 4.17SC	6.0 fl oz/A	dimethomorph	4	12	N
40	Revus 2.08F	8.0 fl oz/A	mandipropamid	1	12	--
40 + 45	Zampro 525SC	14.0 fl oz/A	dimethomorph + ametoctradin	4	12	--
43	Presidio 4SC	3.0 to 4.0 fl oz/A	fluopicolide	2	12	L
49 + 4	Orondis Gold 1.67SC	See labels ⁴	oxathiapiprolin + mfenoxam	0	4	--

¹Apply at transplanting and 30 d later. ²May also be applied via transplant water (see label for restrictions). ³Apply Presidio or Ranman via drip between mfenoxam/metalaxyl applications. ⁴If applying as drip(s), do not apply as foliar application, see label for restrictions.

Pumpkins: Fungicide recommendations for *Phytophthora* crown and fruit rot of pumpkins and winter squash. Tables from 2020/2021 Mid-Atlantic Commercial Vegetable Production Recommendations

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
For control of the CROWN ROT phase of <i>Phytophthora</i> blight, apply one of the following at transplanting and 30 days later.						
4	MetaStar 2E AG	4.0 to 8.0 pt/A ¹	metalaxyl	7	12	N
4	Ridomil Gold 4SL	1.0 pt/A ¹	mefenoxam	--	--	N
4	Ultra Flourish 2E	1.0 qt/A ¹	mefenoxam	--	--	N
21	Ranman 400SC	2.75 fl oz/A ^{2,3}	cyazofamid	0	12	L
43	Presidio 4SC	3.0 to 4.0 fl oz/A ³	fluopicolide	2	12	L
49 + 4	Orondis Gold 1.67SC	See labels ^{1,2,4}	oxathiapiprolin + mfenoxam	0	4	--
For prevention of the AERIAL STEM AND FRUIT ROT phase of <i>Phytophthora</i> blight, tank mix one of the following with fixed copper and alternate with Ridomil Gold Copper 65WP at 2.5 lb/A (PHI 7 d, REI 48 h).						
21	Ranman 400SC	2.75 fl oz/A	cyazofamid	0	12	L
40	Forum 4.17SC	6.0 fl oz/A	dimethomorph	4	12	N
40	Revus 2.08F	8.0 fl oz/A	mandipropamid	1	12	--
40 + 45	Zampro 525SC	14.0 fl oz/A	dimethomorph + ametoctradin	4	12	--
43	Presidio 4SC	3.0 to 4.0 fl oz/A	fluopicolide	2	12	L
49 + 4	Orondis Gold 1.67SC	See labels ⁴	oxathiapiprolin + mfenoxam	0	4	--

¹Apply at transplanting and 30 d later. ²May also be applied via transplant water (see label for restrictions). ³Apply Presidio or Ranman via drip between mfenoxam/metalaxyl applications. ⁴If applying as drip(s), do not apply as foliar application, see label for restrictions.



VEGETABLE PRODUCTION

Improving Early Fruit... (continued from page 15)

are not enough bees when first female flowers open, you will lose much of the crown set. Avoid having flowering crops nearby that are more attractive to bees and could siphon off bee activity.



G Johnson, University of Delaware

Hollow heart is a common problem in early planted watermelons.

Fruit set is often reduced when weather conditions at first flowering is rainy and windy or night temperatures are cold. Honeybees rarely work when the temperature is below 57°F and don't fly when the temperature is below 55°F. They do not forage in rain or in wind stronger than 12 mph. Cloudiness also reduces flight activity, especially near threshold temperatures. A cold spell in late May or early June can reduce fruit set significantly because of reduced bee flights. While honeybees can work over a 2-mile distance, a case can be made for placing honeybee hives at more than one location in or around the field in early plantings to address shorter flights in bad weather.

Bumblebees are stronger fliers that can fly in heavier winds and are active at lower temperatures. Placing bumblebee hives throughout the field may improve early fruit set. Growers should be cautioned not to place bumblebee hives near honeybees because the honeybees will place stress on and rob from the bumblebee colonies if both honeybees and bumblebees are used.

*Dr. Johnson is the Extension Vegetable and Fruit Specialist for the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 28, Issue 6, April 24, 2020.*

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VEGETABLE PRODUCTION

Diseases of Cucurbit Seedlings

Jake Jones

Gummy Stem blight is caused by *Stagonosporopsis* spp. and can occur on cucurbit crops and seedlings. It can be introduced from infected seed or seedlings, highlighting the importance of greenhouse and field sanitation. Gummy stem blight can cause symptoms on the leaves, stems, and vines and is also called black rot when fruits are infected. Growers should be able to recognize gummy stem blight symptoms on seedlings before transplanting them into clean fields. Symptoms include water soaked stems (Figure 1), chlorotic leaf margins, and necrotic lesions on cotyledons and leaves. The necrotic lesions are often chocolatey brown and the majority reach the leaf margins. Concentric rings can be found within the lesions. Diagnostic signs can be seen with a hand lens and are pycnidia, the asexual fruiting body or pseudothecia, the sexual fruiting body. They form in the center of lesions first and can be found in the final stages of infection, as the pathogen is necrotrophic. In order to limit transmission of the disease, rotate away from hosts for 3 years, practice fall tillage to help reduce crop residue (and therefore inoculum), purchase seeds/seedlings from reputable companies, inspect seedlings regularly, monitor and be prepared to spray preventative fungicides.



D Egel, Purdue University

Figure 1. Water soaked lesion where cotyledons attach to the hypocotyl, a symptom of gummy stem blight.

