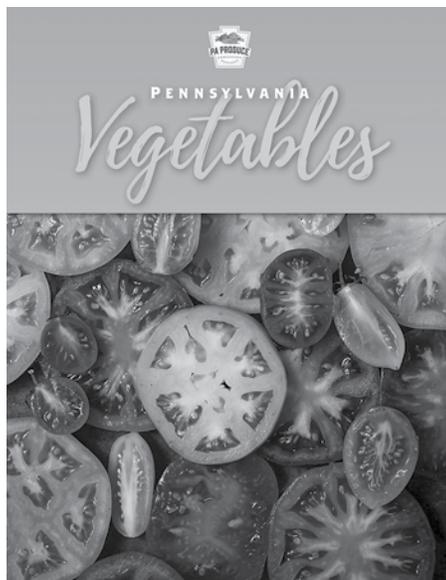




‘Pennsylvania Vegetables’ Digital Cookbook Introduced for PA Produce Month

Pennsylvania Vegetables is the first of its kind. Never before has a cookbook been created in the state of Pennsylvania in such a collaborative fashion and with a focus on fresh, in-season produce. This book was made possible thanks to so many individuals and brands that have a tremendous amount of passion and respect for the local food community — particularly Pennsylvania vegetables!



The main focus of the digital cookbook rests on enjoying seasonal goods in and around August, which is the month that PA Veggies, along with farmers statewide, celebrates annually as PA Produce Month. Pennsylvania’s Secretary of Agriculture reminds us of this holiday and its importance in his video introduction for the cookbook.

“But this cookbook represents even something more important than the recipes. It represents the collaboration, the spirit, that we absolutely need to bring our food community together. We want something that represents our products, our produce, our season, our farms, and our food and tables. That’s what this cookbook is about. So enjoy it! Enjoy the month of August! Enjoy the produce season here in Pennsylvania. It simply doesn’t get any better than this.”

Some content to look forward to includes:

- Herbed Potato and Green Bean Salad by PA Veggies, with help from Dish Works
- Vegan Cauliflower Hot Wings by Christina Maser of Lancaster County
- Cabbage and Ginger Egg Rolls by Leah Shenot of Shenot Farm and Market in Allegheny County
- Cucumber Lemonade from Samantha Ardry of Ardry Farms in Centre County
- Arugula and Mushroom Salad from Carrie Havranek, author of Tasting Pennsylvania
- Sunshine Salad, and Stuffed Peppers from Be Healthy PA

HERBED POTATO & GREEN BEAN SALAD

PAVEGGIES.ORG
PENNSYLVANIA
SERVES 4 TO 6

INGREDIENTS

- 2 pounds small red and gold potatoes
- 1 tablespoon kosher salt, plus more, as taste
- 1 pound green beans, trimmed
- 2 tablespoons fresh lemon juice
- 2 tablespoons Dijon mustard
- 2 cloves garlic, roughly chopped
- 1/4 cup apple cider vinegar
- 1/2 cup extra-virgin olive oil
- freshly ground black pepper, as taste
- 1/4 cup fresh flat-leaf parsley, finely chopped
- 1/4 cup fresh basil, finely chopped
- 2 green onions, finely chopped, plus more sliced for garnish

DIRECTIONS

Place potatoes in a large pot and cover with water by 2". Add salt and bring water to boil over high heat. Reduce heat to medium and continue to boil until potatoes are just fork tender, 20-30 minutes. Drain and let potatoes cool.

While potatoes cook, bring small pot of salted water to boil and add green beans. Boil for 3-4 minutes. Remove beans from water and run under cold water.

In a small bowl, whisk together lemon juice, mustard, garlic and vinegar. While whisking, slowly stream in olive oil until dressing is emulsified. Season with salt and pepper, to taste.

When potatoes are cool enough to handle, cut in half (or quarters if large) and add to large bowl. Cut beans into halves or thirds, depending on size, and add to bowl with potatoes. Pour dressing over potatoes and beans and toss to combine. Stir in parsley and green onions and gently toss until combined. Season with salt and pepper, if needed.

Serve immediately, garnished with green onions, or cover and refrigerate until ready to serve.

PAVEGGIES.ORG

CUCUMBER LEMONADE

SAMANTHA ARDRY, ARDRY FARMS
CENTRE COUNTY
SERVES 1 TO 4

INGREDIENTS

- 1 lb of cucumbers, peeled and cut into chunks
- 1 cup fresh lemon juice
- 1/2 to 1/4 cup sugar
- 2 cups water

DIRECTIONS

Place a fine mesh strainer over a jar that can hold at least 4 cups of liquid and set aside.

Add the cucumber chunks to a blender and process on low until they break down. Increase the speed and blend until smooth.

Pour the cucumber mixture through the strainer to separate the juice from any solids. Discard the solids. You should have about 1 cup of cucumber juice.

Add the fresh lemon juice, 1/2 cup sugar and water to the jar with the cucumber juice. Place a lid on the jar and shake until the sugar is dissolved. Taste and add more sugar if desired. Let the lemonade chill in the refrigerator until ready to serve.

PAVEGGIES.ORG

- Pasta with Saffron Leek and Corn Sauce from Chef Lynn Buono of Feast Your Eyes Catering in Philadelphia
- Oatmeal Almond Cookies with Butternut Squash from Sara Eckert of Healthy Harvest Farm in Centre County
- Photographs by Suzanne Itzko
- An original editorial from Plant-based Chef Char Nolan, that tells the story of Fishtown, Riverwards Produce, HoneyGrow, and more

The list goes on. PA Veggies is truly humbled by the amount and variety of contributions. You must dive in to understand! We hope all contributors, and consumers, are excited to be a part of this unique historical moment.

Ready to start exploring 100+ pages of pure Pennsylvania deliciousness? Check out the **Pennsylvania Vegetables** collaborative digital book of recipes & resources at www.paveggies.org/pennsylvania-vegetables-cookbook/.



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

It's now September and fellow farmers I have talked to most recently are struggling big time with heat and lack of rain. I can feel the pain in their voices. Without access to water they are left with nothing but to see their efforts fade away.

Having that safety net is so critical in being able to manage the financial difficulty that comes along with the weather. What is a safety net? For some it is putting monies away in good years in order to cover losses that are incurred during the tough years. For some it is securing an appropriate insurance policy that may be available. For others it may be downsizing and reducing debt in order to be able to farm another year.

I can only think back to the extreme cold that damaged so many of the orchards in Pennsylvania and the extreme cold that froze early planted crops. Let's not forget the garden centers that were under stress due to the Covid-19 restrictions on whether or not garden centers could open.

We are entering Fall, when many fruits and vegetables will be harvested before the 2020 season ends. I would like to remind everyone, no matter what the hardships each of us may have experienced, there is much to be appreciative for. We love what we do and it won't be long before we are sowing seeds to once again begin a new season. The opportunity to raise a family on a farm is something not many people have the opportunity to do.

Don't forget to make someone SMILE today.

Mr. Campbell is the President of the Association. He grows fresh market vegetables for the retail and wholesale markets on his farms near Berwick.

PVGA, the Farm Show and the Mid-Atlantic Convention

The cancellation of the in-person Farm Show (see page 3) means there will be no PVGA Food Booth, the source of a substantial portion of the Association's budget. While this will have a major impact on the Association's finances, we also fully recognize the impossibility of conducting an in-person event such as the Farm Show given the current pandemic situation and the crowded conditions that characterize the Farm Show.

Another major source of revenue for the Association is the Mid-Atlantic Fruit and Vegetable Convention. The Convention Joint Committee and the PVGA Board of Directors are working on determining if and how the Convention will be held in 2021. We will keep you updated on those plans as they are finalized. The Association has long recognized the potential impact of adverse weather conditions on the profitability of both the Farm Show Food Booth and the Convention. Snow storms were always assumed to be the most likely threat to either of these events – no one ever envisioned a pandemic affecting both events in the same year.

Fortunately, the Board of Directors has over the past 25 years or so built a substantial reserve in the General Fund with the budget surpluses that the Association has been blessed with in past years. Those reserves will allow the Association to weather this storm financially maintaining the basic operations of the Association and continued publication of this monthly newsletter and the weekly email Updates. They will even allow the Association to potentially continue its support of vegetable and small fruit research as well as local grower events although the Board will have to evaluate the level of those budget lines next January. We will, of course, need you, our members, to stand with us in renewing your memberships for 2021 so that we can continue to serve you.

Again, stay tuned for updates on the Mid-Atlantic Convention in the coming weeks and months.

*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 address.*

NEWS

PVGA Life Member Ernest Bergman Passes Away at 98



Dr. Ernest L. Bergman, Professor Emeritus of Plant Nutrition at Penn State University and PVGA Life Member passed away August 15 in State College.

He left the following typewritten text for his obituary. Born July 12, 1922 in Munich, Germany, he was a son of the late Willy J. and Julia Steiner Bergmann. After his father's untimely death in 1925, he moved with his mother and brother to his mother's parents in Lauthheim, Wittenberg, Germany. Here he went to Grade School and completed 3 years of Latin School. Due to the political situation in Germany in 1936, he moved to his uncle and aunt in St. Gallen, Switzerland, where he finished his secondary education. He attended the Kant. Ldw. Schule Schwand Munsingen, Kt. Bern (1939-1941) and received the diploma. He also worked on various farms and at Kant. Gartenbauschule Oeschberg-Koppigen where he received a certificate in vegetable crops and was certified as a fruit growing specialist.

In 1946 he left Switzerland with his mother and brother for the USA. Because he was a stateless person at that time, he had to travel with a Nansen passport for refugees. During the first winter in the USA he was pruning apple trees in Poughkeepsie, N.Y. In 1947 he moved to Oregon where he worked on his relatives' hops ranch and as a horticulturist on a large berry farm. In January 1946, he came back to New York, N.Y. to meet his fiancée Alice H. Adler, who arrived then from St. Gallen, Switzerland. They were married on February 15, 1948 and went back to Oregon.

After receiving his U.S. citizenship in 1952, Ernie started working as an experimental aide at the Horticulture department of the Oregon State Agriculture Experiment Station in Corvallis, OR. In 1953 he was permitted to take courses and graduated in 1955 with the B.S. in Horticulture-Pomology, which included 2 years credit for his Swiss education. From 1955-1958 he worked as a Special Graduate Research Assistant on Concord Grapes at Michigan State University and received his M.S. (1956) and Ph.D. (1958) in Plant Nutrition from the Horticulture Department. Ernie started as Asst. Prof. of Plant Nutrition at the Horticulture Dept. of the Penn State University in 1958 and was promoted to Assoc. Prof. in 1963 and Professor in 1970. He retired as Prof. Emeritus in 1987.

During his tenure he served on many Departmental, College, and University Committees (Chair, University Faculty Senate 1974-1975). He was an undergraduate and graduate student advisor (13 Ph.D.) and served on countless M.S. committees. His activities encompassed teaching and research in horticulture crop

production, plant nutrition, plant analyses, fertilizer use, and hydroponics crop nutrition. Ernie also had to help the Extension service when necessary and was involved in international agriculture with assignments in Argentina (three times 3 months), Uruguay, the Peoples Republic of China (five times), Senegal, and Mali. He was a member of the Agronomy Society, the International Horticulture Society, Sigma Xi, and Alpha Zeta, and attended with his wife many national and international meetings. Ernie was elected Fellow of AAAS and the American Soc. for Hort. Sciences, where he served on the board as vice-president for international affairs and on many committees. He was President and also received "Man of the Year Award" from the PA Plant Food & Protectant Education Soc. in 1983 and Hon. Life Membership of the PA Veg. Growers Assoc. in 1987.

