PENNSYLVANIA
VEGETABLE GROWERS

NEWS

October 2022 / Volume 45 Number 10

for the commercial vegetable, potato and berry grower

2023 Mid-Atlantic Fruit and Vegetable Convention Opens Jan. 31 at the Hershey Lodge

The 2023 Mid-Atlantic Fruit and Vegetable Convention will be held at the Hershey Lodge from January 31 to February 2. Multiple concurrent educational sessions will be featured all three days along with a large industry trade show. Michael Kilpatrick with Growing Farmers will be this year's keynote speaker. An Adams County bus tour and several pre-convention workshops will be offered on January 30, 2023.

Normally over 2,200 fruit, vegetable, and berry growers and other industry personnel from throughout the mid-Atlantic region and beyond gather each year for what has become one of the premier grower meetings on the East Coast. The 2023 Convention will be the 46th annual gathering of growers at the Hershey Lodge in Hershey, Pennsylvania.

Michael Kilpatrick is a farmer, presenter, host, inventor, and online entrepreneur who lives to help entrepreneurs apply business principles and practical, proven solutions to grow their businesses and simplify their lives. He is the owner of Growing Farmers, an online farmer education platform; host of the top-rated Thriving Farmer Podcast; and host of the Thriving Farmer Summit series, which has been viewed by over a quarter million farmers. He has managed large farms and businesses, consulted for industry experts worldwide, and spoken at dozens of conferences. Michael believes anyone can build a profitable farm by following the proprietary RIPEN system that he teaches in the Small Farm University, his company's educational platform and community for thriving farmers. Michael lives in an 1890s brick house on his 8-acre urban Farm on Central in Southwest Ohio with his wife and 3 kids. His keynote topic will be "Thriving in Uncertain Times".

Plans are being made to offer exceptional educational sessions on a full range of topics in tree fruit, vegetable, small fruit, and potato production plus retail and wholesale marketing. Greenhouse ornamental and cut flower sessions plus sessions on urban agriculture will be included as well. Also offered will be special sessions presented in Spanish for Spanish-speaking industry members. A more detailed schedule with topics and speakers will be announced in the coming weeks.

The day before the main Convention opens, growers can choose between a bus tour of several horticultural businesses in the Adams County area or several different workshops. The workshops include Greenhouse Vegetables, Fruit Tree Pruning; Soil Fertility and Health, Managing a Profitable Farm Market Bakery, Farm Transition, FSMA Grower Training, Spotted Lanternfly Permit Training, and Pennsylvania Pesticide Applicator License Training.

On the opening day of the Convention, besides a keynote presentation, there will be production sessions on High Tunnels, Tree Fruit, General Vegetables, Soil Health/Cover Crops, Urban Agriculture, Snap Beans, Garlic, Phytophthora Management, and Biocontrols plus marketing sessions on Farm Market Staff Training, Achieving Success at Farmers' Markets, and Wholesale Marketing.

Sessions on the second day include Tomatoes, Tree Fruit, Stone Fruit, Basic Vegetable Production, Greenhouse Ornamentals, Small Fruit, and Organic Vegetable Production plus Marketing 101 and Diversification in Agritourism marketing sessions and two Labor/Farm Management sessions, one of which will focus on using H-2A workers. Also offered will be the session "Técnicas de Producción de Frutas y Hortalizas" especially for Spanish speaking workers in the fruit and vegetable industries. It will feature various relevant production presentations in Spanish. An evening discussion session will focus on Commercializing Your Ideas.

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NEWS

Applications for the Next PVGA Executive Director Still Being Accepted

While the Search Committee has interviewed several candidates, the Executive Committee has voted to re-advertise the PVGA Executive Director position - re-titling the job description as "Executive Director Designate" to emphasize the plan that the successful candidate would serve as Deputy Executive Director during a transition period of six to twelve months. The Executive Committee also felt that the Association should be specifically looking for someone who would be willing to work as an independent contractor and be willing to hire any need clerical assistance. While the position is an "association management" position, someone with an agricultural background, and particularly someone familiar fruit and vegetable production, would be a great asset to the Association. PVGA members who have a potential interest in the position OR who know someone who would have an interest are urged to review the revised job posting at www.pvga.org/executive-director.

Needed: Nominations for PVGA Directors

The terms of six members of the PVGA Board of Directors expire at the Annual Meeting scheduled for Wednesday, February 1, 2023. The Directors whose terms expire are:

Rita Resick – Somerset – first elected 2017
Christopher Harner – State College – first elected 2014
Christopher Powell – Strasburg – first elected 2017
John Shenk – Lititz – first elected 2011
Jeffrey Stoltzfus – Atglen – first elected 2011
Joel Weaver – Windber – first elected 2020

All the directors are eligible for re-election. The members will elect five members to the Board and the Board will name a sixth Director. The Board was given the opportunity to appoint one of the Board members each year to provide diversity and potentially certain expertise in the Board makeup that the election process does not always provide.

The election will be conducted by a mail-in ballot that will be mailed to all members with the dues renewal notices in early December. The Leadership and Recognition Committee will be seeking additional nominees to be included on the ballot. Members who want to nominate someone for Director, or who would like to be considered, should contact the PVGA office at 717-694-3596 or pvga@pvga.org or Brian Campbell, who as Past President serves as chair of the Committee, at brian@briancampbellfarms.com.

PVGA Young Grower Award Nominations Open

The "PVGA Young Grower" award was an award established six years ago. Brandon Christner was the first recipient at the 2017 Mid-Atlantic Convention and Peter Salerno III was the recipient at the 2018 Convention. Unfortunately, there were no nominees for 2019 but in 2020 two young growers were recognized: Wesley Nell and Nick Lubecki. Wyatt Schriver won the award for 2021 and Jennifer Glenister received the 2022 award.

The winner is chosen each year by the PVGA Leadership and Recognition Committee. PVGA members are asked to nominate a young grower (someone they know or themselves) who meets the following criteria for the Award:

- is a PVGA Member who is 35 years old or younger;
- is successfully growing vegetables, potatoes or berries; and
- has contributed to advancing or promoting the Pennsylvania vegetable, potato or berry industry.

The prize for the winner will be free registration and lodging for the Mid-Atlantic Fruit and Vegetable Convention. To nominate someone or yourself, send a brief but comprehensive description of the farm operation and the nominee's qualifications to PVGA at pvga@pvga.org or 815 Middle Road, Richfield, PA 17086, by November 30, 2022.

*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.

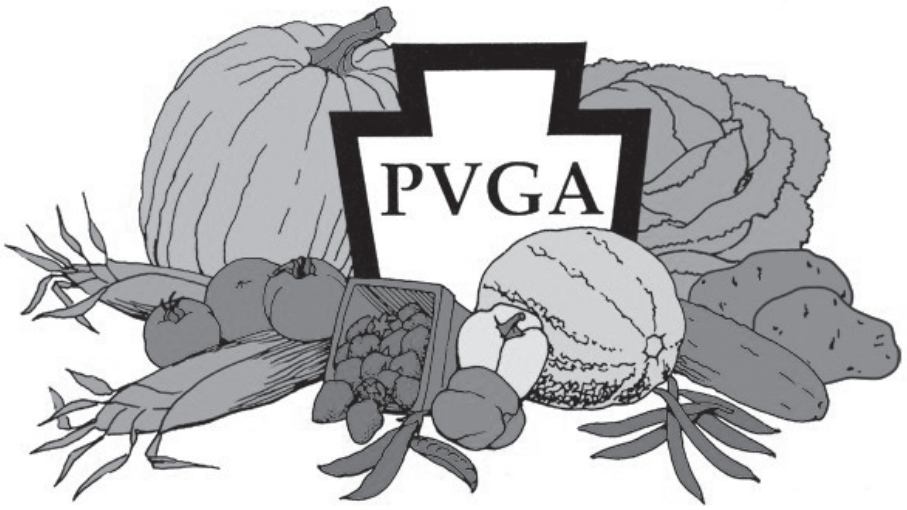
NEWS

2022 PVGA Membership Increases to 862

PVGA membership increased 9% to 862 in 2022, up from 793 in 2021 but still down from 983 in 2020. We assume the decline in membership in 2021 was a direct result of the coronavirus pandemic and subsequent cancellation of the in-person 2021 Mid-Atlantic Fruit and Vegetable Convention. No membership discount was offered for the virtual 2021 Mid-Atlantic Convention – and fewer growers attended the 2021 virtual event – so some growers decided not to join in 2021.

The staff and Board of Directors want to express our sincere appreciation to the members who have chosen to continue to support PVGA in 2021 and 2022 with their memberships. We especially appreciate those who have chosen to contribute additional funds to help support vegetable and small fruit research through the Association. The cancellation of both the Farm Show and in-person Convention in 2021 had a major financial impact on the Association. While both events returned in 2022, attendance and therefore income was down from pre-pandemic levels. Still, we are looking for a larger attendance at the 2023 Farm Show and Mid-Atlantic Convention and progress toward recovering financially.

In 2017, PVGA membership reached its highest level in recent history at 1,064 members. Unfortunately, in 2018, membership dropped to 1,017, and dropped further in 2019 to 956 but rebounded to 983 in 2020 before dropping in 2021. The Census of Agriculture indicates there are over 3,300 farms in Pennsylvania that grow an acre or more of vegetables. Thus, PVGA has a large potential membership as yet untapped.



The Directors have set a goal of retaining 90% of the previous year's members and recruiting 15% new members each year. For 2022 the Association retained 88% of last year's members and 19% new members were recruited – that is they were not members in 2021. Normally, many of the new members are people attending the Convention who join to take advantage of the registration discount.