Anthracnose, caused by *Colletotrichum orbiculare* can be confused with gummy stem blight, although symptoms usually don't become severe until the canopy closes. Both diseases affect all aboveground plant parts and seed can again be the source of initial inoculum. Watermelon, cucumber, and honeydew melon can experience serious losses when susceptible cultivars are grown while squash, cantaloupe, and pumpkin are less susceptible. In cucumber and honeydew melon, leaf lesions start as small water soaked areas, eventually becoming somewhat circular and brown with a yellow halo. In watermelon, the lesions are often smaller than in cucumber, darker brown, and irregular shaped. When seedborne, anthracnose symptoms appear as a wilt of cotyledons and water soaked lesions on the stem near the soil line (Figure 2), below where the lesions occur in gummy stem blight. The best options to avoid anthracnose are to start by choosing resistant varieties, purchasing disease free seeds, monitor and inspect seedlings, rotate away from cucurbits for 3 years, and practice fall tillage to remove residue.

Figure 2. Water soaked lesion at the soil line, a symptom of anthracnose.



D Egel, Purdue University

Another fungal disease worth mentioning is Fusarium wilt, with symptoms in watermelon of wilted seedlings or damping off.

Bacterial fruit blotch caused by *Acidovorax avenae* subsp. *citrulli*, is caused by bacteria as the name suggests. Initial symptoms are similar across cucurbit species but often more severe in watermelon, appearing as water soaked lesions on the underside of cotyledons (Figure 3). Lesions will turn necrotic extending along the leaf veins and in severe cases can cause damping off in seedlings. Lesions on mature leaves are reddish brown and elongated along the leaf veins, but they are easily confused with other diseases like gummy stem blight and anthracnose.



R Walcott, Georgia

Figure 3. Water soaked lesion on the underside of cotyledons, an initial symptom of bacterial fruit blotch.

Seedborne transmission of bacterial leaf blotch is the most important source of inoculum and conditions in the warm and humid greenhouses help the disease become established and spread among seedlings.

Seedling grow out assays of 10,000-30,000 seeds per lot are used to screen for bacterial fruit blotch infected seed lots and help reduce the risk of outbreaks. Sanitation efforts such as cleaning and disinfecting trays, using new soil, separating seed lots, keeping humidity low, and watering seedlings at midday so they have time to dry before the evening can also help reduce the risk of an outbreak. Destroy all trays with symptomatic plants and remove and isolate adjoining trays for observation and monitoring of

(continued on page 19)

Selecting Muskmelon Varieties

Francesco Di Gioia, Elsa Sanchez, Timothy Elkner, Robert Pollock and Thomas Butzler

In 2018 and 2019 we evaluated muskmelon varieties at three sites in Pennsylvania to determine how they performed compared to the standard, 'Aphrodite'.

Most varieties produced marketable yields that were not different than 'Aphrodite' over the 2-year period.

'Sugar Cube' produced more fruit per plot than 'Aphrodite' in 4 site years. Additionally, the mean fruit weight per plot from 'Sugar Cube' was not different than 'Aphrodite'. This shows that 'Sugar Cube' fruit were generally smaller than 'Aphrodite', but the number produced was larger. Because of its size, this variety may be a good option for selling separate from other cultivars as personal or individual-sized.

'Infinite Gold' produced fewer fruit per plot than 'Aphrodite' in 3 site-years and fruit weighed



Photo: Tim Elkner, Penn State

less per plot in 4 site years. 'Infinite Gold' takes longer to mature (81 days listed in seed catalogs) than 'Aphrodite' (72 days). This could be a factor in the yields we saw.

'Shockwave' and 'Fiji' produced fruit per plot that weighed less than 'Aphrodite' in 4 site-years and 'Lani' in 3 site years. When high fruit weights are desired other cultivars may be better options.

Below is a table with the varieties we evaluated along with ornamental characteristics to help make decisions on which ones to grow.

(continued on page 20)

Diseases of...

(continued from page 18)

disease symptoms. Remaining trays should be treated with labeled copper fungicides until they are transplanted.

Angular leaf spot is another bacterial disease and is caused by *Pseudomonas syringae* pv. *lachrymans*. There are resistant cucumber varieties available but angular leaf spot can occur in all cucurbit crops. Symptoms can look similar to bacterial fruit blotch, so proper identification is key. Lesions start as water soaked angular lesions on the underside of leaves before becoming brown or straw colored and surrounded by yellow halos. Similar to bacterial fruit blotch, it is important to start with disease free seed, as both diseases can infect fruit later in the year and directly impact marketable yield. Sanitation, crop rotation, and the ability to identify symptomatic plants are important ways to protect your crops before they go into the field.

Mr. Jones is with the Univ. of Delaware Extension in Kent Co. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 28, Issue 6, April 24, 2020.



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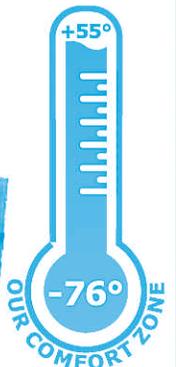
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VEGETABLE PRODUCTION

Selecting Muskmelon... (continued from page 19)