Ernie was a 40-plus year State College Kiwanis Club member (distinguished past president, Hixson Fellow, District Lt. Governor, District IDD chairman); Life member of Mt. Nittany Philatelic Society; Hon. Life member American Helvetia Philatelic Soc. (past president); Life member of the American Philatelic Society (Board member), and American Philatelic Library (Trustee). He was an initial member of Congregation Brit Shalom of State College, PA.

At one time Ernie pledged, if he ever again became a citizen he would serve his country, a pledge he fulfilled by his civic activities during 43 years in the Centre region. He was 10 years elected Ferguson township supervisor, served in many appointed positions in township, Centre Region Council of Government (chairman), Spring Creek Watershed Commission, and Centre County Planning Commission. He was past chairman and 25-year board member each of Patton Ferguson Joint (also cofounder) and University Area Joint Authorities. He also was a board member (13 years) of the Centre Life-Link EMS, Penn State Retired Faculty Staff Club (past president), and initial member of the Penn State Federal Credit Union (also past president). Ernie was honored by Ferguson township in naming a street "Bergman Court" and in 2003 by citations of both the House of Representatives and Senate of the Commonwealth of Pennsylvania.

He is survived by his sister-in-law Eva Bergmann of Silver Spring, MD, his nieces Catherine Bergmann and family, Riverdale, MD, and Sandra Bergmann and husband of Kamuela, HI, his late wife's niece Judy Taylor, of Witney, England, and nephew Dr. Eric Haywood, Dublin, Ireland. In addition to his parents and his brother Willy Bergmann, he was predeceased by his wife of 60 years, Alice H. Bergman who passed away in May 2008. Arrangements are under the care of Koch Funeral Home, State College. Online condolences and signing of the guestbook may be entered at www.kochfuneralhome.com.

2021 PA Farm Show to Go Virtual

Agriculture Secretary Russell Redding announced that Pennsylvania's agriculture industry will be celebrated virtually for the 2021 PA Farm Show, with no in-person events or competitions, to mitigate against COVID-19.

"There are times in the life of a farmer when the risks are too great or uncertain, requiring farmers to make the tough decision to leave a field fallow," said Redding. "To protect our assets – both our people and our resources – from incalculable losses, we have made the tough decision to take a year to lie in fallow. Rather than an in-person Farm Show, we will celebrate Pennsylvania agriculture virtually for 2021 as we prepare for a productive future.

"We'll look at our strengths and where we need to invest together in order to grow and cultivate for tomorrow. We'll consider what has become crystal clear during the pandemic – that agriculture is essential for life; our people are resilient and innovative. We

will focus on agricultural awareness, education, and literacy while highlighting the interconnectedness of our food chain," added Redding.

The department announced the theme for the 2021 virtual PA Farm Show to be *Cultivating Tomorrow*. Details of the virtual show will be announced as they unfold over the coming weeks. Virtual events will be focused on education and awareness for both the general public and the agriculture industry. Any competitive ag events that are held virtually will not require the purchase of an animal.

"Each year, the Pennsylvania Farm Show uses a theme to convey our vision for the future of Pennsylvania agriculture – through *Cultivating Tomorrow* we'll tell this story through technology as we envision and cultivate a prosperous, thriving future

Continued on page 21

NEWS

COVID-19 News Updates

Remember to Apply for COVID-19 Relief Programs

There's still time to apply to state and federal relief programs that offer eligible producers payments to offset losses suffered as a result of the COVID-19 pandemic.

The deadline to apply for the U.S. Department of Agriculture's Coronavirus Food Assistance Program is **September 11**. The program offers direct payments to producers of certain eligible commodities, including: dairy, beef, hogs, sheep (lambs and yearlings only), wool and many specialty and non-specialty crops. Learn more at www.farmers.gov/cfap. Farmers can apply online or via their local Farm Service Agency Service Center. Applicants can contact USDA's CFAP Call Center for assistance at **877-508-8364**.

- Eligible specialty crops include the following vegetable crops: asparagus, beans, beets, blackberries, blueberries, bok choy, broccoli, Brussels sprouts, cabbage, cantaloupe, carrots, cauliflower, celeriac (celery root), celery, collard greens, corn (sweet), cucumbers, eggplant, endive, escarole, greens (others not listed), kale greens, kohlrabi, leeks, lettuce, mesclun mix, microgreens, mustard greens, okra, onions (dry and green), parsley, parsnips, peas (English/garden, snap, and sugar), peppers, potatoes, pumpkins, radicchio, raspberries, rhubarb, rutabagas, shallots, spinach, squash, strawberries, sweet potatoes, Swiss chard, tomatoes, turnip top greens, turnips/celeriac, and watermelons.

To be eligible for the CFAP program, farmers must:

- Have produced a commodity that suffered at least a five percent price drop or had losses due to market supply chain disruptions due to COVID-19 and face additional significant market costs;
- Have an average adjusted gross income of less than \$900,000 for tax years 2016, 2017, and 2018 unless 75 percent of their adjusted gross income comes from farming, ranching, or forestry;
- Meet conservation compliance provisions (the "Highly Erodible Land and Wetland Conservation" regulations);
- Not have a controlled substance violation.

Please be sure to check www.pfb.com/coronavirus regularly for more information about the pandemic and relief available to agriculture.

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

Farm Groups for Worker Protection, Labor Access Measures

Agricultural organizations are asking Congress to help farmers protect their employees and maintain crucial access to workers during the COVID-19 pandemic.

In a joint letter, several general farm groups and organizations representing fruit and vegetable growers asked congressional leaders to help protect farmworkers by ensuring that farmers and farmworkers have priority access to additional testing, protective equipment and, when available, COVID-19 vaccines and therapeutic treatments. The letter also calls for additional funding to help farms quarantine workers who test positive for the virus.

"The men and women who work on our farms are essential to the well-being of our entire nation," the groups wrote. "We call on Congress to include vital resources for farmworker safety in the next COVID-19 relief package."

In addition, the Agriculture Workforce Coalition—which includes several farm and commodity organizations—sent a letter to the Senate asking for funding to help farm employers to implement safety measures including purchasing additional protective gear and testing, securing additional housing and vehicles to help maintain social distancing and making safety upgrades to work and housing facilities. The coalition is also calling for changes to

the H-2A visa program to ensure that farms have access to essential workers during the pandemic. Those include modernizing the program so that agriculture-related activities, such as hauling and packing, are included; allowing farms with year-round labor needs to access the program; and freezing the Adverse Effect Wage Rate to avoid a major spike in costs while farms are also dealing with the financial fallout of the pandemic.

On both issues, Pennsylvania Farm Bureau also advocated specifically with Pennsylvania senators and underscored the importance to agriculture in the Keystone State.

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

Bill Would Increase Borrowing Limit for Farm Programs

A proposal in Congress would increase the amount of money that may be borrowed to fund safety net programs and support programs that help farms remain in operation through disasters and times of crisis.

Pennsylvania Farm Bureau recently asked members of the state's congressional delegation to support the legislation, which would increase the borrowing limit of the Commodity Credit Corporation, the federal government's primary funding mechanism for many farm bill programs. The CCC can now borrow up to \$30 billion from the U.S. Treasury to quickly support agriculture when needed, a limit that has not increased since 1987. The legislation would raise that ceiling to \$68 billion and allow it to rise automatically with inflation.

"This increased (borrowing) authority would support critical farm programs at a time when unprecedented market volatility and supply chain disruptions have occurred due to COVID-19, which comes on the heels of trade-related demand uncertainty and consecutive years of natural disasters," Farm Bureau wrote to members of Congress. "The CCC is a stabilizing force for the men and women who face unpredictable risks to put dinner on our tables."

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

State News Briefs

Proposal Would Create Locally Focused Conservation Program for Agriculture

Farmers and local conservation officials would partner on conservation projects that improve water quality through a new program expected to be proposed soon in the General Assembly.

State Sen. Gene Yaw of Lycoming County has signaled plans to introduce legislation to create an Agricultural Conservation Assistance Program administered by the State Conservation Commission. The program would provide funding to county conservation districts across the state to partner with local farmers to implement conservation practices. Conservation districts would determine what types of projects should be prioritized to make the greatest improvements to water quality, allowing the program to be tailored for each county to meet local needs.

Pennsylvania Farm Bureau partnered with other organizations and government agencies to help develop the proposal.

Funding would be distributed based on a formula. While counties with the most need for investments in conservation—such as those working to meet federally mandated goals for reducing nutrient and sediment pollution in the Chesapeake Bay Watershed—would receive the most funding, the program would provide funding to conservation districts throughout the state.

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

Continued on page 6

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CATEGORY

State News Briefs

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Beginning Farmer Tax Credit Opens

Property owners in Pennsylvania have a new financial incentive to help beginning farmers access the tools they need to get their start in agriculture.

The Beginning Farmer Tax Credit provides an income tax credit for selling or leasing agricultural assets such as land, livestock, facilities, and equipment to a beginning farmer. The program, administered by the Pennsylvania Department of Community and Economic Development, is open now.

"I would encourage Pennsylvania farmers and property owners to look into and help spread the word about this new opportunity to help new farmers get established," said Pennsylvania Farm Bureau President Rick Ebert. "We often hear that access to land and equipment are among the greatest barriers faced by beginning farmers, especially those who did not grow up in agriculture. The Beginning Farmer Tax Credit will help beginning farmers who are passionate about their work grow their operations and secure the future of our industry."

Pennsylvania Farm Bureau partnered with state Sen. Elder Vogel, Jr. of Beaver County, chair of the Senate Agriculture and Rural Affairs Committee, to develop and introduce legislation creating the tax credit last year. The measure was signed into law in June 2019.

Beginning farmers who participate in the program must be certified by DCED by demonstrating that they have the experience or transferable skills needed to work in agriculture, have not received income from farming for longer than 10 years, and plan to farm in Pennsylvania, providing the majority of the labor and management for their operation.

Property owners can claim a credit equal to 5 percent of the sale price or fair market value (whichever is lower) of an asset sold to a beginning farmer, up to a maximum of \$32,000. For rental agreements, the credit is equal to 10 percent of gross rental income for the first, second and third years of the rental agreement, up to a maximum of \$7,000 per year. The program is capped at \$5 million for the 2020 tax year and \$6 million for 2021 tax year.

More information, including guidance from DCED and required forms are available at www.pfb.com/BeginningFarmerTaxCredit.

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

CWD Response Plan Approved

The Pennsylvania Game Commission recently approved a finalized Chronic Wasting Disease Response Plan that calls for increased efforts to monitor and control the disease's spread, including increased sampling, increased hunting opportunities in affected areas, targeted removals, and a renewed focus on hunter and landowner outreach.

The plan creates three new geographic designations, along with the current Disease Management Areas, to coordinate the Game Commission's response to CWD: Established Areas, Enhanced Surveillance Units and Containment Zones.

Established Areas are smaller areas within a DMA where the prevalence of CWD is above a certain threshold year-over-year. There is currently one EA centered in Blair, Bedford and Fulton counties, where the majority of CWD cases have occurred in Pennsylvania.

Enhanced Surveillance Units are individual areas created when new CWD cases are found on the edges of DMAs, at least five miles from other cases. Containment Zones one-mile radii around newly detected CWD cases, and are intended for focused deer removal strategies, including increased hunting and targeted removals after the deer season.

These areas could see increased antlerless license allocations, concurrent seasons, extended seasons, or removal of antler point restrictions to reduce CWD prevalence. The PGC began offering CWD DMAP permits within eight ESUs around the state for the 2020-2021 hunting season on July 30. More details are available at www.pgc.pa.gov/Wildlife/Wildlife-RelatedDiseases/Pages/ChronicWastingDisease.aspx.

The final plan does not call for a statewide deer feeding ban but does aim to "reduce feeding of deer and use of attractants statewide by increasing educational outreach and awareness of risks associated with these activities." Current feeding bans within Disease Management Areas will stay in place.

You can read the final plan at www.pgc.pa.gov/Wildlife/Wildlife-RelatedDiseases/Pages/CWD-Response-Plan.aspx.