PVGA is completing its 96th year as an association. The Directors are fully aware that membership goals can only be met and maintained by providing an adequate return to members for their dues investment. The Association strove to continue to provide a good return on members' dues investment in 2022 with the following ongoing activities and member services:

- PVGA helped sponsor the in-person 2022 Mid-Atlantic Fruit and Vegetable Convention – the premier grower meeting of its kind on the east coast - and is moving forward with plans for an in-person 2023 Mid-Atlantic Convention.
- PVGA published the *Pennsylvania Vegetable Growers News*, its own 24-plus-page monthly newsletter with pertinent information for the Pennsylvania vegetable, potato, berry or greenhouse vegetable grower.
- PVGA produced a weekly *PVGA Update* email for members with email capability to keep members regularly updated about the Association as well as pertinent articles of interest on the internet.
- PVGA helped sponsor two local grower meetings in 2022 and will hopefully be able to sponsor more in 2023.
- PVGA provided $48,747 for vegetable and small fruit research in 2022 - bringing the Association's total for research contributions to $1,357,525 over the last 34 years.
- PVGA represents the interests of the vegetable, potato and small fruit industries on legislative and regulatory issues through letters and meetings with public officials.
- PVGA cooperated with the the Vegetable Marketing and Research Program to promote the Pennsylvania vegetable industry at the 2022 Ag Progress Days at Penn State.
- PVGA holds the trademark for the Pennsylvania Simply Sweet Onion to help develop a profitable, branded crop for Pennsylvania growers.
- PVGA is especially proud of the volunteer effort put forth each year by PVGA members to run the Association's Food Booths at the Farm Show. With the return of the Farm Show in 2022, PVGA volunteers were able to earn a profit of over $35,000. As noted above, these efforts have enabled PVGA to donate over $1,357,500 dollars towards research over the last 34 years. The Board of Directors has essentially devoted the profits from the Food Booth and the Mid-Atlantic Convention to fund the Association's research, promotion and donation budgets rather than any of the Association's general operations.

In 2022 PVGA members again received free subscriptions to the *American Vegetable Grower* magazine and the *Vegetable Growers News*.

While the 2023 Farm Show booth and the in-person 2023 Mid-Atlantic Convention will hopefully be more profitable than the 2022 events and allow the Association to begin rebuild its financial base, the bottom line is that your Association needs your membership for 2023 to continue to serve you and the grower community in the coming years. The Board of Directors had used surpluses in past years to build a healthy general fund reserve for the Association that, along with $10,800 in donations from members and $19,000 in donations from the Directors, enabled it to continue operations pretty much as normal in 2021 and 2022 even with the major loss of revenue – but we do need the continued support of you our members through your dues to remain a strong, viable organization in the coming years.

Dues invoices for 2023 will be mailed in early December. We hope all members will renew your memberships for 2023 and that you will urge a neighboring grower to join as well. We want to see PVGA membership rebound to its former levels and beyond. Increased membership allows the Association to better the serve the vegetable, potato and berry growers of Pennsylvania – and that is our end purpose.

NEWS

Be a Keystone Member for 2023 and Invest in PVGA's Future

In 1994, the Association established a new membership class, the Keystone membership, and an endowment-type fund, the Keystone Fund. PVGA members who wish to support the vegetable, potato and berry industries in a special way pay dues above the regular rate, with the dues above the regular rate being placed in the Keystone Fund. The value of the Keystone Fund balance on June 30 was $219,320 which is invested in money market accounts, bond mutual funds and a S&P index stock fund.

While the interest from the Keystone Fund may be used for scholarships, research or promotion purposes, beginning last year the Board of Directors voted to designate all the interest for scholarships.

Suggested Keystone dues are based on a member's gross income from vegetables, potatoes or berries instead of being a flat rate. However, any member who pays dues of $100 or more is considered a Keystone member regardless of their gross income. The amount of Keystone dues paid by individual members is not published so as not to disclose their gross income. Keystone dues above the $70 regular dues are added to the principal of the Keystone Fund, thus increasing the potential amount of interest available each year.

Keystone membership is open to all vegetable, potato and berry farm operations, processing firms and allied industry firms. Associate Keystone Members are additional family members or employees of Keystone Members. The following farms, firms and persons are Keystone or Associate Keystone Members for 2022:

Robert Amsterdam - *Mechanicsburg*
Anchor Farms (Joe Anchor) - *New Columbia*
Triple B Farms (R.J. and William Beinlich) – *Monongahela*
Benshoff Farms of New Germany (James Benshoff) – *Summerhill*
Catoctin Mountain Orchard (Robert Black) – *Thurmont, MD*
The Bonderosa (Richard and Sandra Bonfiglio) - *Dalton*
Blue Bell Fruit and Vegetable Market (Kenneth Dearolf, Jr.) – *New Providence*
Dudas Farm (Roberta Dudas)- Fairview
Dymond's Farm Market (Christopher and Timothy Dymond) - *Dallas*
Fred W. Eckel Sons (Keith Eckel, David Green, David Green, Jr., Donald Green) – *Clarks Summit*
Frank's Farm Market/Analek Farm (Kyle Ferrick) – *McKean*
Shelby Fleischer – *Port Matilda*
Rose Bank Winery (David Fleming) - *Newtown*
Douds Floyd Farm (Philip Doud Floyd) *Aliquippa*
Pete's Produce Farm (Peter Flynn) – *West Chester*
Forry's Roadside Market (Greg and Tina Forry) – *Palmyra*
Grapevine Hill Farm (Andrew Gadomski, Owen Kotchessa. Lisa Robertson) - *Newfoundland*
New Morning Farm (Jennifer Glenister) – *Hustontown*
Halsey Farm & Nursery (Adam Halsey) – *Water Mill NY*
SIW Vegetables (Harry Haskell) – *Chadds Ford*
B & R Farms (Barron Hetherington) – *Ringtown*
Outstanding Seed Co. (Jamie Hoffman) – *Beaver Falls*
Hopkin's Farm (Andrew and William Hopkins) - *Falls*
Indian Oven Farms (Mark Hopkins) - *Falls*
Harvest Valley Farms (Arthur, David and Larry King, Ryan Maitland and Margaret Wells) – *Valencia*
Kings Potatoes (Gerald King) – *Cochranville*
Triple Tree Flowers (Marcus King) - *Coatsville*
Kreider's Market (J. Lloyd Krieder) – *Kirkwood*
Robert Leiby - *Kutztown*
Udder Merry Mac Farm (Raymond Macwhinnie) – *Ulster*
Arctic Refrigeration (Michael Mager) – *Bativia, NY*
Maplewood Farm Market – (Reuben R Martin) – *Shippensburg*
Mason Farms – (John Mason) – *Lake City*
Harvest View Farm and Market (Kenneth Metrick, Amy Metrick and Laura Palmer) - *Butler*
Miller Plant Farm (David Miller) – *York*
Keith Moyer – *Middleburg*
Daniel's Farm Store – (Amos Nolt) – *Leola*
Michael Orzolek – *State College*
Institute for Plant Based Nutrition (James Oswald) - *Bala Cynwyd*
Palmers Farm – (Neil Palmer) - *Greensburg*
Peters Produce (Dennis Peters) - *Red Lion*
Nells Venture – (Herbert Pollock) - *Indiana*
Reids Orchard (Katherine Reid) – *Orrtanna*
Reiffs Farm Market LLC (Nathan Reiff) – *Ephrata*
Laurel Vista Farm (Rita Resick) – *Somerset*
Rimol Greenhouse Systems (Robert Rimol) – *Hooksett, NH*
Robertson Farms (Gregg Robertson) – *Hershey*
Sample's Vegetable Farm (Steve Sample) – *Duncannon*
Jim's Farm Produce (James and Jason Schirg) – *West Abington Twp.*
Green Barn Berry Farm (Robyn and Jarod Schreiber) – *Muncy*
J & L Shafer Farms (Jack Shafer) – *Tamaqua*
Smith Farms (H. Larue Smith) - *Nescopeck*
Stauffer Huling Farm – *Sandford, FL*
Hilltop Farm Market (Nathan Stock) – *East Berlin*
Happy Day Farm (Tim Stockel) – *Manalapan, NJ*
Allan Stombaugh - *Duncansville*
Caleb Strausser – *New Holland*
Patches Crop Protection (Matthew Summy) - *Myerstown*
William Troxell – *Richfield*

National News Briefs

Farm Bureau Grateful to Avoid Railroad Strike

American Farm Bureau Federation expressed gratitude that a rail strike that threatened to wreak havoc on the American supply chain was averted in September. Railroads and rail labor had until September 16 to reach an agreement that would prevent a strike after the Presidential Emergency Board (PEB) issued a proposed settlement on August 17.

On Sept. 15, the White House announced that railroads and rail unions reached tentative agreements. While subject to ratification, this averted a strike and a network shutdown ahead of the deadline.

A railroad strike would have created major issues for agriculture, as $6.3 billion of total rail revenue comes from farm products, with an additional $11 billion coming from transportation of food, textile mill, wood and paper and pulp products, according to the Surface Transportation Board.

Farmers rely on railways for the delivery of raw materials and shipping of final goods. If they don't have the raw materials necessary or rail cars to ship their products, (i.e. fertilizer to treat fields, grains to feed livestock, chlorine to sanitize food processing equipment, and or lumber for building materials), then operations begin to unravel.

Farmers heavily rely on railways for grain transportation. In the second quarter of 2022, the total number of grain rail cars loaded and invoiced went from 381,000 cars in quarter one to 373,000 cars in quarter two. In comparison at the same time last year, there were 391,000 grain cars. Since 2016, rail rates on corn, soybeans and wheat, including fuel surcharges, have increased 13 percent, 11 percent and seven percent, respectively. Rates to transport ethanol via rail have also increased 18 percent.

Farm Bureau supports H.R. 8649, known as the Freight Rail Shipping Fair Market Act, which was introduced on Aug. 2 by Representative Donald Payne from New Jersey. The bill would potentially help solve the current rail service delays by reautho-

rizing the Surface Transportation Board and creating reforms that would enable stricter standards for the railroads.

A dependable supply chain was a problem before COVID-19 that only worsened when the pandemic hit. Farmers, ranchers and foresters' operations never stopped. Efficient and cost-effective transportation of their raw materials was needed, and their final products are crucial for society.

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

State News Briefs

CREP Program Opportunity Available for PA Farmers

Most Pennsylvania farmers have at least a few acres that are hard to farm: Too steep, too rocky, too shady, etc. And if that land is prone to flood, you risk losing all your work — and your profit — on those lands in any given year.

If you are working twice as hard to earn half as much on some of your land, then maybe it's time to investigate the Conservation Reserve Enhancement Program (CREP). In a nutshell, the Conservation Reserve Enhancement Program (CREP) pays farmers to retire and restore land that erodes easily or floods often. CREP is 100% voluntary for farmers. CREP is administered by the U.S. Department of Agriculture Farm Services Agency, and many Conservation Districts in Pennsylvania can help farmers get enrolled.