Variety	Disease Resistance/ Days to Maturity from Seed Catalog	Fruit Weight from Our Evaluation, Average (Lb) ¹	Average Fruit Weight Range from Our Evaluation (Lb) ¹	Listed Fruit Weight Range from Seed Catalog (Lb)
Accolade	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 73 days to maturity	5.2	2.8–6.7	5–6
Afterglow	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 80 days to maturity	4.7	2.7–6.1	5–7
Aphrodite	Powdery mildew race 1, Fusarium wilt races 0, 1 and 2; 72 days to maturity	6.5	4.9–8.4	6–8
Ariel	Powdery mildew race 1, Powdery mildew intermediate resistance race 2, Fusarium wilt races 0, 1 and 2; 73 days to maturity	5.8	3.8 – 6.8	6 – 8
Astound	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 75 days to maturity	5.2	3.5 – 6.2	5 – 6
Athena	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 75 days to maturity	4.8	3.0 – 6.3	5 – 6
Atlantis	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 73 days to maturity	5.7	4.0 – 10.2	6 – 8
Avatar	Powdery mildew race 1, Powdery mildew intermediate resistance race 2, Fusarium wilt races 0, 1 and 2; 72 days to maturity	8	5.2 – 9.9	8 – 10
Carousel	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 80 – 85 days to maturity	6.1	4.0 – 8.3	6 – 9
Goddess	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 69 days to maturity	5.1	3.5 – 6.7	4 – 6
Infinite Gold	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 81 days to maturity	4.4	3.1 – 5.8	5 – 5.5
Minerva	Powdery mildew race 1, Powdery mildew intermediate resistance race 2, Fusarium wilt races 0, 1 and 2; 78 days to maturity	6.8	5.3 – 8.3	6 – 8
Shockwave	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 85 days to maturity	4.9	3.0 – 6.1	4 – 6
Sugar Cube	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 80 days to maturity	2.3	1.4 – 3.3	2 – 2.5
Sun Blushed	Fusarium wilt races 0, 1, and 2; 93 – 96 days to maturity	5.6	3.3 – 6.1	3 – 3.5
Tirreno	Powdery mildew races 1, 2 and 3, Fusarium wilt races 1, 2 and 5; 83 days to maturity	4.5	3.3 – 5.4	4 – 6
Verona	Powdery mildew races 1 and 2, Fusarium wilt races 0, 1 and 2; 73 days to maturity	7.4	5.9 – 8.9	5 – 8

¹Average and range of fruit weight over 3 Pennsylvania sites and two years (2018–19). At all sites, 4-week-old transplants were set in rows spaced 6 feet apart with 2 feet between plants in a row. Four plots of each cultivar were planted with each plot consisting of 6 plants. Data were collected from all 6 plants. Data were combined by site and analyzed using GLIMMIX. Means were separated at the 5% level using the slice option to perform Tukey's multiple comparison test. Year by cultivar interactions were significant for all variables. Therefore, data were analyzed by site year using the mixed procedure and means were separated at the 5% level using pdiff.

(continued on page 22)

Insecticides for Managing Pepper Weevil

In light of the review of the neonicotinoid insecticides by the Environmental Protection Agency (EPA), it is worthwhile to review insecticidal options if the EPA follows through with its interim recommendations for the neonicotinoid insecticides thiamethoxam, imidacloprid, and dinetofuran.

The proposed recommendation is that these materials may not be used on fruiting vegetables after 5 days post transplanting until the end of blooming. If this recommendation is finalized then the use of Actara, Admire Pro, and Scorpion will not be allowed during crucial growth stages for protecting against, or, suppressing pepper weevil populations.

In recent years, insecticide trials conducted in Florida and California have shown that the products Harvanta, Rimon, Torac, and Vydate L provide the best management of pepper weevil aside from the neonicotinoids. Generally, pyrethroids ((Warrior, Tombstone, etc.) IRAC # 3A) are not recommended unless they are used in rotation with other IRAC group insecticides. It should be noted that under heavy pressure no insecticide will be effective in reducing the weevil population.

Especially for those pepper fields in high-risk areas near processing plants or landfills that accept vegetable waste, an insecticide should be applied to transplants as soon as they begin to bloom and set fruit.

The following is a partial list of registered materials in New Jersey labeled for pepper weevil:

Active ingredient	IRAC #	Product
oxamyl	1A	Vydate L
acetamiprid	4A	Assail
novaluron	15	Rimon
tolfenpyrad	21A	Torac
cyantraniliprole	28	Exirel
cyclaniliprole	28	Harvanta

For a complete list of insecticides that are registered for managing pepper weevil in [Pennsylvania] go to <http://www.kellysolutions.com/PA/pesticideindex.asp>

From *Plant & Pest Advisory, Rutgers Cooperative Extension, April 16, 2020.*

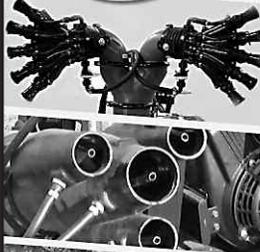


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VEGETABLE PRODUCTION

Selecting Muskmelon... (continued from page 20)



(continued on page 24)

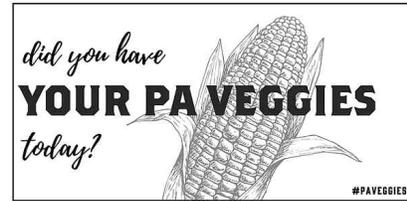
Ant Damage in Transplants

We've heard reports from other New England states this spring of ants causing feeding damage on brassica transplants, eating away the fine roots and girdling stems. This is something we see every once in a while but is fairly unusual. We have a report of this happening in tomato from a few years ago as well. Gerald Brust of the University of Maryland has written here: I have seen controls [for ants in transplants] such as diatomaceous earth, mixtures of garlic and hot pepper, drenches of pyrethrums, boiling water poured onto the soil, and others, but none work very well if at all." Remember also that any pesticide application method must be on-label. There are many potential causes of transplant failure in the field—soildwelling root rot fungi, cutworms, cabbage root maggot or seed corn maggot—so take the time to dig up some plants and search for the "root" cause (sorry, couldn't help myself!). Cabbage root maggot and seed corn maggots aren't doing damage yet, but adult flights usually begin within the next few weeks. If you have transplants going down in the field and you don't know why, feel free to send us pictures at umassveg@umass.edu or leave us a message at (413) 577-3976.

From Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Mass. Extension, Volume 32, Number 6 April 16, 2020.