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

USDA, PDA Urge Reporting and Proper Disposal of Unsolicited Seeds

The U.S. and Pennsylvania departments of agriculture are urging recipients of unmarked and unsolicited seeds for overseas to report and properly dispose them.

The warnings come as consumers across several states have received in the mail mysterious seed packages, often labeled as jewelry. Officials believe the packages are part of a "brushing" scam, in which companies boost online sales by purchasing their own products through fake buyer accounts, shipping a different, low-cost item to a real address and then writing a positive review that appears to come from a buyer.

While the seeds don't appear to be malicious, agriculture officials warned that planting or improperly disposing of them could potentially introduce plant diseases, weeds or invasive species.

"Seeds sold in Pennsylvania are rigorously tested to ensure that they are genetically pure and regulated to ensure that what's on the label is what's in the package," Pennsylvania Secretary of Agriculture Russell Redding said. "Planting seeds without knowing what they are can wreak havoc with our environment, destroy agricultural crops and incur costly control efforts for years to come."

Anyone who receives an unsolicited seed package should report it to USDA's confidential Antismuggling Hotline, **800.877.3835** or email SITC.Mail@aphis.usda.gov. USDA will provide further instructions.

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

REAP Program Now Open

Applications are now open for one of Pennsylvania's signature conservation programs, which offers tax credits to agricultural producers who implement on-farm conservation practices.

The Resource Enhancement and Protection Program (better known as REAP) is funded at \$10 million dollars this year. Farmers can apply for REAP tax credits to cover 50 to 75 percent of the costs of implementing conservation practices or purchasing related equipment. In high-priority areas, such as the Chesapeake Bay Watershed, credits covering up to 90 percent of costs are available for certain targeted practices, such as 50-foot, forested riparian buffers and measures to exclude livestock from streams.

Common REAP projects include no-till planting and precision ag equipment, waste storage facilities, conservation plans, Nutrient Management Plans, cover crops, riparian buffers and barnyards runoff controls. Credits can be used in conjunction with other funding sources and applications are accepted on a first-come, first-served basis.

Learn more about the program and how to apply at <https://bit.ly/30hYrEc>.

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

CATEGORY

State News Briefs

continued from page 6

Reimbursements Available for Conservation Planning in Chesapeake Bay Watershed

The Pennsylvania Department of Environmental Protection will again reimburse farmers in the Chesapeake Bay Watershed for costs associated with developing conservation plans.

The Agricultural Plan Reimbursement Program has \$900,000 available to reimburse producers for the cost of hiring technical experts to develop Nutrient and Manure Management and Agricultural Erosion and Sediment Control plans. Plans developed after Jan. 1, 2019 are eligible.

More than one plan may be submitted for reimbursement, for up to a maximum of \$6,000. Plans must be submitted by May 31 to be eligible for reimbursement.

More information about the program is available at <http://bit.ly/2Nranxh>.

For additional questions, farmers in Bradford, Cameron, Carbon, Centre, Clearfield, Clinton, Columbia, Elk, Jefferson, Lackawanna, Luzerne, Lycoming, McKean, Montour, Northumberland, Potter, Schuylkill, Snyder, Sullivan, Susquehanna, Union, Tioga, Wayne, and Wyoming Counties should contact Josh Glace of Larson Design Group at jglace@larsondesigngroup.com or 570.374.5700, extension 4011.

Farmers in Adams, Bedford, Berks, Blair, Cambria, Chester, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Indiana,

Juniata, Lancaster, Lebanon, Mifflin, Perry, Somerset, and York Counties should contact Jedd Moncavage of TeamAg at jeddm@teamaginc.com or 717.721.6795.

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

Conservation Grants Available to Farmers in Lancaster, York Counties

The Pennsylvania Department of Agriculture has opened up applications to farmers in Lancaster and York counties for up to \$250,000 in Conservation Excellence Grants.

The \$2.5 million program, created by 2019 PA Farm Bill, funds on-farm measures that reduce erosion and run-off, including fencing to keep livestock out of streams, streambank restoration, cover crops, riparian buffers, manure storage, and comprehensive nutrient management plans. Funding will support technical assistance and the installation of these and other high-impact BMPs.

Funds will be administered by the Lancaster and York County Conservation Districts. Lancaster and York County farms have been prioritized in order to help Pennsylvania meet its federally mandated goals to reduce nitrogen, phosphorous and sediment runoff into the Chesapeake Bay by 2025.

Applications will be evaluated on a first-come, first-served basis, according to their potential to meet program criteria. Grant funding may be combined with other public grants, tax credits such as the Resource Enhancement and Protection Program, and private funding.

Continued on page 8

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GENERAL

Farmer Stress and Mental Health

Farming is stressful in the best of times, but the particular challenges of the 2020 season have added to the pressures that farmers normally face. The ongoing COVID pandemic has brought increased customer demand for local farm products, but while trying to meet that demand, growers are also dealing with new safety protocols, labor shortages, and continued uncertainty heading into the fall. High temperatures and lack of rain across the state are making the situation even more difficult. Normal outlets for socializing and commiserating during a tough year, like on-farm twilight meetings, or even just meeting up for a beer after a long day, aren't available right now. Stress management and self-care are always important, but these topics deserve special attention now.

Below are some points adapted from a fact sheet by Iowa State Extension about recognizing and responding to stress on the farm, followed by some resources that might be helpful if you or someone you know needs assistance.

1. We know that farming is dangerous. Farming ranks among the most hazardous of professions.

2. Farmers also have the highest mortality rate from stress related illnesses. Individuals working in the farming, fishing, and forestry group also have one of the highest rates of suicide as compared with other professions. This is primarily due to stressors, such as job-related isolation, stressful work environments, and work-home imbalance. More importantly, stress is caused by those conditions beyond the farmer's control, such as weather, fluctuating commodity prices, variable crop yield, and machinery breakdowns.

3. Stress is simply a response to a threatening event, such as receiving some type of bad news.

4. Unfortunately, our brain and body do not know the difference between being threatened by a saber-toothed tiger, being late for work, or having machinery breakdown during harvest. Our brain and body still respond by being prepared to either jump into a fight or run away quickly.

5. This response causes the body to produce stress related chemicals that make the heart beat faster, our muscles to tense, and the eyes to dilate. Blood is shunted away from the midsection (including stomach), and the mucous membranes dry up. All so you can fight harder, run faster, see better and breathe easier than you would without this response.

6. As stress is experienced over longer periods, our bodies may begin to experience high blood pressure, muscle tension, headaches, stomach upset, heartburn, ulcers, and diarrhea/constipation, which can eventually progress into issues that are more serious.

7. Serious wear and tear on the body can occur if the stress continues too long or becomes chronic. That is why chronic stress is a risk factor for heart attacks, weight gain, stroke, and diabetes. Individuals also become more prone to severe viral infections, such as the flu or common cold. It is also a risk factor in depression, anxiety, addiction and suicide.

8. Other emotional responses can include isolation or withdrawal. For example, a person may frequently miss work or not go to school or church activities they once attended.

Continued on next page

State News Briefs

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Applications are also available online at <https://bit.ly/2CLJyAD> and from both counties' conservation district offices. Farmers with questions about applying may contact Program Administrator Eric Cromer at **223.666.2556** or ecromer@pa.gov.

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

Free Technical Assistance Available for Energy Projects

Farmers and other rural, small businesses can receive no-cost technical assistance to identify and assess renewable energy alternatives that can lead to cost-saving energy alternatives through a program at Northampton Community College.

The school's Emerging Technology Applications Center received a two-year grant from the U.S. Department of Agriculture to participate in the Rural Energy for America Program. Funding through this program will help provide technical assistance to eligible participants throughout Pennsylvania.

For more information and a determination of eligibility, contact cyoung@northampton.edu.

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

Upcoming Workshops for Women in Agriculture to Focus on Conservation

American Farmland Trust is holding a series of workshops this fall in Pennsylvania for women farmers and farmland owners to learn more about conservation and farmland preservation.

Learning circles are scheduled for September and October in Perry, Dauphin, York, Lebanon and Adams counties. Each session

includes a one- to two-day curriculum on conservation options and resources featuring discussions with other local landowners and farmers and services from agencies. There will also be free meals and an optional farm tour.

To learn more information, including the schedule, and to register, visit <https://farmland.salsalabs.org/midatlanticwomenfortheland/index.html>.

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

New Stress-Management Training Program for Agriculture

Farm Bureau and other organizations have launched a free, online course that aims to help farmers, their families and neighbors identify and cope with stress.

The course, developed by Michigan State University Extension and University of Illinois Extension, gives participants the skills to understand the sources of stress, manage their own stress, learn the warning signs of stress and suicide, identify effective communication strategies, and connect farmers with appropriate mental health and other resources.

Farm Bureau is partnering with Farm Credit and the National Farmers Union to offer the course to the general public.

"We have to break through with a message of hope and help," said American Farm Bureau Federation President Zippy Duvall. "Families don't have to face today's stresses and heavy burdens alone. This free online resource is a first step toward recognizing the signs and knowing what to do. We hope anyone who knows someone struggling will take advantage of this potential lifeline."

Learn more or register for the course at opencoursesstore.d2l.com/product?catalog=msu_urmfs_2020.

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

GENERAL

Farmer Stress and Mental Health

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9. Individuals who are stressed might talk in a monotone voice or have a lack of expression on the face. You could observe bursts of anger or abrasive behavior towards children or others. Worry or fearfulness about the future could become a key topic of conversation. You may notice confusion, forgetfulness or difficulty concentrating.

10. Others may respond to stress by trying to screen out unpleasant circumstances in a variety of ways. For example, some people might deny their problems. They may blame others, such as banks or their spouses. Other times, people try to escape through eating or gambling binges, spending sprees or excessive use of alcohol or other drugs. Some may sleep too much or not enough. Most of these are maladaptive attempts to cope, as a person tries to avoid dealing with the stress.

11. A person may notice a lack of pride in the way the farm building and grounds appear. Cattle or livestock might not be cared for in the usual way. Accidents may occur due to fatigue or loss of ability to concentrate. Farm children may act out, decline in academic performance or be increasingly absent from school.

12. In farmers, a lack of social support, such as having few or no friends, is a predictor of depression. The person may not take care of their physical appearance or hygiene. A major concern would be if the farmer starts talking about shooting himself or herself or others. These are signs of hopelessness or depression.

13. Many things can minimize our natural stress response. Taking three slow and deep breaths, stopping to daydream or taking a short mental vacation for 10 minutes, or using repetitive prayer or other grounding words can help. A regular exercise program can provide a break in the daily routine and is a constructive way to relieve stress. Having a strong network of friends, co-workers, and family can provide helpful support during difficult times.

14. Sometimes managing those items an individual does have control over can help to reduce stress. Set priorities about what has to be done today and what can wait. It is OK to say "No," especially to those commitments you do not have time for.

15. If stressed, first talk with someone you trust, such as friends, family or a trusted physician or minister. Taking your partner on a date, or just a walk, helps to strengthen that very important relationship. Getting a good night's sleep, avoiding alcohol and drugs, and eating healthily help us to better manage our current stressors.

16. You may be concerned about someone, or a person's friend or family member, banker, veterinarian, FSA representative or other service provider might express concern about someone you know. You could start a conversation with that person with care and compassion by saying, "I've noticed you're feeling upset" or asking, "What's going on in your life?" Then let the person talk. Listen carefully, provide support and share personal experiences, if you feel that would be helpful. Don't feel that you need to solve their problems, just give them some time to express what's going on.

17. When the person is finished and if you are concerned that they might hurt themselves, be direct and ask, "Are you thinking about suicide?" If he or she says "Yes," get immediate help. Call 911 or take the individual to a hospital emergency room. If he or she says "No," ask, "What do you think might help?" or maybe "Where would you like to go for help?" Offer to make the contact to a local resource and suggest, "Why don't we make the call together?" It helps to have an awareness of or list of the resources available in your area.