CREP helps landowners with projects like these in two ways. First, the CREP program reimburses much or all of landowners' costs to restore the land. Then, CREP pays a guaranteed annual rent for up to 15 years. This can allow a farmer to focus their efforts on their own best land. Many farmers use their rental payments to help lease more productive land to make up for the acres taken out of production.

If projects like these pique your interest, check out www.CREPPA.org. This website provides a user-friendly introduction to the program, with case studies, payment scenarios, and other information that can help you decide if CREP is a good fit for your farm. And you can schedule a consultation with a nearby CREP planner in just a few clicks.

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

Friends of Ag Foundation Unveils Giant Event Lab

Celebrating National Farmer's Day on October 12, The GIANT Company and the PA Friends of Agriculture Foundation unveiled the PA Farms to Families Immersion Lab at the Pennsylvania Farm Show Complex & Expo Center in Harrisburg. The mobile immersion lab connects families to four Pennsylvania farms and the farm to table process, facilitating hands-on learning experiences and authentic food connections.

The immersion lab showcases BrightFarms, a hydroponic greenhouse; Buona Foods, a mushroom farm; Lazy Hog Farm, a swine operation; and Painterland Sisters, a dairy farm and yogurt processor, featuring their on-farm production and environmental practices that bring foods from field to plate. Guests can experience driving a tractor through a virtual reality corn field, quiz their knowledge of common fruits and vegetables, practice building a balanced meal with Pennsylvania-grown foods, and explore growing career opportunities in food and agriculture.

The GIANT Company sponsored the PA Farms to Families Immersion Lab in partnership with the PA Friends of Agriculture Foundation, a charitable organization supported by the Pennsylvania Farm Bureau. The immersion lab will hit the road this fall, visiting schools and community events across Pennsylvania.

"The immersion lab powered by GIANT helps the PA Friends of Agriculture Foundation expand the reach of its mission – Planting Seeds. Cultivating Knowledge. Harvesting an Understanding of Agriculture.,"

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NEWS

State News Briefs *continued from page 5*

said Rick Ebert, president, Pennsylvania Farm Bureau. "Consumers enjoy three meals a day, but many do not understand the process of bringing food from farm to table. The Mobile Immersion Lab serves as a connector, helping consumers better understand the process of food and agriculture and the role they play in our daily lives."

National Farmer's Day is Oct. 12. It recognizes the integral role farmers play in bringing food from farm to table. The GIANT Company is proud to partner with 218 local vendors and 120 farms to provide fresh, quality, wholesome products to the families GIANT serves.

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

Finalists Selected for 2022 Pennsylvania Leopold Conservation Award

Three finalists have been selected for the 2022 Pennsylvania Leopold Conservation Award®.

Given in honor of renowned conservationist Aldo Leopold, the prestigious award recognizes farmers, ranchers and forestland owners who inspire others with their dedication to land, water and wildlife habitat resources in their care.

In Pennsylvania, the $10,000 award is presented annually by Sand County Foundation, American Farmland Trust, The Heinz Endowments, Horizon Farm Credit, and Pennsylvania Farm Bureau.

The finalists are:

- Dotterer Farms of Mill Hall in Clinton County: Ralph Dotterer Jr. utilizes cover crops and no-till practices to prevent soil erosion on his family's farm. The Dotterers have long used rotational cropping and contoured fields to improve the soil's ability to infiltrate water. Ralph has installed grass waterways and buffers to protect water quality, and has overseen the design and construction of stream bank renovation projects on a creek that runs through the farm. Ralph sells his crops to area farmers for feed. His son Daniel is transitioning the farm to sheep production.
- Troy Firth of Spartansburg in Crawford County: As owner and manager of Firth Maple Products, Troy shows that forestry can be economically profitable and ecologically nurturing. He's also the state's second largest producer of maple syrup, and was the founder of the Foundation for Sustainable Forests. His unconventional approach to selecting timber for harvest fosters healthy trees and abundant bird habitat. To better understand his impact, the National Aviary is conducting a multi-year study of songbird diversity in forests he manages.
- Flinchbaugh's Orchard & Farm of Hellam in York County: The Flinchbaughs work with natural systems to increase productivity and conserve natural resources. They utilize no-till practices, cover crops, grassed buffers, and integrated pest management to promote soil health, protect local waters, benefit plant life, and provide wildlife habitat. This multi-generational farm produces grain crops, hay, and specialty crops like pumpkins, fruit, and flowers. The Flinchbaughs operate an apple processing business, farm market, and agri-tourism venue.

The award will be presented during this winter's Pennsylvania Farm Bureau Annual Meeting and the Pennsylvania Farm Show.

"Ralph Dotterer Jr., Troy Firth and the Flinchbaugh family exemplify the conservation ethic of Pennsylvania agriculture," Pennsylvania Farm Bureau President Rick Ebert said. "Farmers consider our natural resources as vital partners in producing quality food, fiber, and fuel. We want our farms to continue producing so that we can pass them down to future generations. These three deserving finalists are being recognized for their on-farm innovation in improving soil health, protecting water quality, preserving natural habitats and generating clean energy."

"Pennsylvania farmers have made great strides toward protecting our water, soil and land resources for future generations," Pennsylvania Agriculture Secretary Russell Redding said. "These finalists for the Leopold Conservation Award exemplify the culture of stewardship that characterizes Pennsylvania farmers. They are models of how we should all strive toward a sustainable future."

"These award finalists are examples of how Aldo Leopold's land ethic is alive and well today. Their dedication to conservation shows how individuals can improve the health of the land while producing food and fiber," said Kevin McAleese, Sand County Foundation President and CEO.

Applications were submitted by landowners, or on behalf of a landowner. Applications were reviewed by an independent panel of agricultural and conservation leaders.

Last year's Pennsylvania Leopold Conservation Award was presented to Brubaker Farms of Mount Joy in Lancaster County.

The Leopold Conservation Award in Pennsylvania is made possible thanks to the generous support of American Farmland Trust, The Heinz Endowments, Horizon Farm Credit, Pennsylvania Farm Bureau, Sand County Foundation, USDA Natural Resources Conservation Service, EDPR NA Distributed Generation, Pennsylvania Department of Agriculture, and Pennsylvania Association of Conservation Districts.

In his influential 1949 book, A Sand County Almanac, Leopold called for an ethical relationship between people and the land they own and manage, which he called "an evolutionary possibility and an ecological necessity."

Sand County Foundation presents the Leopold Conservation Award to private landowners in 24 states for extraordinary achievement in voluntary conservation.

MARKETING

PDA to Host Farm to Institution Wholesale Training

New sales channels can be scary; especially ones called Institutions. No farmer likes the idea of getting a lower price for products. But what if you had a way to measure your potential profit at competitive wholesale pricing and appropriate production scale? And what if selling higher quantities to fewer buyers suddenly looked easier than Direct-to-Consumer sales? Through a free intensive 2-day workshop, including 3 roundtable peer discussions, we will answer all of these questions and more. The 2-day workshop will walk you through evaluating how breaking into this sales channel may (or may not be) right for you. You will have answers and a clear path for the next steps. This is not a generic, boring workshop. This is specifically about you and your farm. We will guide you through applying your own information in a series of training modules to get the clearest answer possible. We will even introduce you to potential buyers.

WHAT YOU CAN EXPECT

The Workshop (Free for PA farmers*)

- Virtual pre-workshop mentoring to get you prepared (webinars and consultant mentoring)
- 2 Days
- All meals provided including off-site networking dinner
- Wholesale buyer meet & greet (meet your next customer!)
  Learn through hands- on modules:
  - The Institutional Buying Process and Barriers to Entry
  - Start Selling: Pipeline Management Strategy with Q&A Panel
    Farm Capacity & Project Planning
  - Basics of Accounting for Farm Businesses
  - Costing: Interactive Costing Toolkit
  - Budgeting for New Sales Channels
- Be secure in knowing you have made a thorough evidence-based decision
- Hotel Room Provided
- All meals provided
- Wholesales buyer meet & greet
- Learn through hands-on modules
- Presentations, tools, and templates provided

MARKETING

Follow Through:

Peer Focused Roundtable Intensives

Ever been to a workshop, got excited and then went home and did nothing? We've been there. To help keep you focused on what can be a long process we'll use the tried and true method of peer pressure (some call it accountability). Three roundtables will be held once a quarter after the workshop. Topics will be tailored to your needs but will always include:

- Comparing actual, real-time farm financials of the attendees in an open and honest peer environment
- A panel of experienced folks to discuss an area of need, such as managing labor costs on the farm
- A review and discussion of a case study that applies to your operations

If you would like to definitively answer if your farm business can break into the wholesale market, this is your opportunity to do so. If the answer is yes, we'll keep working with you through the follow-up and follow through to help you get to the finish line. This free series is made possible by the PA Preferred® program, the Pennsylvania Department of Agriculture, and the USDA.

REGISTER NOW

https://forms.office.com/g/U0c1gpnLed

Applications will be accepted through **November 30th, 2022** and may be completed online. If farmers have questions about the workshop or need to apply via phone, they may contact (contact info).

*Free to PA farmers

*Veterans are given priority in registration

For questions contact: Patrick Andrews 1-717-772-1429 patriandrew@pa.gov

This project has been funded using U.S. Department of Agriculture grant funds and does not imply endorsement by the U.S. Government.

GENERAL

Young Farmers Surveyed about Their Future in Farming

Robert Hadad

A recent article in the American Vegetable Grower concerns a large survey of young farmers and highlights the big challenges in front of people trying to move ahead in or begin farming. The survey was conducted by the National Young Farmers Coalition which collected over 10,000 responses nationwide between 2020-2021, compiled and released in early summer of 2022.

The survey looked to the participants who identified as 40 years old or younger (4,344 out of 10,000). Presently farming: 76.4%. Are looking to farm: 14.4%. Gave up farming: 9.2%.