Brassicas with root and stem damage from ants.
Photo: A. Radin



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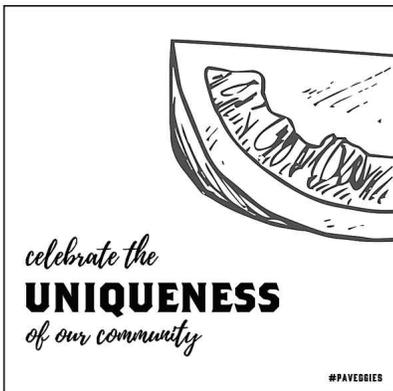
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VEGETABLE PRODUCTION

Selecting Muskmelon... (continued from page 22)

All photos by Tim Elkner, Penn State

The authors are with the Department of Plant Science at Penn State Univ. or with Penn State Extension. From Penn State Extension, <https://extension.psu.edu/selectingmusk-melon-varieties>, April 20, 2020. This research was sponsored by PVGA and the Penna. Vegetable Marketing and Research Program.

Frost and Freeze Damage on Berry Crops

Kathleen Demchak

This year, it feels like winter didn't arrive until April. Plants were beginning to grow, but now are in a holding pattern, so frost damage to susceptible tissues is currently a concern.



Frost-damaged strawberry blossom and developing fruit. Note darkened centers. Photo: Kathy Demchak, Penn State

Here is a review of critical temperatures for damage to berry crops, symptoms of the damage, and some key points regarding protecting plants.

Critical Temperatures for Blossoms

Damage to blossoms is the biggest concern; critical temperatures are those at which you can expect damage to occur. Air temperature close to the ground is often much colder (as much as 5°F) than the low temperature reached at the typical eye-level height where we usually post our thermometers, and if your field is in a low spot, may be even colder. We also need to factor in the fact that the blossoms radiate heat into the sky (called radiational cooling), much like your vehicle roof that may have frost on it on the mornings when the low temperature didn't reach freezing. Of course, low temperatures in any out-of-town rural location are often quite a lot lower than those forecasts; some growers subscribe to services that forecast more accurately for their specific location.

Critical temperatures for strawberry blossoms

For strawberries, critical temperatures for flower buds are 10° when just emerging from the crown, 22° when blossoms are emerged but still tightly closed, 26° when closed but petals are visible ("popcorn" stage), and 30° when open. Young green fruit is actually better able to tolerate cold temperatures than open blossoms, having a critical temperature of 28°. Some recommend actually inserting a thermocouple into the flower buds to most accurately measure their temperatures. Just propping up a thermometer at the end of the row so it's exposed to air on all sides and radiates heat like a blossom would have mirrored the temperatures at which we get damage quite well. Frost-damaged blossoms will have a black center.

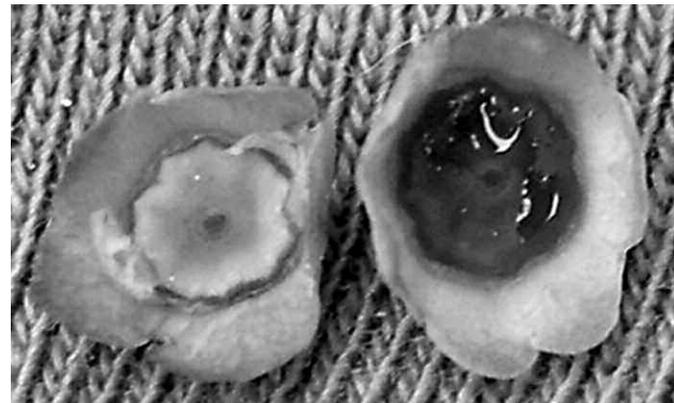
Critical temperatures for blueberry

Blueberry blossoms can tolerate colder temperatures than strawberry blossoms. Different sources give somewhat different values for certain stages, so ranges are given here. Critical temperatures are 15-20° at bud swell; 18-23° when flower clusters are still tight; 22-25° when flower buds in the cluster have separated; 25-26° when flowers are still closed but full-size; and 27°

for open blossoms. The stage where the petals have just fallen off is actually the most tender, with a critical temperature of 28°. Petals will turn brown if damaged, and fruit tissue inside the blossom will have a water-soaked appearance.

Critical temperatures for raspberry blossoms

We never used to mention frost damage on raspberries as



Undamaged blueberry tissue (left) compared to frost-damaged tissue (right). Photo: Kathy Demchak, Penn State

a possibility, since raspberries typically bloom so late that we are usually past danger of frost by the time they bloom. However, in two out of the past ten years, we had frost damage to open raspberry blossoms; this occurred when temperatures were barely below freezing, which makes me think that the critical temperature is in the 30-32° range. Frost damaged blossoms on raspberries turn black in their center, but this is a little less obvious than on strawberries because the anthers extend beyond the damaged portion.

Frost-damaged raspberry blossoms with blackened centers.

Photo: Kathy Demchak, Penn State



Frost Protection Methods

For berry crops, frost protection methods consist of either applying water with overhead irrigation or using row covers, or a combination of the two. Other methods such as wind machines and under-canopy irrigation don't typically provide enough protection for berries or can't be used due to plant architecture.

(continued on page 26)

BERRY PRODUCTION

Frost and Freeze... (continued from page 25)

Frost protection using overhead irrigation

The theory behind why overhead irrigation works for frost protection is that heat is released as the water freezes (144 BTUs per pound of water), so the blossom temperature stays at 32°. The water application rate must be sufficient to keep a layer of liquid water on the ice that is forming, and coverage must be fairly even. If water completely freezes before additional water is applied by the next sprinkler rotation, heat is no longer being released by the freezing process.

This means that blossom temperatures can drop to ambient air temperature instead of being kept at 32°. When coverage is uneven or it is windy (more than about 3 mph), the application pattern is uneven, and you have more heat loss from evaporation than usual, so you are likely to have more damage than if you had done nothing at all. Irrigation should be kept running in the morning until ice starts to melt from the plants.