Resources

- Farm Aid hotline: (800) FARM-AID / (800) 327-6243
- National suicide hotline: (800) 273-TALK / (800) 273-8255
- Crisis text line: Text HOME to 741741
- Mass.gov mental health crisis resource page: <https://www.mass.gov/info-details/mental-health-crisis-support>
- Farm Bureau resources for taking care of your mental health: <https://www.fb.org/programs/farm-state-of-mind/>
- National Farmers Union Farm Crisis Center: <https://farmcrisis.nfu.org/>
- Farm Credit East Customer Assistance Program: <https://www.farmcred-iteast.com/industry-support/customer-assistance-program>
- Michigan State University Managing Farm Stress: https://www.canr.msu.edu/managing_farm_stress/

From Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Mass. Extension, Vol. 32, No. 21, August 13, 2020.

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FARM LABOR

New Pennsylvania Farm Employer Discussion Group Forming

The Penn State Center for Agricultural and Shale Law and Penn State Extension announce the creation of the **Pennsylvania Farm Employers' Listserv (PFEL)** discussion group. The PFEL is an email networking and resource-sharing group specifically tailored to agricultural labor issues for those with human resources responsibilities at agricultural operations. In this forum, farm employers can exchange information and resources to better prepare them to do their jobs confidently and efficiently, keep up on the latest news and developments, and learn how to best comply with legal requirements from state and federal laws and agencies.

Penn State Law's Center for Agricultural and Shale Law will provide content and help field questions from the forum's participants. All agricultural employers in Pennsylvania are welcome to participate and do the same, sharing their experiences, expertise, and know-how.

To participate in this discussion group, you will need to subscribe first. This helps prevent the discussion group from being attacked by spammers and bots, and keeps the quality of content shared in the list high.

To subscribe, please send an email to: pfel-subscribe-request@lists.psu.edu. In the subject line, type "subscribe" and type any word in the body (to circumvent spam filtering). Once the subscription is approved by a list moderator, you will receive an email on how to participate in discussions and how to change default settings, such as how to receive a weekly digest or index list of messages sent.

To post after subscribing, send your message to pfel@lists.psu.edu.

For more information, please contact Daniel Weber, Penn State Extension, Daniel.weber@psu.edu or 717-334-6271.

MARKETING

COVID-19 Safety Tips for Agritourism Operations



Continued community transmission of COVID-19 presents challenges to many businesses, including on-farm agritourism operations. The Rutgers Cooperative Extension Agritourism Working Group developed farm assessment resources titled, *Considerations for Agritourism Operations During the COVID-19 Pandemic* at https://agritourism.rutgers.edu/pdfs/Considerations_for_Agritourism_Operations_During_the_Covid19_Pandemic.pdf, to assist producers with agritourism activities as part of their on-farm marketing strategies. Considerations listed are designed to help operators evaluate business and management strategies that align with State executive orders and federal/state/local safety guidelines enacted to reduce possible transmission of COVID-19.

Key considerations include:

- Remain apprised of/and compliant with executive orders issued by the Governor to reduce COVID-19 transmission, including those establishing limits on public indoor and outdoor gatherings, as well as requirements for face coverings and social distancing;
- Monitor guidelines issued by the Centers for Disease Control and Prevention (CDC) and State/local authorities to reduce community transmission of COVID-19;
- Clearly communicate farm rules and visitor expectations—prior to arrival and during farm visits—through website and social media posts, promotional materials, staff instruction, and farm signage;
- Ensure that all farm staff undertake a daily screening for symptoms of COVID-19 and avoid coming to work if they are symptomatic, have tested positive for the virus, or have been in close contact with anyone who has tested positive for COVID-19;
- Train employees on all personal and farm safety protocols developed to minimize risks of COVID-19 transmission;
- Organize agritourism activities and manage visitor flows to maintain adequate social distancing on the farm. This includes carefully evaluating farm/attraction capacity limits, identifying areas of anticipated high visitor volume (e.g., parking areas, restrooms, sales areas, foodservice, attraction entrances and exiting areas, etc.), and taking measures to reduce pedestrian "bottlenecks," large congregations, and cross-flow contact when guests are entering/leaving areas;
- Instruct employees and visitors to wear appropriate face coverings;
- Provide adequate and appropriately stocked/maintained hand washing and hand sanitizer stations in key areas (e.g., sales areas, outside restroom facilities, foodservice areas, key thoroughfares, entrances/exits, etc.);
- Establish regular cleaning and disinfection procedures for frequently touched surfaces or objects;
- Construct physical barriers, if needed, to reduce potential contacts between staff and visitors (e.g., Plexiglass partitions in sales areas);
- Explore options for pre-registration to control visitor volumes and pre-payment or touchless payment options to reduce contact between staff and visitors; and
- Discourage unnecessary customer handling of farm products prior to purchase.

This resource and other tools to help agritourism operators evaluate and strengthen the management of their operations, identify safety concerns and manage liability are available at the New Jersey Agricultural Experiment Station's agritourism resource site: <http://agritourism.rutgers.edu/training/>

*From the **Plant and Pest Advisory**, Rutgers Cooperative Extension, <https://plant-pest-advisory.rutgers.edu/covid-19-safety-tips-for-agritourism-operations/>, August 19, 2020.*

VEGETABLE PRODUCTION

Plectosporium Blight Common in Pumpkin Fields This Year

Jerry Brust

By this time of the season I usually see pumpkin fields infected with powdery mildew pretty commonly

throughout the mid-Atlantic. And while powdery mildew is present in many pumpkin fields it does not seem as bad as in previous years. The one disease I am seeing a great deal more of this season is plectosporium blight. This fungal disease of pumpkin, zucchini and squash can cause yield loss if left uncontrolled. Plectosporium blight prefers warm, humid or rainy weather conditions. It overwinters on crop residue and can persist in the soil for several years. Plectosporium blight can be recognized from the small white to light tan spots on leaves (fig. 1) and elongated lesions on stems and leaf petioles (fig. 2).



Fig. 1 *Plectosporium* yellow-tan spots (lesions) on pumpkin leaf.



Fig. 2 *Plectosporium* lesions on pumpkin leaf petioles — the petiole to the right has split.

On green fruit the lesions are very small white to tan flecks (fig. 3) on more mature fruit the lesions are round to irregular shaped pimples on the surface of the pumpkin making them at times unmarketable (fig. 3). These fruit lesions also allow soft rot pathogens to penetrate into the pumpkin which will cause the fruit to 'melt-down' into a deflated mess. When stem and foliar lesions occur in large numbers they can give a light gray or white appearance to the foliage, vines and leaf petioles (fig. 2). Severely infected pumpkin stems or petioles will become brittle and can split or shatter if disturbed (fig. 2).

When *Plectosporium* blight occurs, rotate away from summer squash and

pumpkins for 2 years. Scout for disease and apply fungicides when disease first occurs. Thorough coverage of foliage, vines, and fruit is necessary for good control. Most of the time protective applications of chlorothalonil or mancozeb will give you good protection from this disease, however in years like this one where we have had frequent and heavy rains at times the disease control needs a kick with the addition to the protective sprays of using something in rotation such as Cabrio or Flint Extra or Pristine. These 'extra sprays' should not be rotated with one another.

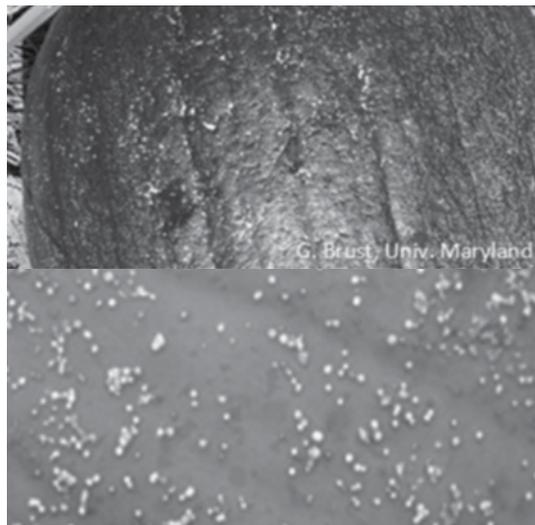


Fig. 3 *Plectosporium* lesions on small green fruit and on more mature orange fruit.

Dr. Brust is the Extension IPM Vegetable Specialist at the Univ. of Maryland. From *Vegetable and Fruit News*, Univ. of Maryland Extension, Vol. 11, Issue 5, August 13, 2020.

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VEGETABLE PRODUCTION

Bacterial Spot, Thrips and Mites – Problem Pests Now in Tomatoes

Jerry Brust

Last week several fields were found with one or more of the big 3 for mid-summer pests in tomato. These disease and insect pests do well in hot weather, although two spotted spider mites (*Tetranychus urticae*) and thrips (*Frankliniella* spp) do best in hot dry weather and bacterial spot (*Xanthomonas* spp) likes it wetter.

Bacterial spot in tomatoes and peppers is a tough one to manage and it seems to be more difficult to do so in the last several years. One of the possible reasons is that copper is not working as well as it once did because of the development of resistance. Combining copper with mancozeb has helped, but in hot rainy weather it is still difficult to slow its spread. It has been my observation over the years that the copper-fungicide combination seems to protect the fruit fairly well (but not always) from becoming infected with bacterial spot or speck. So even if the foliage is infected by the bacteria much of the fruit is usually OK, although the bacteria will infect the pedicel and flower, which can cause flower abortion (Fig. 1). The big problem is the infected foliage eventually



G Brust, University of Maryland

Figure 1. Bacterial spot lesions on stems and pedicels of tomato.

dies and the plant has exposed fruit (Fig. 2) that at first is not a problem but as the season moves on the exposed fruit becomes sunburned and unmarketable (Fig. 3). Actigard is a plant activator and when used preventively with copper-fungicide treatments has done a very good job of reducing bacterial spot and speck problems in tomato fields.

With thrips, the difficulty is getting the chemical controls to



G Brust, University of Maryland

Figure 2. Bacterial spot infected tomato plants with exposed fruit in foreground row and little to no bacterial spot problems in background rows of tomatoes.



G Brust, University of Maryland

Figure 3. In mid-August plants defoliated because of bacterial spot allow fruit to become sunburned.



G Brust, University of Maryland

Figure 4. Thrips feeding damage and black specks-thrips feces.

the pest on the underside of a leaf on plants with heavy foliage. Thrips feeding damage appears as small white dots or stippling scattered on a leaf often with tiny black specks around these feeding scars which is thrips feces (Fig. 4). Radiant insecticide would be good to try first if it has not been used much before in the field, if it has a different chemistry such as Torac or Harvanta should offer better control (each has a 1-day PHI and a 4-12 hr REI). Growers also report success with controlling thrips using combination products that use a pyrethroid and a neonicotinoid such as Endigo, Brigadier or Leverage, etc. However, growers need to be sure to use high gallonages (50-90 gal/a) and pressures (150-200 psi) and if possible hollow cone nozzles to get the insecticide into the tomato's dense canopy and to the underside of leaves.

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VEGETABLE PRODUCTION

Bacterial Spot, Thrips and Mites – Problem Pests Now in Tomatoes

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Figure 5. Two spotted spider mite feeding damage to tomato foliage.



Figure 6. Tomato leaf with two spotted spider mite silken webbing on underside of leaf.

Two spotted spider mites do damage that looks similar to thrips, but they do not produce black flecks where they have scarred the leaf tissue (Fig. 5). Mites become very difficult to control if you see webbing on the underside or top of an infested leaf (Fig. 6). This is because the webbing reduces the mites exposure to any miticides. There are several miticides that work well, provided the material gets to the mites, such as Agri-Mek, Portal, Oberon or Acramite.