Some Survey Findings

- Nearly 60% of all young famers named finding affordable land to buy as very or extremely challenging with 65% of Black, Indigenous, and People of Color found access to affordable land to buy as very or extremely challenging. 54% of all respondents and 75% of Black farmers said they currently need greater access to buy or lease land.
- 86% of young farmers identified their production practices as "regenerative". Regenerative agriculture is an approach to farming that relies on healthy soils through building up structure, biomass, and ecosystems along with taking steps to support climate-resilient practices and addresses inequity in the agricultural field.
- Finding capital to help with running or expanding their farming operations: greater than 50% Black, Indigenous, and People of Color reported access to capital very or extremely challenging as compared to the 37% of white farmers.
- 49% of the respondents have not used any USDA programming while 71% were unfamiliar with any programs that might help them.
- Health care affordability where available being very or extremely challenging was noted by 40% of the farmers.
- 35% of young farmers stated that cost of production exceeded their sales income.

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VEGETABLE PRODUCTION

Verticillium Wilt of Cucumbers

Judson Reid

With the amount of Downy Mildew, Powdery Mildew, and Bacterial Wilt affecting cucumbers at the moment, it would be easy to overlook less common diseases. That is until that disease is Verticillium Wilt!

Wilt begins at the growing point and progresses to the older leaves. Photo credit - Judson Reid, CCE Cornell Vegetable Program.

The wilting eventually creates a characteristic yellow/brown necrosis. Photo credit - Judson Reid, CCE Cornell Vegetable Program.

Why is Verticillium Wilt of such concern?

This soilborne pathogen survives for years in the soil and affects a very wide host range. For cucurbits there are a number of wilts, including those caused by Fusarium species. However, in cucumbers, Verticillium is our primary soilborne wilt pathogen. Once infection occurs, the fungus grows inside the xylem of the plant, interfering with water uptake. When the crop is under high water demand caused by fruit set or temperature, plants begin to wilt at the growing point. This wilting will progress down the plant to the older leaves, leaving a characteristic yellow/brown necrosis. Since this is a soilborne disease associated with high moisture, infections tend to run in a line of plants, often moving with irrigation lines. This helps distinguish Verticillium Wilt from Bacterial Wilt; the latter vectored by Cucumber Beetles with a sporadic distribution.

Treatment

Unlike many fungal diseases, Verticillium cannot be treated chemically. Crop rotation is our greatest management tool. Corn, or a non-vegetable crop such as a sod, are excellent choices. When Verticillium occurs in high tunnels, we are particularly challenged due to the year-to-year vegetable cropping with susceptible host species. This leads growers to grafting or production in containers instead of the soil.

We would also like to highlight the opportunity to grow a cover crop to break the host/disease cycle. Although a single season of cover cropping isn't long enough to outlive the Verticillium spores, we hypothesize the incorporation of non-host species can decrease the disease prevalence.

Now is a great time to plant cover crops in tunnels!

Our current research is examining the potential of grains and legumes in fruiting vegetable rotations for high tunnels. Our research species are triticale and Austrian Winter Peas. The combination of a grain with the legume is often considered beneficial for the germination and establishment of the legume. Triticale itself may produce more biomass than other winter grains such as wheat or barley and is less likely to produce volunteer plants. We are interested in legumes such as peas, to fix additional nitrogen. Given current fertilizer prices, these cover crops are of value, not just to combat disease but to reduce our input costs too!

Cover crops including grains are a sustainable management strategy. Photo credit - Judson Reid, CCE Cornell Vegetable Program.

Mr. Reid is with Cornell Cooperative Extension Vegetable Program.
*From the **VegEdge** newsletter, Cornell Cooperative Extension Vegetable Program; Vol. 18, Issue 23, October 3, 2022..*

VEGETABLE PRODUCTION

Spinach Leaf Disorders

Julie Kikkert

The lush green leaves of a spinach crop can easily be ruined by any number of biotic or abiotic factors. Below I list many of the common ailments grouped by the general symptoms. Please see the websites listed for each disorder and/or the 2022 Cornell Vegetable Guidelines for more information and management strategies.

Leaf blotch on spinach leaf that was determined to contain Cladosporium, Stemphylium and Alternaria. Photo credit - J. Kikkert, CCE Cornell Vegetable Program.

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Specks, Spots and Blotches (No Fuzz)

Leaf spots are a common issue in spinach and can be caused by a variety of factors. These can be difficult to diagnose. Often a sample needs to be collected and observed using a microscope. When diagnosing a problem, make sure to: 1) note what symptoms are on the upper and/or lower leaf surfaces, 2) determine if a certain age leaf is affected, and 3) look for patterns in the field.

Abiotic leaf spots on spinach are commonly caused by pesticides or fertilizers but may also be due to water and weather. According to Richard Smith, Univ. of California, "spinach leaves are quite sensitive to chemicals and will readily respond to them by developing chlorotic or tan colored necrotic areas. The size and distribution of the lesions can often provide clues as to the cause of the issue. Having some background information about recent spray applications in the vicinity of the field helps piece together how and when the incident occurred. Spotting on the weeds also provides confirmation of the cause of the incident. Distortion of the leaves occurs when the necrosis occurs early in the development cycle of the leaf; in this situation, the expanding young leaf continues to develop around the dead lesion and results in distorted growth. Chemical issues can also cause a sub-lethal response in spinach leaves which results in chlorotic lesions." Additional information and photos can be found at https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=29890#:~:text=Abiotic%20leaf%20spots%20on%20spinach,spotting%20or%20lesions%20on%20spinach or by contacting our office for a print out.

"**Insects**, such as leafminers, frequently cause spots on spinach leaves. Female leafminers stipple spinach leaves by puncturing the leaf surface with their ovipositors and then feeding on plant sap that exudes from the holes. The stippled areas often occur in clusters and have a characteristic look due to the broken epidermal cells in the center of the stipple." (Richard Smith, Univ. California).

Diseases that cause spots on spinach in New York include Anthracnose, Cladosporium leaf spot, and Stemphylium leaf spot. These are often difficult to diagnose except by a trained eye and a microscope. In addition, more than one pathogen may be present in a leaf spot or blotch.

Anthracnose https://www2.ipm.ucanr.edu/agriculture/spinach/anthracnose/ is favored by wet conditions and cool temperatures, with fall plantings being more susceptible. Symptoms of this disease are small, round water-soaked spots on leaves. The spots develop into larger yellow or tan areas with distinct margins that coalesce to form brown lesions that become thin and dry like paper. Tiny black fruiting bodies on diseased tissue distinguish this pathogen from other leaf spot pathogens.

Cladosporium leaf spot https://www2.ipm.ucanr.edu/agriculture/spinach/cladosporium-leaf-spot/ is characterized by round,

VEGETABLE PRODUCTION

Spinach Leaf Disorders

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tan leaf spots that rarely exceed 0.25 inch in diameter. Dark green spores and mycelium later develop in the centers of these spots. The presence of dark green sporulation distinguishes Cladosporium leaf spot from other leaf spot diseases. Cladosporium is known to be seedborne.

Stemphylium leaf spot http://blogs.cornell.edu/livegpath/2019/06/13/stemphylium-leaf-spot-new-disease-of-spinach-for-northeast-region/ is considered uncommon. It was first detected in western NY in 2017 and on Long Island in June 2019. It is favored by prolonged periods of leaf wetness when temperatures are moderate (64-75 F). Symptoms are light gray to tan leaf spots ranging in size from 1/16th to ½ inch with larger spots being irregular in shape. Older spots often dry up and become papery. Stemphylium is seedborne, so it is important to purchase seed from a reputable dealer as a first step in disease management.

Yellow Spots/Blotches with Fuzz or Blisters on Underside of Leaf

Downy Mildew (DM) – the Spinach DM factsheet was recently updated and is available at https://www.vegetables.cornell.edu/pest-management/disease-factsheets/spinach-downy-mildew/#:~:text=Introduction,constraint%20in%20California%20and%20Arizona or by contacting our office. This disease has been observed on farms in the Northeast since 2014. Growers should inspect their spinach crop routinely. Upper leaf surfaces will be yellow. Flipping over the leaf will reveal the characteristic purplish-gray, fuzzy growth of the pathogen. Early morning is the best time to see the spores because they are produced overnight and then dispersed during the day. Please see the factsheet for photos and detailed measures for control which include resistant varieties, cultural practices, and fungicides.

White Rust is a concern all season, and is favored by warm (72 F), sunny days followed by cool nights with dew. Symptoms are small yellow spots on the upper leaf surface and white blister-like pustules most commonly on the lower leaf surfaces and petioles. The pustules release spores that can infect other leaves.

Yellowing, Stunting, Mosaic Symptoms

Cucumber Mosaic Virus (CMV) has caused severe crop loss in several fields each year in western, NY for the past decade. Aphids acquire and transmit CMV when they feed, even briefly, moving the virus quickly from infected to uninfected plants as the aphids migrate through the weeds and fields. Weedy areas adjacent to fields are of great concern as a source of CMV. Infested aphids usually do not colonize spinach. Infected plants show severe stunting, leaf curling, and mosaic symptoms on the leaves. Resistant varieties are the best management tool. It is not possible to control CMV by managing aphids because they transmit the virus very quickly. CMV can be seedborne.

*Mr. Reid is with Cornell Cooperative Extension Vegetable Program. From the **VegEdge** newsletter, Cornell Cooperative Extension Vegetable Program; Vol. 18, Issue 23, October 3, 2022.*

Severe symptoms of CMV in spinach. Photo: J. Kikkert, CCE Cornell Vegetable Program.

Young Farmers

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- 28% of young farmers raised vegetables; nearly 18% raised flowers; 5.3% grew fruit, 4% had livestock for eggs, meat, or fiber; nearly 4% had dairy livestock; 2.7% grew grains. Greater than 75% had up to 2 enterprises running. More than 50% had 3 or more; and more than 25% had 4 or more enterprises.
- When examining gross income: Averaging all ages of farmers who responded (after removing outliers), the average gross income was $54,998, with a median of $30,000.
- Direct to consumer sales: 60% sold products on a farm website; 58% sold at farmers markets; 53% sold through a CSA; 47% sold at a farm stand. For wholesaling: 51% sold to restaurants; 40% through grocery stores; and over 20% through food hubs or institutions.
- Labor is a challenge for growers with 48% hiring mostly seasonal workers (4 or less), 36% had year-round full-time workers, and 32% had year-round part-time.