Keep in mind that you will need to allow time for the irrigation system to fully wet the plants, and there will be evaporation from the water than will lower the plant temperature at first; for this reason, we generally recommend starting the irrigation when the air temperature is 4° above the critical temperature. Of course, if the low temperature is forecasted to occur very late in the overnight hours and is close to the critical temperature, you will need to judge whether it is worth starting irrigation up or not.

Frost protection using row covers

Row covers can be effective, but they work best on still nights and when you only need 3 or 4° of frost protection. A row cover that is fairly stiff so it doesn't cling to the plants and ground and maintains some air space works best; clingy ones may not provide much protection. There is one particular 1.25 oz/sq. yd. fabric that works well. It is more expensive than others but has a long field life, so it can be used for multiple seasons and is less expensive in the long run.

Row covers should be pulled over the field during the afternoon to allow some heat buildup under the cover. If it is windy, protection will be less, and if winds are over 5 mph or so, you may not get any protection at all. If you have an old row cover, it can be applied as a second layer underneath the newer cover – this helps on very cold nights and also helps to some degree on windy nights.

Recently there have been some questions regarding whether anthracnose can survive on row covers. One study showed that spores can survive on fabric (in the study's case, denim) for 5 weeks. However, typically row covers aren't still being used when anthracnose lesions are present in PA, but if they are, this may be a concern.

Overhead irrigation – row cover combination

We have had very good results with pulling on row covers and then irrigating over top of them for frost protection. Depending on the night, this has resulted in needing no overhead irrigation at all or delaying the time that we needed to start the irrigation since the temperature under the row cover is higher than the outside temperature, and water use is greatly decreased. You'll want to pull the row covers back off as soon as you can the next day though to allow the plants to dry, otherwise, it will likely get steamy under the row cover, increasing the possibility of disease issues

Frost Damage to Vegetative Tissues

Vegetation on small fruit crops is quite hardy in the spring.

New vigorously growing raspberry canes can get “nipped” however, sometimes seriously. I can think of two instances when this happened with ours. Once was about 20 years ago when we hit 16° in mid-April when the new canes were about a foot tall, and the second time was about in 2012 when raspberries in our high tunnels had grown to about a foot and then got nailed. Fortunately, these canes are replaced by new canes, so the damage wasn't devastating for the long haul. The damage, if not noticed could be mistaken for some sort of disease, but the difference is that the plants grow vigorously otherwise, and the damage is all at the same location on the plants throughout the planting.

Ms. Demchak is with the Department of Plant Science at Penn State Univ. From Penn State Extension, <https://extension.psu.edu/frost-and-freeze-damage-on-berry-crops>, April 25, 2020.

High Tunnels Basics Video Series Now Available

As part of the “TunnelBerries Project”, a series of five short Learn Now videos on high tunnel structures has been completed and is now available for viewing.



Photo by Wenxuan (Tess) Li

Each video is between 5 and 8 minutes long. They can be found on Penn State's extension web site and watched individually or in order as part of the series.

Titles are: “Types of High Tunnels,” “Parts of a High Tunnel,” “Site Selection for a High Tunnel,” “Squaring a High Tunnel,” and “Building a High Tunnel.” The information is applicable to various types of high tunnels but focuses mainly on single-bay tunnels and applies regardless of crop grown. Information is basic, and so will be most useful for those new to building high tunnels, though those who intend to build more—or even build other types of structures, should also check these videos out at <https://extension.psu.edu/high-tunnel-structures-the-basics>.

Funding was primarily through the USDA-SCRI project “Optimizing Use of Protected Structures for Berry Production”, with additional matching funding provided through the Pennsylvania Vegetable Growers Association and other grower associations. For additional information from the entire project, visit TunnelBerries Research & Extension: A Grower's Information Website at <https://www.tunnelberries.org/>.

Understanding and Controlling Angular Leaf Spot in Strawberries

Andrew Wyenandt and Peter Nitzsche

Often considered a minor pathogen, angular leaf spot caused by the bacterium, *Xanthomonas fragariae*, can cause serious leaf and calyx infections ruining the marketability of fruit if left uncontrolled. Like all bacterium, the pathogen will infect leaves and the calyx through natural openings or wounds. Primary infections of new growth in the spring originate from systemically infected overwintered plants and dead leaves in which the bacterium survives the winter; or from infested transplants. The pathogen is very resistant to desiccation and can survive in old, dried leaves or infected plant debris buried in the soil. The pathogen will not survive free in the soil so it originates primarily from infected leaf debris and infected crowns.



Fig. 1. Water-soaked lesions caused by angular leaf spot on infect strawberry leaf. Photo by P. Nitzsche

Infections can often start in production operations and come in on infected bare root transplants or cuttings. Symptoms on leaves include initial small, irregular water-soaked lesions (Fig. 1). Young, actively growing leaves are most susceptible, especially on vigorously growing plants. Disease development is favored by moderate to low daytime temperatures, low night time temperatures – near or below freezing, and high relative humidity. Long periods of precipitation, overhead irrigation used to establish plantings or protect plantings from freezing, and heavy dews favor disease development.



Fig. 2. Reddish-brown lesions on infected strawberry leaf caused by angular leaf spot. Note the translucent spots when held up to light. Photo by P. Nitzsche

As disease progresses lesions will enlarge and coalesce forming reddish-brown spots on upper leaf surfaces which later become necrotic and translucent (Fig. 2). Holding infected leaves up to the light will reveal this diagnostic feature. Heavily infected leaves may die, especially if major veins become infected. Bacteria exuding from leaf spots under high moisture conditions can act as secondary inoculum and are spread to healthy plants by splashing rain, overhead irrigation, and during harvest. The pathogen can enter the plant via natural openings in the leaves or wounds while suspended in drops of dew, guttation fluids on the margins of leaves, rain, or overhead irrigation water.