*Dr. Brust is the IPM Vegetable Specialist at the University of Maryland. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 28, Issue 21, August 7, 2020.*

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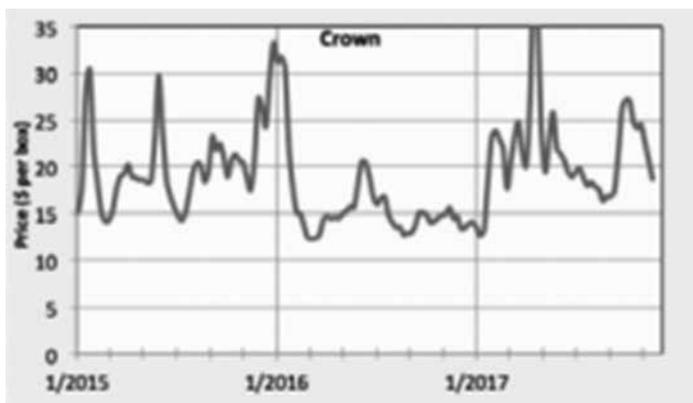
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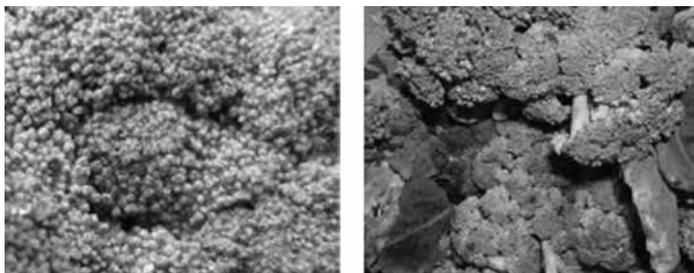
Managing Heat-Related Disorders in Brassicas

Achieving 500-600 boxes per acre of broccoli through the hottest part of the summer is a tricky proposition, and while there isn't a silver bullet that will ensure a perfect crop, there are ways that you can mitigate your risk and ensure the best possible broccoli crop all summer long. Plant too early, and your broccoli or cauliflower may suffer from buttoning due to cold temperatures; have head formation occur during a heatwave, and you may suffer from heat related disorders. However, there is a benefit to having a crop like broccoli year round if selling to a wholesale market. There are many spikes in the price, and having fields to harvest year-round will give you the opportunity to capture a good price (see figure).



Terminal market prices of broccoli crowns in the East. Mean value for all Eastern terminal markets for crown-cut broccoli. Source: USDA AMS Market News.

To avoid the risks of heat related disorders, many growers focus their brassica production on the cooler ends of the season. They have been harvesting early spring brassicas since May, are now cutting spring cabbage and broccoli, and are starting to plant their fall brassica crops. Some growers are managing to produce summer brassicas successfully, with head formation beginning now, but this can be challenging. As our first heat wave of the summer hit New England this past week, we thought now would be a good time to discuss management of heat related disorders in brassicas. Heat and moisture stress reduce the crops' ability to take up and translocate nutrients within the plant, ultimately leading to a majority of the disorders discussed below. Head rot, brown beading, and tip burn are all caused by calcium (Ca) deficiencies in the plant, while hollow stem is caused by a boron (B) deficiency.



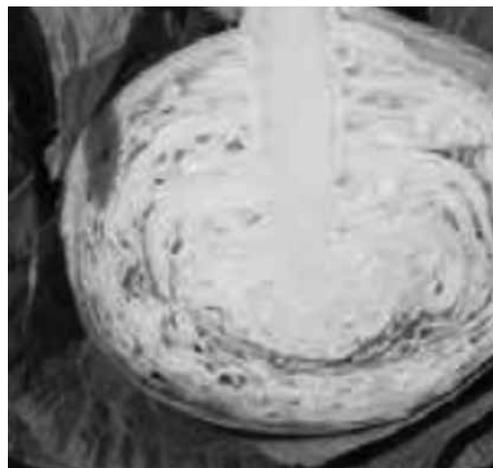
Brown beading (left) and head rot (right) in broccoli.

Head Rot and Brown Beading: Problems with Ca uptake combined with rapid growth can result in head rot or brown beading in broccoli, even when soil Ca levels are high. Head rot results from bacteria breaking down the tissues under wet conditions,

and brown beading results from individual flower buds aborting under dry conditions. Excess nitrogen and extended periods of wet or dry conditions during warm temperatures give rise to rapid plant growth while Ca uptake is diminished due to poor transpiration rates in the plants.

Research done by Thomas Bjorkman at Cornell University, using the cultivar 'Galaxy', showed that the critical period for heat sensitivity in broccoli only lasts for roughly ten days. This 'window' of sensitivity corresponds to the time when the growing tip shifts from vegetative growth to flower bud initiation. This period of about 10 days begins just before a tiny crown is visible in the center of the plant. Temperatures above 35°C (95°F) for more than four days during that period causes uneven bud development, resulting in heads that are uneven and poorly shaped, leading to head rot and brown beading. Other references suggest that temperatures above 85°F can cause heat injury.

Management: Uneven or inadequate soil moisture also exacerbates heat stress. Drip irrigation is helpful for supplying water on a steady basis without increasing the risk of water sitting on the head. When individual buds or areas of the head are killed by heat stress, this allows entry of pathogens. Uneven heads also allow water to remain longer on the surface of the head, which increases the likelihood of disease development. Mixing varieties based on rate of maturity offers growers another practical defense against either head rot or brown beading, because it distributes the critical period for heat sensitivity across a range of weather conditions. Select a later-maturing cultivar to be harvested along with your regular cultivar for the part of the growing season when problems have typically occurred. Check with your seed supplier regarding heat tolerant varieties. 'Emerald Crown' (Seedway), 'Green Magic' (Johnny's Selected Seeds, Harris), and 'Belstar' (JSS, High Mowing Seeds) are standard varieties reported to have good heat stress tolerance in New England. The Eastern Broccoli Project,



Internal tip burn in cabbage. Photo: J. Howell

led by Thomas Bjorkman found that "in the most stressful environments, four varieties stood out from the rest with respect to bead uniformity and dome structure: DuraPak 19, Lieutenant, DuraPak 16, and Tradition."

Tip burn

has been generally recognized as a

calcium (Ca) disorder, though it usually results from high temperatures and uneven rainfall/irrigation preventing the plant from taking up adequate Ca, rather than from a deficiency in the soil. Tip-burn and internal browning affect many brassicas and both head and leaf lettuce. Calcium (Ca) deficiencies show up on young, growing tissues. In cabbage, margins of inner leaves turn brown, beginning at the hydathodes (structures in the leaf tip or margin that excrete excess water), and later desiccate to become thin and papery at the margin or over large portions of the leaf. The affected tissue may turn dark brown to black, occasionally being invaded by secondary bacteria that cause a watery soft rot.

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VEGETABLE PRODUCTION

Managing Heat-Related Disorders in Brassicas

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In cauliflower, internal leaves turn brown and fold over the developing curds. When secondary microorganisms attack these leaves, they become a mushy smear over the curd and make the head unmarketable. On a daily basis, Ca moves with the transpiration stream to the outside leafy parts of the plant, which are actively transpiring on sunny days. At night, especially when dew forms, transpiration is reduced and water movement generated by the roots is directed to the inner part of the head. However, on warm, dry nights the outer leaves continue to transpire, and Ca is diverted away from the head. Once Ca is fixed by the outer leaves, it cannot be translocated to the interior of the head.

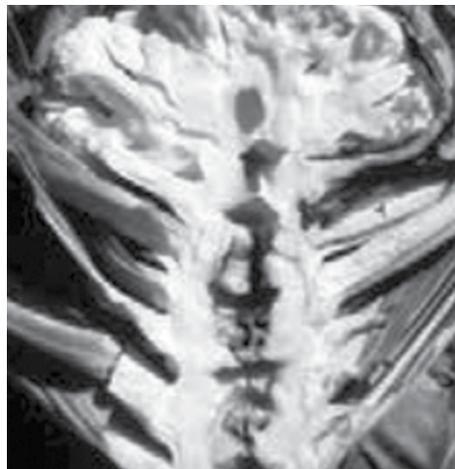
Environmental conditions that favor rapid plant growth favor tipburn. Abundant soil moisture promotes rapid growth, while excess moisture reduces soil oxygen levels, which in turn reduces Ca uptake and movement. A warm dry spell after a period of abundant moisture may aggravate the disorder. Drought or root damage such as early season cabbage maggot feeding also stress the root system and can impair the plant's ability to take up Ca and translocate it. Excess nitrogen (N) encourages rapid growth, and also results in large outer leaves that accumulate Ca at the expense of young inner leaves. Wide spacing also encourages large outer leaves and rapid growth.

Use of urea, ammonium nitrate, or calcium ammonium nitrate fertilizer can aggravate Ca problems, because ammonium cations out-compete Ca for uptake in the plant. Calcium nitrate is more expensive, but the N is all in the nitrate anion form which will give brassicas the needed N fertility but will not compete with Ca for uptake. Note that when applying Ca nitrate through a drip system it is important to use greenhouse grade material rather than field grade to avoid clogging the system. Excess potassium cations also inhibit uptake of Ca, while excess phosphorus binds with Ca in the soil, reducing uptake of both nutrients. Some of our soils have excessively high phosphorus relative to potassium.

Management: Factors that promote rapid plant growth should be avoided, because rapid growth puts a high demand for Ca on the tissues. Maintenance of optimum but not excessive fertility (including N) is important. Maintaining a phosphorous to potassium ratio of 1:1 should help to minimize the incidence of tipburn. Irrigation may be necessary to maintain steady and optimum levels of soil moisture. Addition of high levels of Ca to the soil and foliar applications do not seem to alleviate the problem. Close plant spacing and prompt harvesting of crops when mature are beneficial practices. Internal symptoms grow worse as heads become larger and more mature. Avoid aggressive cultivation which can damage roots.

Cultivars that grow less vigorously are less prone to this disorder. Resistant cultivars are available for some crops - check your seed suppliers for their recommendations. Growers reported that the cabbage cultivars Green Cup and Bronco had worse symptoms than other cultivars when the problem occurred in 2004 and 2005.

Hollow Stem: Heat and rapid growing conditions exacerbate the effects of boron deficiency leading to hollow stem in heading crops, which is often not noticeable until harvest. Chlorotic younger leaves or rosette die-back can be a sign of B deficiency and hollow stem. Hollow stem is worsened by pH greater than 7. Excess moisture leaches B out of the soil and low moisture inhibits soluble B uptake and poor root development. Excess Ca, K, or Zn have also been shown to outcompete B in plant uptake. Other causes include excess nitrogen fertilizer, imbalance of nitrogen and boron, or rapid growth after head initiation. High P levels in soil have been shown to increase B uptake. There are cultivar differences in B sensitivity



Boron deficiency in cauliflower.
Photo: J. Howell

Management: Avoid side-dressing brassicas with nitrogen after head development begins. Broccoli, cabbage, cauliflower, turnip, and rutabaga are very sensitive to boron deficiency. The best method to apply a small amount of boron is as an additive to the fertilizer or diluted in a water spray applied to soil before final field preparation.

For example, if the level of boron in the soil is low (below 3ppm), apply 3 lb of boron (15 lb Solubor, or 30 lb Borax)/A before planting broccoli and cauliflower, and 2 lb/A for cabbage. Conventional fertilizers can be purchased with added boron. Other boron products include granular Boron 15% and soluble Borosol 10%.

From the Univ. of Massachusetts Vegetable Program, updated 2018. From *Vegetable Notes for Vegetable Farmers in Massachusetts*, Univ. of Mass. Extension, Vol. 32, No. 20, August 20, 2020.