To read the full 93-page report, go to: https://www.youngfarmers.org/wp-content/uploads/2022/08/NationalSurveyReport2022.pdf.

*Mr. Hadad is with the Cornell Cooperative Extension Vegetable Program. From the **VegEdge** newsletter, Cornell Cooperative Extension Vegetable Program, Vol. 18, Issue 23, October 3, 2022.*

VEGETABLE PRODUCTION

Postharvest Handling and Storage

Chris Callahan

Harvested vegetables are living things that carry on the process of respiration and other biological and chemical processes. How produce is handled after harvest will directly affect quality characteristics such as appearance, flavor, texture, and nutritional value. Attention to postharvest quality can increase repeat sales and support higher prices.

Control of postharvest quality essentially comes down to limiting respiration rate (lowering temperature), controlling water loss (maintaining proper relative humidity), minimizing physical damage to the product (harvesting and handling with care), and avoiding contamination (handling, washing, and storing appro¬priately).

Limiting Respiration

Respiration is a temperature dependent biochemical process that converts carbon in plant tissue (mainly sugars) to carbon dioxide (CO_2) and water (H_2O) while producing some heat. Rates of respiration vary by crop (see Gross 2016, table p. 7 and text pp. 68-75) and should be considered when sizing cooling equipment. Fortunately, we can significantly reduce respiration, and therefore maintain high product quality, by reducing product temperature (precooling) and keeping it low (holding or storage cooling). This concept is known as establishing the "cold chain"; a chain of reduced temperature that connects the field to the consumer ensuring the highest quality produce possible by minimizing respiration.

From the moment of harvest, product quality will deteriorate. Intentional precooling of produce directly after harvest helps quickly reduce the rate of respiration and initiates the cold chain. Examples of precooling include scheduling har¬vest activities at cooler times of day, shading harvested product in the field prior to transport, forced air cooling through the packed product with refrigeration, hydrocooling with cool water, and vacuum cooling via evaporation. Once cooled to storage temperature, reliable, refrigerated storage is necessary to maintain high quality.

It is important to note that not all crops can be cooled to the same temperature without resulting in cold or freeze injury and some crops are sensitive to the method of cooling. Crops have different susceptibility to chilling or freeze injury depending

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Postharvest Handling and Storage

on their physiology. Good guidance is available (see Gross 2016, pp. 62-67) and is summarized in Table 16 of the New England Vegetable Management Guide. Common precooling methods are also noted in Table 16. Additionally, a computer-based crop storage planner is available for determining appropriate grouping of your crops and estimating over¬all respiration load (see Callahan 2016). Chilling injury is also an important consideration when considering particularly sensitive fall-harvested crops and the possibility of lower nighttime temperatures, e.g., winter squash.

Controlling Water Loss

The control of water loss requires careful attention to the relative humidity (RH) of the air surrounding stored product in addition to temperature. RH is a measure of the amount of water vapor in air compared to the maximum amount that can be saturated in that air at a given temperature. Most, but not all, crops are ideally stored at higher RH to prevent water evaporation into the air leading to water loss. The loss of water reduces the weight of the crop and can lead to lower qual¬ity and poor appearance.

Some crops, such as onions, garlic, and winter squash, are purposefully "cured" or dried resulting in drier outer skin and curing harvest wounds to allow long term storage. Because this results in a paper-like layer, these crops are generally stored at lower RH to prevent development of postharvest disease such as molds and fungi on this outer skin. Other than these examples, most crops are best stored at 90%-95% RH with specific guidance provided in Table 16, in the crop stor¬age planner noted above, and in the literature (see Gross 2016).

Bins of squash. Photo: UMass Veg Program

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[Ed. note: Some storage crops are also particularly sensitive to injury from exposure to ethylene, a plant hormone released by fruits and vegetables. Avoid storing ethylene-sensitive crops with crops that produce significant amounts of ethylene. See the UMass Veg¬etable Program fact sheet, Optimal Storage Conditions and Ethylene Sensitivity of Fall Storage Crops.]

Minimizing Physical Damage

Generally speaking, produce crops live a very gentle life until harvested. Starting with harvest, produce is moved and handled for the first time and, typically, many times after. With each movement there is a risk of physical damage. Even if the damage is not obvi¬ous, it can result in bruising or other damage that becomes evident later and can led to postharvest disease and pathogens which are encouraged by damaged cell tissue. Even during harvest, crops can suffer "harvester blight." For the majority of crops, gentle handling, crates with smooth and clean surfaces, and conveyance with elastic and soft belts and rollers should be used.

Avoiding Contamination

Sorting and culling are also important practices at this stage. As the saying goes, "one bad apple can spoil the bunch". Sorting allows for different sizes and grades of product to be stored and sold separately and culling can separate dam¬aged or lower quality product from the main lot. Culls can be used for sale, rescue donation, or compost depending on the defect. The removal of obviously damaged product from the lot helps minimize cross-contamination with postharvest pathogens to a larger portion of the stored product.

Produce can be rinsed to remove soil and debris, and often a sanitizer is added to the rinse water to prevent cross-contam¬ination with plant and human pathogens from one item of produce to another in the same batch (see the following refer¬ences: LaBorde, Samuels and Stivers 2016, Bihn et al. 2014).

Once packed and ready for storage or transport, care should be taken to avoid contamination of product with other con¬taminants such as foreign matter and unintentional water such as condensate from refrigeration systems.

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Mr. Callahan is with the Univ. of Vermont Extension Ag Engineering. Excerpted from the upcoming ***2023-2024 New England Vegetable Management Guide.***

VEGETABLE PRODUCTION

Winter Squash for Extended Sales

Gordon Johnson

Growers with CSAs, sales to schools and institutions, or restaurant customers should consider storing and marketing winter squash. Winter squash include a wide range of types including butternuts and neck pumpkins, acorns, spaghetti squash, buttercup and kabocha types, delicata and dumpling types, hubbards, cheese pumpkins, and others. Many of these have the ability to be stored for long periods, especially butternuts, buttercups, and spaghetti types. New England has a tradition of eating large quantities winter squash; however, the further south you get, the less they are eaten. This may require customer education in order to market successfully. For example, butternut squash is great in soups, pastries, and casseroles and spaghetti squash is a fine low calorie, low carb, pasta substitute.

Having winter squash for winter sales requires proper handling and storage. Follow a regular fungicide program during crop production to produce disease free fruit to minimize postharvest fruit rots. Harvest when fruits are mature and prior to frost. Use care in handling fruit to prevent wounds. Wounding can negate benefits from a season-long fungicide program. Cure fruit after harvest at temperatures between 80 and 85°F (27-29°C) with a relative humidity of 75-80% for approximately 10 days. Temperatures below 50°F (10°C) cause chilling injury. The hard-shelled squashes, such as Butternut, Delicious, Spaghetti, and the Hubbard strains, can be stored at 55°F (13°C) and 50-70% relative humidity. Acorn squash will store for 5-8 weeks; pumpkins for 2-3 months and other hard-shelled squashes will store for 3-6 months. Research has not documented any benefit to post-harvest fruit fungicide dips.

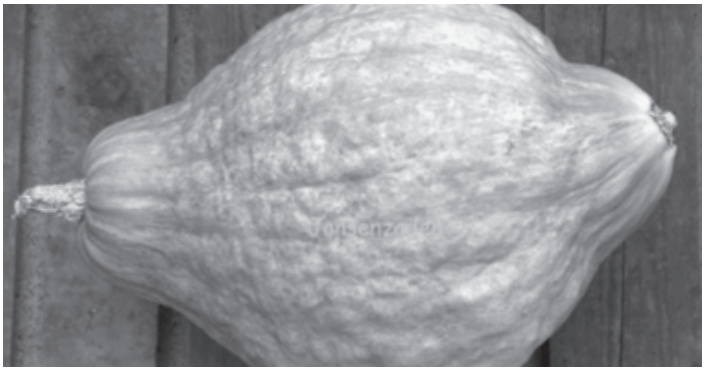
For storage, a ventilated storage shed with supplemental heat works well. Basements are ideal. Empty greenhouses can be used if fans are run to keep the heat down in the day and heat is run to keep the temperature above 50°F (a significant cost). A cold room/box kept at 55° F will also work. Under these conditions, the longer keeping winter squash types can be kept in saleable condition through late winter, into spring.

Butternut squash stores well for 6+ months.

Cheese types are similar to butternut squash in keeping ability.

Butternut squash stores well for 6+ months.

Japanese types are long keepers.



Hubbard squash stores well.

Wheel types will keep for 4 months

VEGETABLE PRODUCTION

Fall and Winter Crops for High Tunnels

Gordon Johnson

As summer crops finish in high tunnels there is the opportunity to plant a wide range of vegetables for late fall and winter harvest. This is a way to continue providing fresh produce to CSA's, farmer's markets, restaurants, schools, and local retail.

Fall planted arugula in a high tunnel

Leaf Crops

Options for leafy greens from direct seeding include many mustard family crops such as kale, green and red mustards, arugula, Bok Choi, Napa cabbage, Asian greens such as mizuna, and turnip greens. Many of these greens will overwinter in a tunnel.

Many types of lettuce for cut salad greens and small heads can be direct seeded including leaf types, butterhead and bibb types, romaine, and crisp head types. Lettuce can be grown throughout the fall and winter months.

Beet family greens including beets for greens, swiss chard, and spinach direct seeded in will provide long term harvests into mid-winter.

Other cool season greens to try as a fall planting in high tunnels include corn salad, cress, and Claytonia.

Root Crops

Beets, carrots, radishes, and turnips seeded in the high tunnel in October and early November will provide late fall and early winter harvests.

Alliums

Leeks transplanted now for overwintering will allow for late winter and early spring harvest. Green onions (scallions) will produce a fall crop from transplants and will overwinter from direct seeding to produce an early spring crop. Chives and garlic chives seeded in October will produce a crop from late fall through spring.

Other Possibilities

Thick seedings of peas (green shelled or field peas) will provide plentiful pea shoots throughout the late fall and winter.

Herbs such as parsley can be seeded now for late fall through early spring harvest. Cilantro is an excellent choice for fall high tunnel production from direct seeding. There are also several perennial herbs that will produce well from late fall through winter (thyme, oregano, sage, rosemary, mint as examples).