Importantly, in severe outbreaks in the spring, the bacterium can spread to fruit causing the calyx to turn brown and dry out ruining the marketability of infected fruit (Figs. 3 & 4).



Fig. 3. Angular leaf spot infections on calyx of infected strawberry fruit. Photo by P. Nitzsche



Fig 4. Strawberry fruit infected with Angular leaf spot. Note the brown, dried up calyx.

(continued on page 28)

BERRY PRODUCTION

Growing Raspberries and Blackberries from Planting to Harvest Course Offered

This course prepares you to grow berries, from choosing varieties, to planting, to handling pests and diseases. Growing can be rewarding and profitable. The course includes eight hours of instruction by Kathy Demchak, Penn State Extension Associate in small fruits divided into four sections.

Brambles production can be a good fit for small farms, as a small planting can provide significant income, and equipment needs are quite modest. Although berries are susceptible to a number of diseases and insects, many problems can be avoided if the right choices are made before and during planting.

Growing Raspberries and Blackberries will prepare you to navigate these challenges and more. You'll learn what it takes to grow brambles like raspberries and blackberries successfully—from preparing your plantings to marketing your harvest. And you'll learn about management strategies throughout the season, such as proactive practices to help prevent common pests and diseases. This self-paced course features a series of videos, readings, case studies, and interactive practice questions. You'll also take away handouts, including customizable budget sheets. With some practice and experience, you'll produce and manage a good crop from year to year.

You will learn how to:

- understand the growth habits of different kinds of brambles
- identify what cultivars you want to use
- know the basic requirements of brambles
- establish a basic foundation for diagnosing bramble problems
- evaluate the financial health of your operation

From Penn State Extension at

<https://extension.psu.edu/growing-raspberries-and-blackberries-from-planting-to-harvest>

Understanding and... *(continued from page 27)*

Strawberry plantings should be scouted on a regular basis, especially if overhead irrigation has been run or persistent rainfall has occurred. Conventional or organic copper-based products can help suppress the development of ALS, and should be applied at a low rate to avoid phytotoxicity in leaves. Weekly, preventative applications of 0.3 lb fixed copper have been shown to be effective in reducing ALS if applied early enough when disease pressure was still low. Apply copper only on days only when leaf drying can occur. Discontinue copper applications if phytotoxicity injury occurs, this usually occurs after 4 to 5 applications. Scout fields after each copper applications for injury.

*Dr. Wyenandt and Mr. Nitzsche are with Rutgers Coop. Extension. From **Plant and Pest Advisory**, Rutgers Coop. Extension, <https://plant-pest-advisory.rutgers.edu/angular-leaf-spot-in-strawberries-2/>, April 10, 2020.*



Strawberry Season is Here – Considerations for Direct Marketers

Gordon Johnson

Social distancing, face mask use, and increased hand washing/sanitizing will/may be the new norm for this season. The goal is to prevent the spread of COVID-19 and keep customers and farm employees safe.

With strawberry season at hand, the following are some considerations for growers that market directly to consumers.

Communication

It is important to get the message out that food is essential and having fresh local berries for customers is a valuable service that you are continuing to provide.

Inform your customers through available communication channels (traditional media, social media, website) of the following:

When you are opening and prices (prepicked, u-pick), hours

Changes in farm procedures to provide a safe environment during the COVID-19 outbreak and to avoid food borne illnesses

- Not to come if sick
- Practice social distancing of 6'
- Wear face mask
- Parking and entrances, areas customers may access
- Hand washing and/or hand sanitizing areas, all pickers must wash hands
- All pickers must use containers provided by farmer.
- Absolutely no sampling in the field.

Signs, Signs, Signs

Provide signage that informs customers on:

- Farm guidelines
- Do not enter if sick
- Hand washing
- Distancing, 6' distancing marks
- Check-in and check-out procedures
- Prices
- Field distancing for U-pick
- Areas the public is allowed and not allowed
- Do not touch the prepacked berries before buying

Many of these signs are on-line and can be printed.

In U-pick areas, communicate how pickers should enter and leave the field. Mark out picking areas with flags or tape that reinforces distancing. Limit the number of customers in the field and make sure that customers are spread out.

Sales Considerations

Extra attention should be paid to sales and sales areas. The following are some ideas to consider:

- Encourage customers to use correct change.
- Package in a container (quart, 2 quart) and charge a flat fee per container instead of by the pound.
- Have u-pick by appointment. Use scheduling apps to schedule u-pick.
- Sell as many pre-picked berries as possible.

(continued on page 29)

Vegetable Transplant Height Control

Gordon Johnson

One of the most important considerations for transplant production is managing “stretch” or height of transplants. The goal is to produce transplants of a size that can be handled by mechanical transplanters and transplanting crews without damage and also tolerant to wind. More compact plants with thicker stems are desired.

Most growth regulators that are used for bedding plants are not registered for vegetable transplants. One exception is Sumagic® registered for use as a foliar spray on tomato, pepper, eggplant, groundcherry, pepino and tomatillo transplants (no other crops are registered at present). The recommended label rate is 0.52 to 2.60 fluid oz per gallon (2 to 10 ppm) and one gallon should be sprayed so it covers 200 sq ft of transplant trays (2 quarts per 100 sq ft). The first application can be made when transplants have 2-4 true leaves. One additional application may be made at the low rate, 0.52 fluid oz per gallon (2 ppm), 7-14 days later, but you cannot exceed 2.60 fluid oz of total product (per 100 sq ft) for a season. Growers are advised to perform small-scale trials on a portion of their transplants under their growing conditions before large scale adoption.

For other crops alternative methods for height control must be used. One such method that is successful is the use of temperature differential or DIF; the difference between day and

night temperatures in the greenhouse. In most heating programs, a greenhouse will be much warmer during the day than the night. The critical period during a day for height control is the first 2 to 3 hours following sunrise. By lowering the temperature during this 3-hour period, plant height in many vegetables can be modulated. Drop air temperature to 50° – 55°F for 2-3 hours starting just before dawn, and then return to 60° – 70°F. Vegetables vary in their response to DIF. For example, tomatoes are very responsive, while squash is much less responsive.