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VEGETABLE PRODUCTION

Managing Fall Diseases of Brassicas

Susan Scheufele

While it's still hot and dry out there, we've had some cooler nights and dewy mornings recently. These conditions, along with cooler daytime temperatures that will be coming soon (hopefully!), set the stage for brassica diseases to quickly take off and reduce yield and quality. The three major diseases of brassicas outlined here—black rot, *Alternaria* leaf spot, and 5 downy mildew—share much in common. They can be seed-borne, they can survive in crop residues in soil for about two years, they are spread by wind, splashing water, and insects like flea beetles, and are favored by moist conditions. This means that the following preventive, cultural practices will go a long way in reducing the impacts of all the diseases described later in this article.

Variety selection. In some cases, varieties exist that are totally resistant to a given disease and hold up well even under very high disease pressure. There are no varieties of any brassica crop that are totally immune to black rot or *Alternaria* (wouldn't that be a dream!), but there is a spectrum of tolerance to both of these diseases, and to downy mildew as well. You have probably noticed on your farms that some varieties get more or less disease than others. Plant breeders and researchers are aware of this too and are choosing varieties to bring to market based on their observations and studying the performance of available varieties. A study done by Chris Smart at Cornell University https://ag.umass.edu/sites/ag.umass.edu/files/newsletters/april_19_2018_vegetable_notes.pdf showed differences in susceptibility to black rot of 35 cabbage varieties. The study showed that several varieties were extremely or very susceptible and 6 or 7 were "tolerant". Plant these tolerant varieties in fall, when environmental conditions typically favor disease, or in fields with a history of disease.

Start with disease free seedlings. All of these diseases are commonly introduced on infested seed. Either talk to your supplier to be sure the seed has been tested or, better yet, hot water treat your seed to eradicate bacteria, fungi, and oomycetes that may be present. You can do this at home with some simple equipment, (see the Mid-Atlantic Commercial Vegetable Recommendations page 124 and <https://extension.psu.edu/hot-water-treatment-for-tomato-and-pepper-seeds>). When raising seedlings in the greenhouse, avoid overwatering and encourage air flow to reduce leaf wetness. Monitor transplants in the greenhouse and remove any symptomatic plants.

Plant into a clean field. Rotate out of brassicas for 2–4 years, and control weeds in the brassica family like shepherd's purse, wild radish, and field pennycress. Any amount of rotation you can do will help—the further away the better, as these diseases are dispersed by wind and insect feeding. Chopping and burying infested residue quickly after harvest will shorten the period of time the organisms persist in the soil (e.g., avoid leaving diseased Brussels sprout stalks standing in the field through the winter; mowing them is better than nothing if you can't disk them in). Manage cull piles so that crop residue breaks down and they do not become sources of inoculum.

Reduce leaf wetness. All of these diseases require moisture to grow and spread. Increase plant spacing so plants will dry off more quickly and so the pathogens can't spread as easily from plant to plant. If overhead irrigation is necessary, or when watering in the greenhouse, water on a sunny day when leaves will dry quickly.

Control insects and remove weeds. Flea beetles can move fungal spores and bacteria from plant to plant and field to field. A study by Helene Dillard at Cornell University showed that spores of *Alternaria brassicicola* are present on flea beetles' bodies, in their mouths, and in their feces, and that flea beetles actually concentrate *Alternaria* spores in their mouthparts when they clean their antennae. The insects move from plant to plant, basically injecting spores and bacteria into wounds they create through their feeding. Therefore, reducing flea beetle pressure will also reduce

the spread of diseases through the field. Similarly, cruciferous weeds can harbor diseases and act as bridges between fields and between seasons. Weeds also crowd the crop, increasing moisture and leaf wetness and reducing efficacy of sprays.

Chemical control. There are many effective pesticides to control these diseases. Please see the brassica disease section of the Mid-Atlantic Commercial Vegetable Recommendations for a full list of labeled fungicides. Copper products and plant defense activators like Actigard or Regalia are the best choices for managing black rot. Avoid using excessive pressure when spraying for black rot, as this can cause abrasions and wounds on leaves through which the bacteria can enter the plant—use only enough pressure to get good coverage. Many OMRI-approved fungicides are labeled for these diseases, but those tested in our studies have not shown good efficacy for *Alternaria*.

Black Rot



Black rot in cabbage. Photo: UMass Veg Program

Black rot is one of the most devastating diseases of brassica crops, and can result in high losses of yield and quality. The bacterium, *Xanthomonas campestris* pv. *campestris*, plugs the water-conducting tissue of the plant with xanthan, a mucilagi-

nous sugar, causing leaf yellowing and wilt. Seedlings are commonly affected but symptoms can appear at any growth stage and not all infected plants show symptoms. The most common and characteristic symptom is a yellow V-shaped lesion that extends from the leaf margin toward the base of the leaf (see photo). This symptom is caused by bacteria entering the plant through hydathodes, tiny openings into the plant's vascular system at the leaf edges. Lesions can also occur mid-leaf, as darkened dead patches of tissue between the veins, where wounding from insect feeding, hail, or mechanical injury has occurred. Infected veins turn black as they are plugged with xanthan. Blackened veins may also appear in root crops like rutabagas even though foliar symptoms may not be present. On heading crops, infection may spread into the six leaves of the head and is often followed by invasion by soft-rotting organisms.

Black rot is commonly transmitted by seed, and a seed lot with as little as 0.03% infected seed can cause an epidemic in the field. The bacteria can persist in infected plant debris for up to two years, but can only survive for 40–60 days in the soil in the absence of host tissue. Disease development is favored by warm, wet weather and the pathogen is spread within the field by splashing water, wind, equipment, workers, and insects (e.g. flea beetle feeding).

Alternaria Leaf Spot

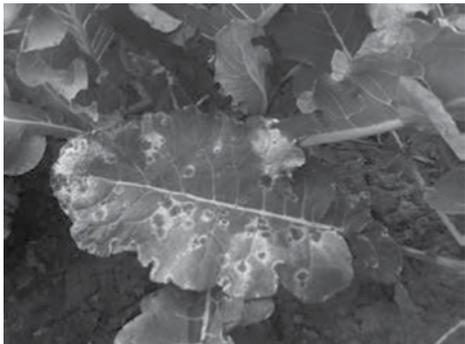
Alternaria leaf spot is a fungal disease that affects all cultivated brassicas. The disease can be caused by several fungi in the genus *Alternaria*, but the most damaging species in vegetable brassicas are *A. brassicae* and *A. brassicicola*. There are other *Alternaria* species that cause disease on essentially every other

Continued on next page

VEGETABLE PRODUCTION

Managing Fall Diseases of Brassicas

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Alternaria leaf spot in broccoli. Photo: G. Higgins

major vegetable crop family, but each species is host-specific, meaning that the *Alternaria* that affects brassicas cannot infect tomato or onion or cucumber, and vice versa. The disease can spread in storage so management is especially important for

cabbage and other storage crops and crops should be inspected for early symptoms before storing.

The initial symptoms of *Alternaria* leaf spot are small black dots surrounded by chlorotic haloes. As the disease progresses, lesions expand into characteristic, dark-brown to black circular leaf spots with target-like concentric rings. The centers of lesions often turn brown and crack or fall out, giving the leaf spots a shot-hole appearance. Individual spots coalesce into large necrotic areas and leaf drop can occur. Lesions can occur on petioles, stems, flowers, flower pedicels, and seed pods. Brussels sprouts can be rendered unmarketable by numerous small spots on the buds. Brown, sunken spots on heads of broccoli and cauliflower can make those crops unmarketable.

Alternaria species overwinter primarily in diseased crop debris. Lignin-rich stalk tissues can persist in the soil for over two years, and the fungi can remain active on that tissue as long as it is present. Disease development is favored by cool temperatures (60–78°F) and 12 hours of at least 90% relative humidity. The main means of introduction into new areas is on infested seed. However, once the disease is established on a farm, spores can spread easily between crops on wind, splashing water, equipment, workers, and insects.

There are many fungicides with efficacy against *Alternaria* leaf spot including Quadris, Endura, and Bravo, among others—please see the brassica disease section of the Mid-Atlantic Commercial Vegetable Recommendations.

Brassica Downy Mildew



Brassica downy mildew sporulation. Photo: S.B. Scheufele

Brassica downy mildew is caused by the oomycete (a fungal-like organism) *Hyaloperonospora parasitica* and can cause disease in both waxy and leafy brassicas. Similarly to *Alternaria*, there is a downy mildew for almost every vegetable crop family, but they are all unique and very host

specific—cucurbit downy mildew does not affect brassicas, and vice versa. Infection can occur at any stage of growth. Infected

seedlings can also be symptomless until they are transplanted into the field and conditions become favorable. On seedlings, slightly yellow patches appear before whole leaves and cotyledons turn yellow and drop. In larger plants, irregular, angular yellow to brown spots develop on both the top and bottom of the leaf and a characteristic grayish-white, fluffy growth on the undersides of leaves appears. In broccoli and cauliflower, the first symptom is often darkened flower head stalks, or stalks with black streaks. Dark brown areas will develop internally in curds or floral buds. In cabbage, internal darkening and purplish spots appear in the inner layers of the head or move upward in the head from stem infections. The disease can spread in storage and infected plants are susceptible to secondary infection with soft rot bacteria, resulting in a stinky puddle of rotten cabbage.

Unlike other downy mildews that blow in from afar each year, *H. parasitica* can overwinter as thick-walled resting spores, called oospores, in the soil or crop debris. These sexual spores can survive in the soil for extended periods and produce asexual spores when conditions are moist and cool, especially at night. Other sources of initial inoculum are infested seeds, and cruciferous weed hosts. Disease development is favored by abundant moisture on leaves provided by dew, drizzling rain, or heavy fog, and by temperatures of 50–60°F. Sporulation, germination, and reinfection can occur in four to five days. Sporangia (secondary, asexual spores) are spread throughout the field by wind, splashing rain, and by feeding insects. Varieties of broccoli with tolerance to downy mildew have been developed; our sources list Marathon and Arcadia among these.

Ms. Scheufele, is with the Univ. of Massachusetts Vegetable Program. From Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Mass. Extension, Vol. 32, No. 21, August 13, 2020.



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VEGETABLE PRODUCTION

General Management Strategies for Rhizomatous Perennial Weeds

Elizabeth Buck

Perennial rhizomatous weeds include Canada thistle, perennial sowthistle, field & hedge bindweeds, horsenettle, yellow nut-sedge, and quackgrass. All of these weeds have running stems that go through the soil and have many buds along their length, called rhizomes. In the spring, some of those buds emerge as vigorous, troublesome shoots. The rhizome stems store carbohydrate reserves over the winter and serve as propagation material.

Tillage and other field operations serves to propagate these rhizomes. Each pass with a chisel plow, for example, will distribute rhizome pieces up a field. New horsenettle plants, for example, can emerge from a ¼ inch long segment buried a foot below the surface. As you can imagine, this makes mechanical control challenging. The **key management objective for all perennial weeds is to kill the overwintering, underground tissues.** In the case of perennial rhizomatous weeds, this is often most efficiently achieved through the use of translocating herbicides applied between mid-summer and early fall.

Translocating herbicides are taken up by the plant and move in the phloem, following the flow of sugar to the strongest, most actively growing sinks. In late summer and early fall, perennials are sending resources to the overwintering structures, like rhizomes, to prepare for winter. In the spring, resources are

flowing from the below ground rhizomes to the new shoots, and the rhizomes are being physically depleted. Around bloom that balance begins to shift for many perennial species as they partition more of their photosynthetic resources to the underground overwintering structures. Thus, **applications of translocating herbicides are often more effective in the long run when applied at or after bloom.**

Glyphosate and several group 4 herbicides (dicamba, 2,4-D, Stinger) are examples of translocating herbicides. Other herbicides can be fall-applied to target rhizomes on a case-by-case basis, like the Group 1 material quizalofop (Assure II) for quackgrass rhizomes. **Translocating herbicides work best when the weeds are unstressed and of an appropriate (label specified) size at time of application.** The weeds should remain undisturbed for a couple weeks following application to achieve the greatest effect. Adjuvants, tank-mix partners, and water alkalinity can all influence the efficacy of some common translocating herbicides. Use caution when applying translocating herbicides near horticultural crops. Read labels carefully regarding crop safety and environmental conditions at application, and consider using a hooded sprayer for applications near crops.