*Dr. Johnson is the Extension Vegetable & Fruit Specialist at the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 30, Issue 27, September 23, 2022. Management Guide.*

VEGETABLE PRODUCTION

Effect of Flooding and Waterlogged Soils on Vegetables

Gordon Johnson

Climate scientists predict that extreme weather events will become more common over the next several decades. This will present additional challenges for vegetable growers related to flooding, wet weather diseases, nutrient losses, ability to do timely harvests, field compaction, other wet soil issues, and resulting crop losses.

In flooded soils, the oxygen concentration drops to near zero within 24 hours because water replaces most of the air in the soil pore space. Oxygen diffuses much more slowly in water filled pores than in open pores. Roots need oxygen to respire and have normal cell activity. When any remaining oxygen is used up by the roots in flooded or waterlogged soils, they will cease to function normally. Therefore, mineral nutrient uptake and water uptake are reduced or stopped in flooded conditions (plants will often wilt in flooded conditions because roots have shut down). There is also a buildup of ethylene in flooded soils, the plant hormone that in excess amounts can cause leaf drop and premature senescence.

In general, if flooding or waterlogging lasts for less than 48 hours, most vegetable crops can recover. Longer periods will lead to high amounts of root death and lower chances of recovery.

While there has been limited research on flooding effects on vegetables, the following are some physiological effects that have been documented:

- Oxygen starvation to vegetable roots will cause roots to cease to function resulting in plant collapse with limited recovery potential
- Oxygen starvation in root crops such as potatoes will lead to cell death in tubers and storage roots. This will appear as dark or discolored areas in the tubers or roots. In carrots and other crops where the tap root is harvested, the tap root will often die leading to the formation of unmarketable fibrous roots.
- Ethylene buildup in saturated soil conditions can cause leaf drop, flower drop, fruit drop, or early plant decline in many vegetable crops.
- Leaching and denitrification losses of nitrogen and limited nitrogen uptake in flooded soils will lead to nitrogen deficiencies across most vegetable crops.
- In bean crops, flooding or waterlogging has shown to decrease flower production and increase flower and young fruit abscission or abortion.
- Lack of root function and movement of water and calcium in the plant can lead to calcium related disorders in plants. There is a potential for higher incidence of blossom end rot in tomatoes, peppers, watermelons, and other susceptible crops when fruits are forming and soils are saturated.

Low lying areas of fields are most affected by excess rainfall. However, cropping practices can also increase water standing. In vegetables, field compaction will reduce water infiltration leading to increased crop losses in wet weather.

Plasticulture Concerns in Wet Weather

In plasticulture, water can accumulate and persist between rows of plastic mulch because of the impervious surface of the mulch. Because much of the rainfall runs off the plastic, water pooling can be serious problem in plastic mulched fields, especially where row middles have become compacted. Vining crops that fruit into the row middles can have vines and fruits sitting in water and this produces ideal conditions for diseases of wet conditions to develop. A prime example is Phytophthora capsici (a water mold) that needs saturated soils or standing water to infect plants (fruits). Phytophthora capsici grows at 10 to 36°C (50 to 97°F), with optimal temperatures of 24 to 33°C (75-91°F).

When water overflows the bed tops of plastic mulched crops, whole beds become saturated as water enters the planting holes. This often leads to plant losses as beds take a very long time to dry once saturated in this way and oxygen is very limited in the root zone.

To avoid water accumulation between plastic mulched beds, tilling with a deep shank or a subsoiler in row middles can help improve drainage. Cut drainage channels at row ends to reduce blockage (dams) that can back up water. Where practical, section plasticulture fields and install cross drains to remove extra water to improve drainage and reduce water damage potential. Growers may also choose not to plant lower areas in the field prone to water damage where plastic is laid.

In some crops, such as peppers and strawberries, high raised beds will improve drainage significantly and can reduce losses to water standing between plastic rows. Another option in watermelons (and other strongly vining crops) grown on plastic is to reduce plastic bed width and increase distance between rows to limit impervious surfaces.

Compaction between mulched beds can lead to increased ponding.

When water goes over top of beds they become saturated for long periods leading to plant losses. In this case the water just missed going over the bed (note the trash line).

VEGETABLE PRODUCTION

In some crops in our region (plasticulture strawberries for example), cover crops such as ryegrass are being grown between beds to reduce erosion. Research on row middle management will be a priority for the future.

Identifying Poorly Drained Areas for *Phytophthora capsici* Management

Growers with crops susceptible to Phytophthora capsici (P. cap) are encouraged to evaluate fields with susceptible crops (all vine crops, tomatoes, peppers, lima beans) for drainage issues where this disease can proliferate. The primary keys to P. cap management are limiting standing water, the potential for saturated soils, and water movement across the crop.

Compaction between mulched beds can lead to increased ponding.

Compaction between mulched beds can lead to increased ponding.

Recovering from Flooding or Waterlogging

One option to aid in vegetable crop recovery after floods or waterlogging is to aerate the soil by cultivating (in crops that can be cultivated) as soon as you can get back into the field. This allows for oxygen to enter the soil more rapidly. To address nitrogen leaching and denitrification losses, sidedress with 40-50 lbs of N where possible depending on the crop and crop stage.

In vegetable fields that remain wet, consider foliar applications of nutrients. Since nitrogen is the key nutrient to supply, spraying with urea ammonium nitrate (28 % N solution) alone can be helpful. These can be sprayed by aerial or ground application. Use 5 to 20 gallons of water per acre. The higher gallons per acre generally provide better coverage. As with all foliar applications, keep total salt concentrations to less than 3% solutions to avoid foliage burn.

Future Considerations

To address excess water challenges in the future, vegetable growers will need to invest in and plan for drainage in every field. Solutions including land levelling, surface drainage, tiles (tile wells, patterned tiling), and pumping may all need to be considered. See this article by James Adkins on drainage basics https://sites.udel.edu/weeklycropupdate/?p=11895.

*Dr. Johnson is the Extension Vegetable and Fruit Specialist at the Univ. of Delaware. From the **Weekly Crop Update**, Univ. of Delaware Extension, Vol. 30, Issue 28, September 30, 2022.*

CONVENTION

2023 Mid-Atlantic Fruit and Vegetable Convention

continued from page 1

On the final day of the Convention, sessions on Tree Fruit, Stone Fruit, Small Fruit, Sweet Corn, Pumpkins, Potatoes, General Vegetables, Cut Flowers, Pollinators, Equipment Technology, Growing and Marketing High Value Niche Crops for Direct Marketing and Digital and Social Media Marketing will be featured.

The Mid-Atlantic Convention has been jointly sponsored by the State Horticultural Association of Pennsylvania, the Pennsylvania Vegetable Growers Association, the Maryland State Horticultural Society and the New Jersey State Horticultural Society since 1978. In 2014, the Virginia State Horticultural Society also began meeting at the Convention. Extension personnel from Penn State, University of Maryland, Rutgers and Virginia Tech all assist in organizing the three days of educational sessions.

The Great American Hall and the Aztec Room at the Hershey Lodge will host most of the Trade Show with several additional booths being located in the Confection Level Lobby. Specialized horticultural equipment, farm market merchandise, and packaging will all be on display along with information on the latest seed varieties, fruit varieties, pesticides and other supplies and services for the commercial grower.

Many pesticide applicator update training credits will be available to Pennsylvania, Maryland, New Jersey and Virginia growers attending the sessions. Arrangements are also being made to offer respirator-fits tests for pesticide applicators. The program covers nearly every aspect of fruit, vegetable, potato and berry production. Commercial growers should not pass up this terrific educational opportunity. Just as important, however, is the opportunity to network with fellow growers and others in the industry. Many growers feel that is the most important part of the Convention.

The sixteenth annual Mid-Atlantic Cider Contest will be conducted during the Convention to determine the best tasting cider produced in the region. On January 31, fruit and vegetable growers will gather for the annual Fruit and Vegetable Growers Banquet which will include awards and recognitions. On February 1, there will be an Ice Cream Social for all in the evening plus a reception for apple growers.

Registration is required for all persons attending the Convention trade show or educational sessions. Registration with any of the five sponsoring organizations allows one to attend any of the sessions although there are additional charges for workshops and meals. Detailed information will be included in next month's newsletter and will be available on the Conventin website at www.mafvc.org. If you have questions, call PVGA at 717-694-3596.

Monday, January 30	
01 Greenhouse Vegetables	06 PA Pesticide License Training
02 FSMA Grower Training	07 Managing a Profitable Farm Market Bakery
03 Soil Fertility/Health	08 YGA Pruning Workshop
04 Spotted Lantern Permit	09 Bus Tour
05 Farm Transition	

Tuesday Morning, January 31	Tuesday Afternoon, January 31
11 High Tunnels	21 High Tunnels
12 Phytophthora	22 General Vegetables
13 Cole Crops	23 Soil Health/Cover Crop
14 Garlic	24 Biocontrols
15 Urban Ag	25 Urban Ag
16 Snap Beans	26 Wholesale Marketing
17 Farm Market Staff Training	27 Achieving Success at Farmers Markets
18 Tree Fruit	28 Tree Fruit
19 Keynote	

Wednesday Morning, February 1	Wednesday Afternoon, February 1
31 Tomatoes	41 Basic Vegetable Production
32 Basic Vegetable Production	42 Organic Veg Production
33 Organic Veg Production	43 Stone Fruit
34 Greenhouse Ornamentals	44 Greenhouse Ornamentals
35 Marketing 101	45 Diversification in Agritourism
36 Small Fruit	46 Small Fruit
37 Labor/Farm Management (joint)	47 Labor/Farm Management
38 Tree Fruit	48 Tree Fruit
39 Spanish	49 Spanish

Wednesday Evening, February 1	
71 Commercializing Your Ideas Roundtable	

Thursday Morning, February 2	Thursday Afternoon, February 2
51 Pumpkins	61 Sweet Corn
52 General Vegetables	62 Pollinators
53 Potatoes	63 Potatoes
54 Cut Flowers	64 Equipment Technology,
55 Growing and Marketing High Value Niche Crops to	65 Digital and Social Media Marketing
56 Small Fruit	66 Small Fruit
57 Stone Fruit	67 Labor/Farm Management
58 Tree Fruit	68 Tree Fruit

BERRY PRODUCTION

Plasticulture Strawberry Crop Status: Are Additional Protections Needed to Encourage Fall Growth?