Mechanical movement can also reduce transplant height. This may be accomplished by brushing over the tops of transplants twice daily for with a pipe or wand made of soft or smooth material. Crops responding to mechanical height control include tomatoes, eggplant, and cucumbers. Peppers are damaged with this method.

Managing water can also be a tool to control stretch in some vegetables. After plants have reached desired size, expose them to stress cycles, allowing plants to approach the wilting point before watering again. Be careful not to stress plants so much that they are damaged.

Managing greenhouse fertilizer programs is yet another method for controlling transplant height. Most greenhouse growing media come with a starter nutrient charge, good for about 2 weeks after seedling emergence. After that, you need to apply fertilizers, usually with a liquid feed program. To produce more compact plants, limit the amount of phosphorus applied. Greenhouse fertilizers that are high in phosphorus will induce more stretch than those low in phosphorus.

Exposing plants to outside conditions is used for the hardening off process prior to transplanting. You can also use this for transplant height control during the production period. Roll out benches that can be moved outside of the greenhouse for a portion of the day or wagons that can be moved into and out of the greenhouse can be used for this purpose.

*Dr. Johnson is the Extension Vegetable and Fruit Specialist for the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 28, Issue 4, April 10, 2020.*

BERRY PRODUCTION

Strawberry Season... (continued from page 28)

- Use online ordering and scheduled pickup.
- Have markings on the ground indicating 6-foot spaces in payment areas
- Consider using online money transfers to limit contact with customers.
- Collect money first then issue picking containers for u-pick
- Have a drop box for cash paying customers.
- Ask customer to swipe their cards, omit signatures
- Use gloves and proper disposal of gloves when handling payments
- Sanitize after each transaction.

Sanitary Practices

Sanitary practices should be increased. Maintain good hand washing stations. Keep filled with water and keep stocked with soap and single use paper towels. Maintain trash cans for proper towel disposal. If hand sanitizer stations are used, monitor regularly and keep stocked.

Sales and service employees and farm workers that pick strawberries should also wash their hands regularly: before starting work, before putting on gloves, after using the restroom, after breaks, and any other time that hands may have become contaminated.

Clean and sanitize all contact surfaces. Clean and disinfect high touch areas several times a day. Wipe scales after each weighing. Clean and disinfect reusable picking containers after each use. Clean and disinfect sales areas often.

*Dr. Johnson is the Extension Vegetable and Fruit Specialist for the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 28, Issue 6, April 24, 2020.*

NEWS

State News Briefs (continued from page 12)

Lebanon, Luzerne, Lycoming, McKean, Montour, Northampton, Potter, Schuylkill, Snyder, Somerset, Sullivan, Susquehanna, Tioga, Washington, Wayne, Westmoreland, Wyoming and York. Farmers in other counties may also be eligible if they can show documentation that their losses were related to excessive moisture, such as approved crop insurance claims.

For more information about the program, visit www.farmers.gov/recover/whip-plus. Be sure to contact your local Farm Service Agency office for assistance navigating the program's eligibility requirements and to sign up.

*From the **Pennsylvania Agricultural Alliance Issues Update**, Penna. Farm Bureau, April 2020.*

GREENHOUSE PRODUCTION

Ralstonia Found in Michigan Geraniums

Ralstonia solanacearum Race 3 Pathovar 2 has been detected in geranium plants in a Michigan greenhouse.

From USDA APHIS: "The United States Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) has confirmed the detection of *Ralstonia solanacearum* race 3 biovar 2 (RSr3b2) in a single variety of geranium plants located in a Michigan greenhouse. This particular type of *Ralstonia* can cause a wilt disease in several important agricultural crops such as potatoes, tomatoes, peppers and eggplant. This is the first confirmed case of RSr3b2 in a U.S. greenhouse since 2004. APHIS has taken immediate action to contain and eradicate the disease from the Michigan facility. We confirmed that the infected plants came from a greenhouse in Guatemala. The importer immediately stopped shipments of geranium plants to the United States upon confirmation of the detection and has voluntarily agreed to destroy all shipments that were pending export or in route to the United States. They also provided a list of 288 greenhouses in 39 states that received geranium cuttings from the Guatemala facility. Federal and State agriculture officials are currently visiting the 288 greenhouse locations. They will inspect, isolate and destroy all Fantasia 'Pink Flare' geranium plants and co-mingled and exposed host and non-host plants. They will also isolate, sample, and destroy other geranium varieties and comingled and exposed host and non-host plants, if the other geraniums test positive for RSr3b2. After the plants are destroyed, the greenhouses will be cleaned according to our sanitation protocol to clear the facility of the pathogen."



Ralstonia solanacearum causing wilt and dieback on geranium.
Photo: R.L. Wick

From the UMass Extension Greenhouse Crops & Floriculture Program: Symptoms of RSr3b2 on geranium are very similar to those caused by *Xanthomonas pelargonii*. The main difference is that *Ralstonia* will cause wilting along with leaf yellowing and necrosis, whereas *Xanthomonas* can cause small round leaf spots as well as wilt. *Ralstonia* is spread primarily within diseased cuttings, and can be transmitted from root system to root system by water movement such as recirculating subirrigation systems. *Ralstonia* is soil-borne and is not expected to be spread by overhead irrigation unless there was puddling around pot bases. The time between infection and symptom development is temperature dependent; for example, at 81°F days and 68°F nights it takes 13 days for symptoms to appear, while at 75°F days and 64°F nights it takes 23 days.