Continued on next page



Photo: Perennial sowthistle shoots emerging from buds on an overwintering rhizome with secondary rhizome branches

General Management Strategies for Rhizomatous Perennial Weeds

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Pre-emergent herbicides generally have little impact on emerging rhizome shoots because they are designed to control seedlings, not established plants. **In-season contact herbicides** can knock back the top growth of most perennial rhizomatous weeds. This has a **two-fold effect** on the rhizomes:

- 1) reduces the amount of photosynthates transported to below-ground storage
- 2) can force the rhizome to further expend energy reserves by generating replacement shoots.

This **two-fold approach** underpins the cultural and mechanical control strategies for rhizomatous broadleaf perennials. Step 1 is to weaken the rhizome by depleting the energy reserves. Step 2 is to limit the amount of energy that is allowed to go back into the ground to replenish old rhizomes and grow new ones.

Rhizome depletion occurs every time new shoots emerge. The larger the rhizome, the more energy it has to grow shoots. Keep in mind that not every bud on a rhizome turns into a shoot — several are held back in case the plant needs to regenerate shoots. Here **two tactics** develop:

1) Forced Depletion via recurrent regeneration

Start with smaller rhizome pieces and always keep them sending resources upward. Do this by eliminating shoots several times over the course of the season using cultivation, mowing, etc. However, and **this is critical: taking a mechanical approach means committing to making many control passes throughout the season.** Remember that every time ground infested with rhizomatous perennials is worked the weed is propagated and there are many times more weeds to control. That means there are many more opportunities to lose control of individual plants and make the problem worse if repeated operations to limit top growth do not occur or are ineffective. Be careful not to spread the rhizomes while cultivating — work towards the center of the patch and remove dangling rhizome pieces from equipment. **Successfully eliminating top growth multiple times not only depletes rhizomes, it also effectively prevents the development of new rhizomes.** This tactic can be used to reset the stage of top growth so weed size better aligns with heights specified on translocating herbicide labels.

2) Limit carbohydrate storage via induced stress

Perennial weeds are less likely to overwinter if they have weak rhizomes. They also are less tolerant of other stresses. For example, **heavy competition from cover crops, drought, or disease have a better chance of finishing off a weak rhizome** than one left to grow all summer. This same logic applies to fall herbicide use — **a weaker rhizome is easier to kill.** Rhizomatous perennial problems are the perfect scenario for making full use of as many tools in **the weed control tool box** as possible, to best exploit all the weaknesses in the biological cycles of these difficult plants. **Unfavorable crop rotations, dense cover crops, and narrower crop rows or higher planting density** are some examples of other toolbox techniques that will stress perennial weeds. Note that to date, there is insufficient evidence to support the use of light exclusion methods (tarping) for long-term suppression or killing of rhizomatous perennials.

Though overwintering plants are a primary concern, seeds deposited into the seed bank can permit re-infestation down the road. Aim to **control the plants before the seed can mature** by attacking populations shortly after flowering begins. Cultivation can be insufficient to deal with large escaped plants in bloom, and the timing often prohibits herbicide use within a vegetable field. In these cases, consider taking a mower or weed whacker to patchy, isolated stands of large weeds that are in bud or flower. Many

weeds can finish immature seeds on severed portions of the plant so strive to make timely mowing-type operations, especially if the weeds have already flowered. Luckily, seedlings are far easier to kill than established plants. When caught early, mechanical or chemical control can be effective against seedlings of perennial rhizomatous weeds.

Tackling perennial rhizomatous weeds may be a multi-season task, but it is achievable. With a good weed map, dedication, and perseverance, these troublesome weeds can be conquered.

Special Note on Yellow Nutsedge: In New York State, in mid-July yellow nutsedge (YNS) is initiating and setting up the bulk of their little tubers (which form at the terminal end of the rhizomes), as typically happens during mid to late July. If severed from the main plant now, the partially formed nutlets will not be viable and the main plant will struggle to produce replacements. The window for taking advantage of this vulnerable developmental state is small, maybe 2-3 weeks. To sample YNS for the appropriate staging, dig several up throughout the field/patch being careful to dig up the whole rhizome instead of pulling and breaking them off. The rhizome tips swell and become rounded when initiating tubers. The nutlets then become fully rounded, then start to get a brownish coating on them. They need to be disturbed before this coating is fully developed and set. The window for control is between the clearly initiated tuber and the light brown, soft/incompletely coated stages. Making the field operation before the second half of July provides plants with enough time to set a second, decent crop of nutlets.

Ms. Buck is a Fresh Market Vegetable Specialist with the Cornell Coop. Extension Vegetable Program. From the VegEdge, Cornell Coop. Extension, August 1, 2018.

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VEGETABLE PRODUCTION

Squash Bug Management

Squash bugs (*Anasis tristis*) have been out for many weeks now across the region, feeding in cucurbit crops. There was also recently a confirmed report of cucurbit yellow vine decline, a rather elusive disease vectored by squash bugs. Now is the time to notice if you have a damaging population of this pest and either take control steps or make a plan for next year, and to look for symptoms of yellow vine decline in your crop.

Life stages and identification

Squash bugs are a type of true bug, a group that also includes other pests like the native brown stink bug and brown marmorated stink bug, as well as beneficial insects like the spined soldier bug. Adults are 0.5–0.75 inches long, flattened and grayish-brown. The edge of the abdomen is marked with alternate gold and brown patches. Adults frequently shelter beneath debris in the field at night, and it's common to see many bugs congregated beneath a squash fruit in the field. Adults are long-lived and lay eggs over several weeks. A single female can lay up to 250 eggs. Yellow to bronze colored eggs are usually laid on the underside of leaves, often in the junction of leaf veins, in an orderly cluster, and hatch in 7–10 days in summer conditions. Wingless nymphs are light green when small, with a brown head and dark legs, and are usually found in groups. Nymphs become darker gray and more solitary as they grow and molt through 5 nymphal stages. There is one generation per year in the Northeast, and the complete life cycle requires 6–8 weeks. Sheltered and protected areas such as field borders, woods edges, brush or wood piles provide a home for unmated adults through the winter.

Host crops and damage

The most susceptible and attractive crops are yellow summer squash, zucchini, and pumpkin (*Cucurbita pepo*) as well as Hubbard squash (*Cucurbita maxima*) and other *C. maxima* crops. Watermelon, cucumber, muskmelon, and butternut resist damage, and provide poor food quality for adults and nymphs. Resistant varieties also include sweet cheese pumpkins (*C. moshata*) and royal acorn squash (*C. pepo*). Both adults and nymphs feed by inserting their beak and sucking sap from plant tissue. Adult feeding on seedlings can cause wilting of the whole plant. Places on the leaves where the bugs feed develop small, yellow specks that eventually turn brown due to a toxin released by the bug while it feeds. High densities and intensive feeding cause foliage to wilt, turn black and die in a condition known as “Anasa wilt”. Squash bugs also feed on the fruit, causing scarring that can make the fruit unmarketable.

Squash bugs also vector the bacterium, *Serratia marcescens*, which causes the disease yellow vine decline. Yellow vine decline was first observed in the US in 1988 in Texas and Oklahoma and has since spread throughout the southern US and has been reported intermittently in New England. It is not thought to be widespread in the Northeast, but it was found in MA in 2003 and was confirmed from one site in CT this summer. The bacterium is inoculated into a cucurbit plant by the piercing-sucking mouthparts of the squash bug and enters the phloem of the plant. Symptoms of yellow vine decline include a general yellowing of the entire vine within a two to three day period. Infected plants usually collapse completely approximately 10 to 14 days before the fruit matures. Plants infested with squash vine borer can display similar symptoms—leaf yellowing, wilt, lack of vigor—but will have an entry hole in the stem where the borer entered, usually ac8 accompanied by lots of sawdust-like frass.

Cultural strategies

If possible, rotate cucurbit crops between fields as far apart as possible. Placing row covers over the young crop prevents adult access until blooming, when covers must be removed. Natural enemies of the squash bug include the tachinid fly (*Trichopoda pennipes*) which is a parasitoid that attacks nymphs and adults, and several wasps that parasitize eggs (Hymenoptera: *Encyrtidae* and *Scelionidae*). Squash bugs like sheltered hiding places, so keep headlands and field borders mowed and free of debris to reduce overwintering sites. Plastic and straw mulch and reduced tillage systems encourage higher populations, probably by providing good hiding places. In small plantings, boards can be used to attract adults seeking a protected hiding place; check in evening or morning and spray with insecticide or capture and remove. A study conducted by Oklahoma State University found that squash bugs prefer to lay eggs on yellow straightneck and crookneck squash (Bonjour *et al.* 1990) and these cucurbits can be used effectively as a trap crop planted earlier in the season along field edges. The trap crop must receive an insecticide application or be mechanically destroyed before eggs hatch. Remove crop residues and/or till field immediately after harvest to kill adults before they move to field edges seeking shelter.

Scouting and chemical control

Scout plants from seedling to vining/flowering stage to detect adults as well as eggs and nymphs. After flowering, thresholds are based on egg masses and young nymphs, but also note adults and large nymphs while scouting.

There are two key windows for control

Target adults on young plants (before flowering or vining). An insecticide application made when adults are colonizing plants in June will prevent subsequent egg and larval populations. Coverage is easier at this time, and broadspectrum pyrethroids (e.g. bifenthrin, lambda-cyhalothrin, permethrin) or carbaryl, which are reported to be effective on adults at this stage, can be used without risk to bees on the crop. OMRI-approved pyrethrin products are available (e.g. PyGanic). The threshold for targeting adults has been determined for watermelon crops at an average of 1 adult per plant (Dogramaci *et al.* 2006), but in more susceptible crops such as summer squash and zucchini, it might be appropriate to use a lower threshold (e.g. 1 adult per 2 or more plants). Aim for coverage of underside of leaves and stems where bugs hide. Systemic furrow, drip, or seed treatments and sprays for cucumber beetle at the seedling stage may also control colonizing squash bug adults.

Target smaller nymphs on flowering plants. Scout for egg masses and note first emergence of nymphs. The threshold is reached at an average of 1 egg mass per plant and when the first nymphs are seen. Good coverage of undersides of leaves is needed. For newly laid eggs and nymphs, consider a foliar application of acetamiprid (Assail 30 SG) which has moderate toxicity to bees (lower than other neonicotinoids). Adults and larger nymphs are more difficult to control, partly because they hide in the lower canopy and near the soil. An organic option for nymphs is a mixture of pyrethrin (a contact toxin) and azadiractin (an insect growth regulator, made from neem). This can be achieved by mixing separate products or with a pre-mixed product called Azera, which has both. This would be easier on bees than a high rate of pyrethrin alone, and would include two modes of action. Insect growth regulators work to disrupt the molting process so are useful only on immature stages. Treat late in the day when the flowers are closed to reduce risk to bees.

Take note of re-entry and pre-harvest intervals of materials used on summer squash and zucchini that are being harvested frequently.

Continued on next page

VEGETABLE PRODUCTION

What to Do with Flooded Produce

Jeffrey Stoltzfus

Recent storms have caused some small stream flooding that has impacted produce fields. Some areas have received 15 inches of rain over a ten day period in three different storms. Streams spilled out across roads and fields. The Food and Drug Administration reminds growers that produce that has been exposed to flooded stream, river or lake water is considered adulterated and cannot be sold or donated into the food system according to the Federal Food, Drug, and Cosmetics Act of 1938.