Wenjing Guan

I have heard concerns about the size of strawberry plants this year. We saw a large variation in plant sizes at different locations; production systems, weather conditions, cultivars, and other environmental and management factors likely to influence plant growth.

Growing degree day (GDD) is a good tool to understand temperature influence on plant growth at different locations and in different years. Using the modified growing degree day tool from Purdue Mesonet Data Hub at https://ag.purdue.edu/indiana-state-climate/purdue-mesonet/purdue-mesonet-data-hub/, we compared the modified growing degree days from Sep 1 to Oct 17 in the past three years at Southwest Purdue Ag Center. The up-to-date accumulative GDD in 2022 was similar in 2020, but it was fewer than that in the same period in 2021 (Figure 1). We also compared accumulated GDD at three Purdue Ag Centers in Indiana, there was about a 200 GDD difference between southern and northern Indiana since Sep 1. 2022 (Figure 2).

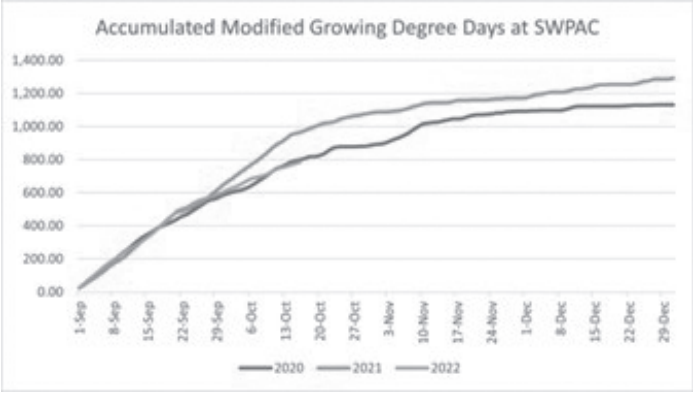


Figure 1. Accumulated modified growing degree days at SWPAC in the past three years.

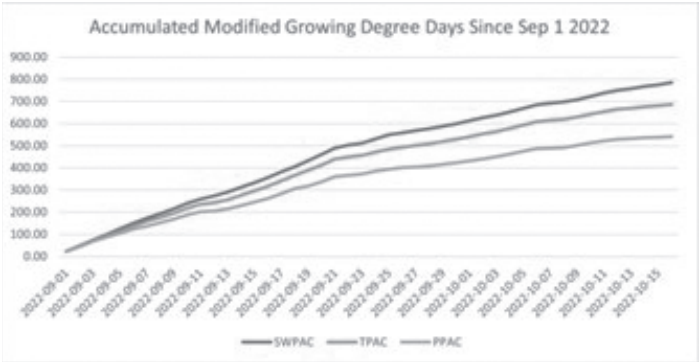


Figure 2. Accumulated modified growing degree days at Southwest Purdue Ag Center (SWPAC, Vincennes IN), Throckmorton-Purdue Agricultural Center (TPAC, Lafayette, IN), and Pinney Purdue Ag Center (PPAC, Wanatah, IN) since Sep 1 2022.

Flower initiation happens in the crown. Crown size at the end of fall largely determines spring yield potential. Crown growth and development is best at temperatures above 50°F. As temperatures may drop quickly, do additional environmental protection increase plant growth? At SWAPC, we have observed the plant size differences of strawberries grown inside the high tunnel and grown in the open field. The additional accumulated GDD provided by high tunnels has led to faster plant growth.

Figure 3. Low tunnel was installed with a mechanical transplanter low tunnel layer.

For open-field production, low tunnel or row covers may be used to increase growth.

We explored using low tunnels to extend the fall growth in the past few years. We installed the low tunnels using a mechanical transplanter low tunnel layer in early Oct. The low tunnel layer set hoops 4.5' apart and covered with 1 mil perforated clear plastic. Low tunnel plastic was removed in Dec before covering the plants with a floating row cover. We explored the system for three strawberry seasons (Figure 3). In the 2019-20 season, a significant yield increase was achieved with low tunnels, but the yield of the best cultivars was under 1 lb/plant even using low tunnels. Deer damage happened in September before installing low tunnels delayed plant growth. This article describes that story. We did not see a yield increase using low tunnels in the 2020-21 and 2021-22 seasons. In both seasons, plugs were planted at the end of Aug. and fall was relatively warm. Most plants' yields were above 1 lb/plant; satisfied yields were achieved without using low tunnels.

A few critical factors farmers should consider in using the additional protection in the fall. First, both low tunnel or floating row covers increased temperature fluctuations and delayed the process of plant acclimatization. As a result, plants may be more susceptible to winter damage if unseasonably cold temperatures happen while plants are still actively growing (see the above article for more information). Second, using additional protection, mainly row covers, increases relative humidity. High relative humidity plus warm temperatures increase disease potential. A study in North Carolina found more gray mold fruit on plants covered with row covers in the fall. The study suggested a strict spray program must be implemented to minimize disease losses if row covers were used. Third, a thinner row cover that allows better light transmission should be considered if one chooses to use row covers in the fall.

In short, additional protection can increase plant growth, but one should balance the extra cost, increased risks of other factors, with a potential yield increase when deciding on using additional protection to encourage fall growth in plasticulture strawberries.

*Dr. Guan is with the Dept. of Horticulture and Landscape Architecture at Purdue University. From the **Vegetable Crops Hotline**, Purdue Univ. Cooperative Extension Service, Issue 713, October 18, 2022.*

BERRY PRODUCTION

Applying Row Covers for Winter Protection in Plasticulture Strawberry Production

Wenjing Guan

Row covers are used in plasticulture strawberry production for winter protection. There is also interest in using row covers to encourage fall growth. The different purposes of using row covers affect when farmers should consider applying the row covers, and what type of materials best meet these goals.

At Strawberry Chat on Plasticulture at https://anchor.fm/strawberrychat/episodes/Plasticulture-Production-I-Episode-6--Aug-10-2022-e1mebh4 production, Brad Bergefurd mentioned a major difference between plasticulture and matted row systems is that there may not be a true dormancy in plasticulture strawberry. Directly applying straw on top of plants for winter protection is not a good option in the plasticulture system. It suffocates the plants. Depending on the year, strawberries may stay green until Christmas.

Thick row covers (1.5 oz/yard2 or thicker) are used for winter protection (Figure 1). They are also good for spring frost protection. But thick row covers do not have a good light transmission. Applying these row covers when plants are still green, and still having warm days (average temperatures above 50°F) ahead, sacrifices plant growth days. With this consideration, we have tended to delay applying row covers. In the past few years, we applied row covers close to Christmas in southern Indiana. By then, the plants are typically well-acclimatized and ready for the coldest period.

Fully hardened plants adapted to colder climates can withstand temperatures below –20°F. Plants grown in warmer climates, including cultivars typically grown in plasticulture systems, can not withstand temperatures lower than 10°F. Better protection provided if snow accumulates on the ground on the coldest days. We successfully used row covers for winter protection in one year with the lowest recorded ambient temperatures at –5°F. If lower temperatures are expected and without snow cover, straw may be added on top of the row covers for additional protection.

If cold temperatures come early when plants are actively growing, shall we consider temporarily applying row covers to protect the plants from damage? For non-acclimatized plants, leaves lose photosynthetic activity when they are exposed to temperatures between 20 to 23°F. And crowns may be killed when crown temperatures are at 27°F for 1 or 2 h. As I write this article, the forecasted minimum nighttime temperature was at 28°F in Vincennes, IN. It is not likely the temperatures would cause damage to leaves, and the soil is still warm enough to protect crowns. Considering this, we do not think it is necessary to apply row covers at this time. Actually, the light frost events are helpful to get plants ready for the winter.

Figure 1. The strawberry field was covered with floating row covers (1.5 oz) for winter protection.

In the next article, we will discuss growing degree days and current crop status, and lead to the discussion of whether additional protection is needed to encourage fall growth.

*Dr. Guan is with the Dept. of Horticulture and Landscape Architecture at Purdue University. From the **Vegetable Crops Hotline**, Purdue Univ. Cooperative Extension Service, Issue 713, October 18, 2022.*

NARBA 2023 Annual Conference Visits Florida's Gulf Coast

The North American Raspberry & Blackberry Association (NARBA) will be gathering in person for their annual meeting to be held January 22-24, 2023, in Tampa, Florida. After two years of virtual conferences, the group will move the conference to the Sunshine State for the first time. The event will be held at the Hotel Alba, Tampa. Visit the hotel website for more information on the hotel's great amenities, including free wi-fi, outdoor pool, wellness center, and two in-house dining options as well as many walkable Tampa attractions and dining. Visit https://www.raspberryblackberry.com/2023-narba-conference/ for more information.

Conference sessions will feature top experts and experienced growers. Topics include caneberry breeding and varieties, pest and disease management, production research, new technology and industry updates, new grower resources, and marketing. Over 50 speakers from around the world are included in the multi-track format. Time for Q&A and networking will be part of all sessions.

Attendees will have the opportunity to register for the conference tour which will include field and nursery visits for an up-close look at the emerging raspberry and blackberry industry in Florida and a visit to the University of Florida Gulf Coast Research Center to learn about advances in berry research. The tour will include refreshments, networking with speakers and views of the beauty of the Florida Gulf Coast.

Registration for the conference, tour and the hotel block are OPEN NOW! A detailed listing of speakers and courses will be posted in October 2022 on https://www.raspberryblackberry.com/2023-narba-conference/ Early registration is recommended to ensure attendees have first choice for desired room types and sessions.

For further information and updates about the 2023 NARBA annual conference please contact Darcy Kochis at info@raspberryblackberry.com.

GREENHOUSE PRODUCTION

Cleaning and Disinfecting the Greenhouse

Tina Smith

If you've had reoccurring problems with diseases such as damping off or insects such as fungus gnats or aphids, perhaps your greenhouse and potting areas need a good cleaning. Vegetable growers are now mostly done using their greenhouses for planting, and if they are not being used to cure or store fall crops, or for winter greens, now is a good time to clean the houses well before next season's big rush. Some growers wait until the week before opening a greenhouse before cleaning debris from the previous growing season, but it's better to clean up as early as possible to eliminate over-wintering sites for pests and to reduce their populations prior to the spring growing season—pests are much easier to prevent than to cure.