Monitor geraniums and solanaceous vegetable starts carefully for symptoms. If you are concerned that you have symptomatic plants in your greenhouse, do not move them, as movement facilitates the spread of the bacterium to uninfected plants. If you are in Massachusetts or Connecticut, contact the office of the State Plant Health Director at 203-741-5644. Growers in other states should contact their respective State Plant Health Regulatory Official (SPRO). For more information on RSr3b2, refer to the UMass Extension Greenhouse Program's fact sheet.

Tips for preventing spread of bacterial diseases

- Isolate new shipments of geraniums from the rest of your crops.
- Keep batches from different propagators separate from each other.
- Keep cultivars separate from each other.
- Keep seedlings, perennial geraniums and zonals separate from each other.
- Do not grow ivy baskets over seed or zonal geraniums.
- If possible, do not keep vegetable transplants in the same greenhouse as ornamentals.
- Work in blocks to prevent spread.
- Wash hands or change gloves often.

Ms. Madeiras is with the Univ. of Massachusetts Extension. From Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Mass. Extension Volume 32, Number 7 April 23, 2020

NEWS

Paraquat Training... (continued from page 11)

You should expect to spend about 60 minutes on the course and the assessment quiz. It includes videos, a narrative outline, and brief exercises so you can test your own comprehension.

You will receive a certificate of successful completion of the training when you correctly answer all quiz questions. There is no limit on the number of attempts you take to correctly answer all questions. Make sure to print the certificate, and keep it on file for inspection by inspectors.

For more details see, EPA's list of Frequently Asked Questions about the paraquat dichloride training at www.epa.gov/pesticide-worker-safety/paraquat-dichloride-training-certified-applicators.

**Always follow the directions found on the product label. If you will be using previously-purchased paraquat that does not have the amended label requirements, you would not be required to take the training. However, you must complete the training when using a product with the amended label requirements.*

A Secret Shopper Service & Network Designed to Help You Enhance Your Agricultural Retail Business

Registration Deadline: Monday, June 15, 2020

Under the Ground is an annual subscription-based service and network that provides businesses with a comprehensive picture of their retail storefront from the eyes of customers, peers, and marketing specialists. The subscription period is from Jul. 15, 2020 - Jun. 30, 2021. The program is open Agricultural Businesses in All Pennsylvania Counties

Curious to hear a customer's perception of your storefront? The 2020-2021 program will be providing your business with engagement materials to gain customer insight into your operation. In addition, you'll have the opportunity to directly observe as a secret shopper and get to the root of how different agricultural retail spaces are designed to enhance the customer experience.

In response to COVID-19, survey feedback will additionally target your web presence and how your business is perceived digitally.

You can look forward to receiving quarterly mailings including educational newsletters and secret shopper reports

During the year, you'll also receive access to webinars tailored to participating businesses, have the opportunity to attend a networking event, and have discounted tickets available to the Are You Crazy Retail Farm Market Bus Tour.

To register for the program go to <https://extension.psu.edu/under-the-ground> or call 877-345-0691. The cost is \$100.

PVGA Member Responses...

(continued from page 2)

sales there mostly specialty items for shipping along with ticket sales for events. However a few weeks ago, Leah and our new market manager Emily were tasked with launching a more extensive online store featuring mostly essential items. This took some time and is ongoing. As we move forward they are adding more and more items. It's been two and a half weeks now and our sales are coming in fast. At times it's tough to keep up. All sales are paid through the website and customers pick up their orders curbside. This is a completely different model and it's still taking some "getting used to". Unfortunately I see this as how we will be doing business for the entire season. Getting started was pretty easy since we already had a strong social media presence. Many of the local grocery stores have waiting lists and delays for curbside pickup or delivery with minimum order restrictions as well. Another model that seems to be working for some other farms out here is putting together flat rate "essential boxes" for curbside pickup.

Dave Miller from Miller Plant Farms sent the following pictures.



Equipment

FREE – SOLO 451 BACKPACK MIST BLOWER - used.
Contact Carl Cantaluppi at 919-691-5455 03

FOR SALE - (2) AIRBLAST SPRAYERS

- a.) 'Berthould' approx. 160 gals , 3 Piston Pump, gear driven fan, Vineyard / Fruit Trees
- b.) 'FMC' Model 12RCTR 200 gals, S.S. tank, 4 Piston Bean Pump, Sweet Corn extension (removable), field crops, Hyd. motor driven fan

Both: pull type / PTO drive / always stored inside

H. Bolkey 1-814-434-0461 / 1-814-474-2177 Fairview, Pa.

Businesses and Farms

FOR SALE BY OWNER – PRICE REDUCED

GREENHOUSE/GARDEN CENTER OPERATION AT 171 Greenhouse Road, (Snyder County) Middleburg, PA 17842. Owners retiring. Proven profitable business model for over 40 years. Turn-key business with records, equipment, inventory, trees, shrubs, retail items. Owner is willing to assist in transition. Creative financing possible. The 18-acre property consists of a two-story, 3-bedroom, 2-bath home with small stream and approximately 60,000 sq. ft. total greenhouse area consisting of aluminum structures with flood tables. A 100 gallon+/minute never-failing well. Additional land to lease.

Call or Text Larry 570-765-6470

03

REMEMBER

Classified Ads are Free for PVGA Members for Non-Commercial Sales.

Your Source for . . .

HIGH TUNNELS



Call Harry Edwards @ 717.606.8021
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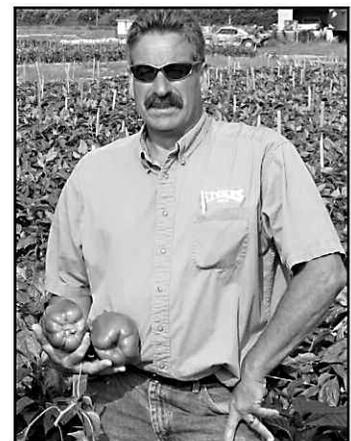
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