The first distinction to be made in evaluating whether produce can be marketed is the source of the floodwater. The FDA guidance specifically calls out water from streams, rivers, and lakes. Because this water may contain raw sewage, manure, chemicals, heavy metals, etc, produce contacted by this water cannot be sold as food. Water from field runoff, or ponding water in a low area of the field is not considered as high of a risk unless it has come from a barnyard or manure storage area. Produce from these fields should be evaluated on a case by case basis.

The next evaluation should be whether the flood water from surface water has impacted the edible part of the crop. This applies to ground crops such as potatoes, radishes, carrots, as well and is not impacted by whether or not the crop is consumed raw.

Some issues such as heavy metals, petroleum products, etc will not be impacted by cooking. Crops that grow above the ground like sweet corn, staked tomatoes, cauliflower for example may not be impacted by water that may have been only a couple of inches deep. When we think about the edible portion of the crop, we are not only thinking about ripe fruit but also small, green, or immature crops as well. Anything beyond the flower or bud formation is considered the edible part of the crop. Edible parts of the crop that have been touched by the surface water cannot be sold for human consumption. Other situations should be evaluated on a case by case basis. Considerations to take into account include how long the flood waters were in the field, what was the potential for splash, how large was the watershed that fed the stream, and what potential risks exist in that watershed.

For more information on FDA guidance for flooded produce see Guidance for Industry: Evaluating the Safety of Flood-affected Food Crops for Human Consumption <https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-evaluating-safety-flood-affected-food-crops-human-consumption>.

Mr. Stoltzfus is with Penn State Extension in Lancaster Co.

Squash Bug Management *continued from page 20*

For more information on rates and products for squash bug control, see the Cucumber, Muskmelon, and Watermelon insect section and the Mid-Atlantic Commercial Vegetable Recommendations.

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From the Vegetable Notes for Vegetable Farmers in Massachusetts, Univ. of Mass. Extension, Vol. 32, No. 21, August 13, 2020.

2021 PA Farm Show to Go Virtual

continued from page 3

together," said Pennsylvania Farm Show Complex Executive Director Sharon Myers. "We have not lost sight of what this industry means to Pennsylvania, in fact, this pandemic has highlighted our reliance on it. The show will go on, just as agriculture has persevered."

For information as it relates to agriculture during COVID-19 mitigation in Pennsylvania visit agriculture.pa.gov/COVID. To stay up to date on PA Farm Show news and updates on the virtual show, visit farmshow.pa.gov or follow the Pennsylvania Farm Show on Facebook and Instagram.

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BERRY PRODUCTION

CMREC Blackberry Cultivar Trial: Initial Yield Data

Alan Leslie

Blackberries are an attractive alternative crop for many fruit and vegetable farmers in Maryland, and present an opportunity to add diversity to pick-your-own, direct sale, or wholesale operations. In general, blackberries are well adapted to growing conditions in Maryland, but newer variety releases from state breeding programs in Arkansas and North Carolina have yet to be thoroughly tested in this state. In collaboration with the Southern Maryland Agricultural Development Commission, we established a variety trial, testing six newer varieties at the Central Maryland Research and Education Center in Upper Marlboro, MD. The blackberry varieties included in the trial are Arapaho, Freedom, Natchez, Osage, Ouachita, and Von (Fig. 1).

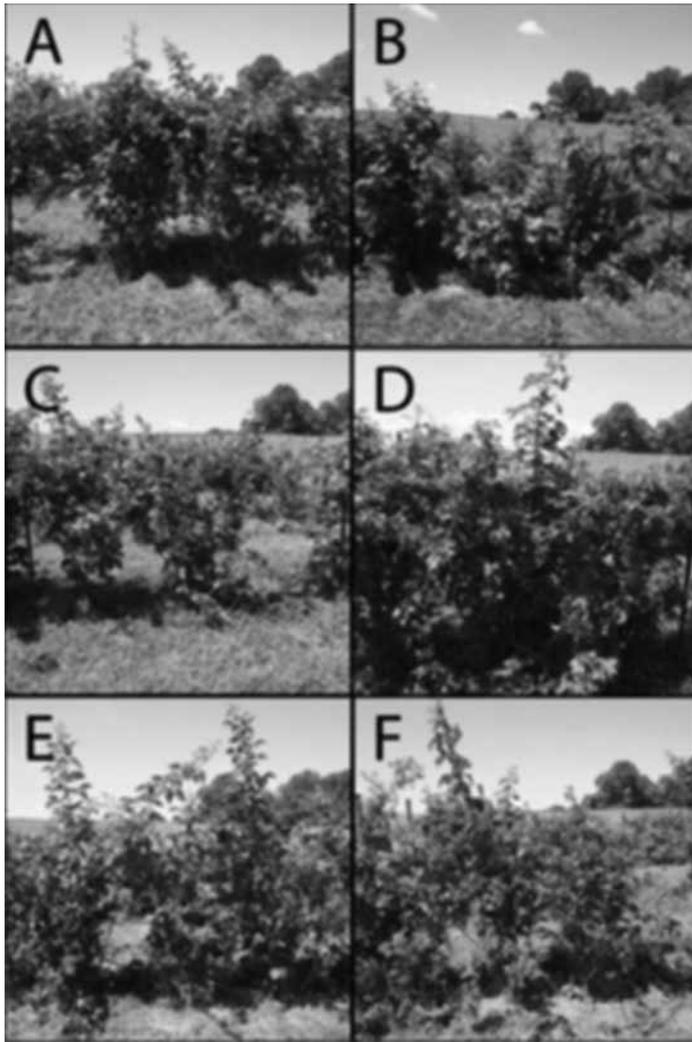


Figure 1. Representative plots of each blackberry variety tested: A) Arapaho, B) Freedom, C) Natchez, D) Osage, E) Ouachita, F) Von.

All varieties are thornless, floricanefruiting types, with the exception of Freedom, which is a thornless, primocanefruiting variety. Floricane varieties produce fruit on the second-year growth of the plant, which results in earlier fruit production and typically a short fruiting period with high yields (Fig. 2).



Figure 2. Floricane fruiting blackberry.

These varieties require overwintering of the first-year growth, and can be sensitive to extreme winter temperatures. Primocane varieties develop fruit on the first-year growth, and therefore typically do not mature until late summer or early fall, which can extend the harvest season. Primocane varieties do not rely on winter hardiness of first-year canes, and therefore may be more resilient to abnormally cold winters. For this trial, we retained the first-year growth of Freedom plants to measure both floricanefruiting and primocanefruiting production in a single season. However, future reports will focus on primocane production in this variety.

The variety trial was initially established in the spring of 2018, with four replicates of each variety planted in a randomized complete block design. Each replicate contained three plants of that specific cultivar, each spaced 3 ft apart. For the initial two years, data were collected on plant vigor and survival, with 2020 being the first year that yield data were collected. Fertilizers and protective fungicides were applied according to production guide recommendations. Weeds were controlled with herbicide application in early summer and mowing between trellised rows. A single application of lambda-cyhalothrin (Warrior II) was made to suppress insect pests, but regular insecticide applications were not made through the season. Fruit loss to insect damage was substantial, and yield values are expected to be higher with better insect scouting and spraying. Therefore this year's yield data mainly highlight differences in yield between varieties, and do not necessarily represent the actual yield potential for any individual variety. The primary insect pests observed this year were spotted wing drosophila (*Drosophila suzukii*), potato leafhopper (*Empoasca fabae*) and brown marmorated stink bug (*Halyomorpha halys*).

Ripe berries were picked weekly between July 13 and August 10 and weighed to determine yield per replicate. Because replicates had uneven plant survival, we then divided the yield values by the number of surviving plants to present yield on a per-plant basis as well as a per-plot basis (Table 1). A subsample of harvested berries were counted and weighed separately to determine average berry size. Yield totals for the entire season are summarized in Table 1, with Arapaho, Von, and Osage producing the highest yield on a per-plant basis during the harvest period.

Continued on next page

BERRY PRODUCTION

CMREC Blackberry Cultivar Trial: Initial Yield Data

continued from page 23

Table 1. Mean plant survival and yield on a per-plant basis for the six blackberry varieties tested. Note that Freedom is primarily a primocane-fruiting variety, so the main harvest will be later in the season.

Variety	Survival (%)	Yield (lbs/plant)	Yield (lbs/plot)
Arapaho	58.3	2.88	6.39
Freedom	75.0	0.08	0.22
Natchez	66.7	0.29	0.53
Osage	100	1.88	5.65
Ouachita	91.7	1.18	3.38
Von	100	2.13	6.40

Figure 3 shows differences in timing of fruit production, with Osage peaking earliest in the season (Jul 20), followed by Arapaho and Von the following week (Jul 27). Ouachita had a less pronounced peak, and had similar yields through two weeks of harvest (Jul 20–Jul 27).

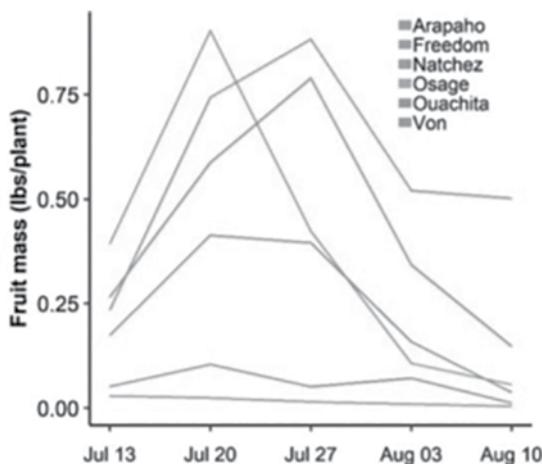


Figure 3. Mean yield per plant through the five weeks of harvest during summer 2020.

Figure 4 shows the mean berry size by variety. Arapaho produced the highest yield and the largest berries, while Von and Osage, which produced the second and third highest yields, had the smallest berries on average.

These data represent the first year of observations on yield for these varieties in Maryland, and multiple years of data will be required to draw any generalizations about the performance of these cultivars under growing conditions in this state. However, early observations indicate that varieties Osage and Von are good candidates for commercial production in Maryland. Arapaho had the highest per-plant production, but had the lowest survival through establishment. One other interesting note was the overall poor performance of Natchez, with the second lowest survival (66.7%) and the lowest per-plant yield among florican varieties. Future work will repeat measurements of yield and berry size, and will include measures of berry quality and flavor parameters for each variety. The overall goal is to provide objective assessment of the quality of these different blackberry varieties for the Maryland farmer.

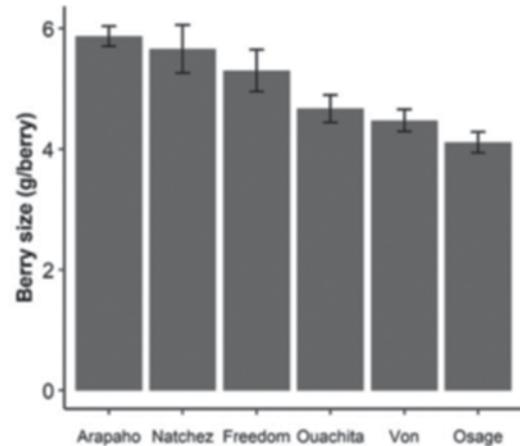


Figure 4. Average berry size for each blackberry variety tested. Bars represent standard error of the mean.

Research conducted by the Southern Maryland Fruit Extension Team, CMREC, Upper Marlboro Farm University of Maryland: Alan Leslie, Extension Educator, Charles County; Ben Beale, Extension Educator, St. Mary's County; Dave Myers, Extension Educator, Anne Arundel County; Joe Fiola, Extension Specialist, WMREC-Keedysville; and Mengjun Hu, Assistant Professor, College Park – PSLA. From **Vegetable and Fruit News**, Univ. of Maryland Extension, Vol. 11, Issue 5, August 13, 2020.

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