Cleaning

Cleaning involves physically removing weeds, debris and soil, and is the first step prior to disinfecting green¬house surfaces and equipment. Soil and organic residues from plants and growing media reduce the effectiveness of disin-fectants. There are some cleaners specifically developed for greenhouse use, for example Strip-It, which is a combination of sulfuric acid and wetting agents formulated to remove algae, dirt, and hard water deposits. Some growers use a wet/dry vacuum on concrete and covered floors to remove debris. High-pressure power washing with soap and water is also an option. Soap is especially useful in removing greasy deposits. Thorough rinsing is needed because soap residues can inactivate certain disinfectants such as the Q-salts.

Begin at the top and work your way down. Sweep down walls and internal structures and clean the floor of soil, organic matter and weeds. Disease-causing organisms can be lodged on rafters, window ledges, tops of overhead piping and folds in plastic. Extra care is needed to clean these areas as well as textured surfaces such as concrete and wood, which can hide many kinds of pests.

Install physical weed mat barriers if floors are bare dirt or gravel and repair existing mats to prevent weeds and make it easier to manage algae. Avoid using stone on top of the weed mat, as soil and moisture will then get trapped, creating an ideal environment for weeds, diseases, insects and algae.

Irrigation filters should also be cleaned to remove dirt and microbial buildup (or biofilm) at the end of the growing season. Growers often use products labeled for cleaning irrigation systems such as sulfuric acid plus wetting agent (e.g. Strip-It) or sanitizers containing hydrogen peroxide and peroxyacetic acid (e.g. SaniDate) to flush out slime and debris.

Disinfecting

Many pathogens can be managed to some degree, using disinfectants. For example, dust particles from fallen growing medium or pots can contain bacteria or fungi such as Rhizoctonia or Pythium. Disinfectants will help control these pathogens. In addition to plant pathogens, some disinfectants are also labeled for managing algae, which is a breeding ground for fungus gnats and shore flies.

Greenhouse Benches and Work Tables

If possible, use benches made of wire or other non-porous materials such as a laminate that can be easily disinfected. Wood benches can be a source for root rot diseases and insect infestations. Algae tend to grow on the surface of the wood creating an ideal environment for fun¬gus gnats and shore flies, and plant pathogens can grow within the wood. Plants rooting through containers into the wood will develop root rot if conditions are favorable for pathogen activity. Disinfect benches between crop cycles with one of the labeled products listed below. Keep in mind that disinfectants are not protectants—they may destroy certain pathogens, but will have little residual activity.

Greenhouse benches made of non-porous materials are easier to disinfect. Photo: UMass Floriculture

Cleaning Containers.

Plant pathogens such as Pythium, Rhizoctonia, and Thielaviopsis can survive in root debris or soil particles on greenhouse surfaces. If a crop had a disease problem, then avoid re-using containers. Containers to be re-used should be washed thoroughly to remove soil particles and plant debris before being treated with a disinfectant, even if there is no evidence of disease in the crop. Debris and organic matter can protect pathogens from contacting the disinfectant solution and can also reduce efficacy of certain disinfectants.

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GREENHOUSE PRODUCTION

Cleaning and Disinfecting the Greenhouse

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Disinfectants for Greenhouses.

If possible, disinfectants should be used on a routine basis both as part of a pre-crop clean-up program and during the cropping cycle. There are several different types of disinfectants that are currently used in the greenhouse for plant pathogen and algae control listed below. Remember that sanitizers and disinfectants are pesti¬cides and may have serious health consequences if not used according to their labels. Be sure to use an appropriate prod¬uct for the pathogen and for the surface material you are trying to disinfect and use good ventilation and proper personal protective equipment.

Quaternary ammonium chloride salts (Green-Shield II®, Physan 20®, KleenGrow™). Q-salt products, commonly used by growers, are quite stable and work well when used according to label instructions. Q-salts are labeled for fungal, bacterial, and viral plant pathogens, as well as algae. They can be applied to floors, walls, benches, tools, pots, and flats as disinfectants. Physan 20® is also labeled for use on seeds, cut flowers, and plants. Carefully read and fol¬low label instructions. Use directions may vary according to the intended use of the product. For example, the Green-Shield II® label states that objects to be disinfected should remain wet with the product for 10 minutes, and walkways for an hour or more. Instructions allow that surfaces can be wiped or air-dried after treatment. For cutting tools that are being dipped between uses, one way to allow them to remain wet for the appropriate amount of time is by having two cutting tools, one pair to use while the other is soaking.

Q-salts are not protectants. They will kill the pathogens for which they are labeled on contact but will have little residual activity. Presence of organic matter will inactivate them, so pre-clean objects to dislodge organic matter prior to application. KleenGrow™ does have a higher organic matter tolerance and longer residual activity on hard surfaces. Because it is difficult to tell when the product becomes inactive, prepare fresh solutions frequently (twice a day if in constant use). The products tend to foam a bit when they are active; when foaming stops, it is a sign they are no longer effective. No rinsing with water is needed.

Hydrogen dioxide and peroxyacetic acid (ZeroTol® 2.0, OxiDate® 2.0, SaniDate®12.0). Hydrogen dioxide kills bacteria, fungi, algae, and their spores immediately on contact. It is labeled as a disinfectant for use on greenhouse surfaces, equipment, benches, pots, trays, and tools, and for use on plants. Label recommendations state that all surfaces should be wetted thoroughly before treatment. Several precautions are noted. Hydrogen dioxide has strong oxidizing action and should not be mixed with any other pesticides or fertilizers. When applied directly to plants, phy¬totoxicity may occur for some crops, especially if applied above labeled rates or if plants are under stress. Hydrogen dioxide can be applied through an irrigation system. As a concentrate, it is corrosive and causes eye and skin damage or irritation. Carefully read and follow label precautions. Note that OxiDate® and SaniDate® are OMRI-approved for organic production.

Sodium carbonate peroxyhydrate (GreenClean Pro Granular Algaecide®) is a granular and is activated with water. Upon activation, sodium carbonate peroxhydrate breaks down into sodium carbonate and hydrogen peroxide. Green¬Clean is labeled for managing algae in any non-food water or surfaces. Non-target plants suffer contact burn if undi¬luted granules are accidentally spilled on them.

Chlorine bleach. There are more stable products than bleach to use for disinfecting greenhouse surfaces, but when used properly, it is an effective disinfectant; it has been used for many years by growers. Chlorine bleach may be used for pots or flats, but is not recommended for application to walls, benches, or flooring. A solution of chlorine bleach and water is short-lived and the half-life (time required for a 50% reduction in strength) of a chlorine solution is only two hours. After two hours, only ½ as much chlorine is present as was present initially. After four hours, only ¼ is there, and so on. To ensure the effectiveness of chlorine solutions, it should be prepared fresh just before each use. The concentration normally used is one part of household bleach (5.25% sodium hypochlorite) to nine parts of water, giving a final strength of 0.5%. Some bleach products are more concentrated—check the percent active ingredient for the product you are using and see the label for the recommended dilution rate. Chlorine is corrosive. Repeated use of chlorine solutions may be harmful to plastics or metals. Soak objects to be sanitized for 30 minutes and then rinse with water. It should also be noted that bleach is phytotoxic to some plants, such as poinsettias. Chlorine can also ir¬ritate the respiratory system and so should only be used in well-ventilated areas.

Alcohol (70%) is a very effective sanitizer that acts almost immediately upon contact. It is not practical as a soaking material because of its flammability. However, it can be used as a dip or swipe treatment on knives or cutting tools.

No rinsing with water is needed. Alcohol, although not used as a general disinfectant is mentioned here because it is used by growers to disinfect propagation tools.

OMRI-listed organic disinfectants include OxiDate 2.0, SaniDate 12.0, ZeroTol and others. Ethyl or isopropyl alco¬hol is used to disinfect tools. Organic growers should always check with their certifying organization before using any material new in their growing practices. For list of products, visit the OMRI website at www.omri.org.

This information is supplied with the understanding that no discrimination is intended and no endorsement of any particu¬lar product is implied. Due to constantly changing regulations, we assume no liability for suggestions. If any information in this article is inconsistent with the label, follow the label.

Managing Algae.

Algae are a diverse grouping of plants that occur in a wide range of environments. Algae growth on walks, water pipes, equipment, greenhouse coverings, on or under benches, and in pots is an ongoing problem for grow¬ers. Algae form an impermeable layer on the media surface that prevents wetting of the media below and can clog irriga¬tion misting lines and emitters. Algae are a food source for insect pests like shore flies and cause slippery walkways that can be a liability risk for workers and customers. Recent studies have shown that algae are brought into the greenhouse through water supplies and from peat in growing media. In a warm, moist environment with fertilizer, the algae flourish.

Proper water management and fertilizing can help to slow algal growth. Avoid over-watering slow-growing plants, espe¬cially early in the production cycle. Allow the surface of the media to dry out between watering. Avoid excessive fertilizer runoff and puddling water on floors, benches, and greenhouse surfaces. The greenhouse floor should be level and drain properly to prevent the pooling of water prior to installing a physical weed mat barrier. Algae management involves an integrated approach involving sanitation, environmental modification, and frequent use of disinfectants.

Steps to Prevent Disease Contamination

- Disinfect benches, preferably made of wire. Pots, flats and trays should be new or disinfected. Wood benches can be a source for root rot diseases and insect infestations. Algae growing on wood surfaces create an ideal environment for fungus gnats and shore flies. Plant pathogens such as Pythium can grow within the wood and plants rooting into the wood can become infected.
- Disinfect potting tables preferably made of a non-porous surface such as a laminate.

GREENHOUSE PRODUCTION

- Set up washing stations for hand washing and foot baths at the entrances of each greenhouse, especially propagation houses.
- Keeping hands and fingernails clean can help reduce the spread of diseases. If wearing latex or other protective gloves, clean as you would your hands and change periodically. Change the disinfectant daily in foot baths and wash floor mats weekly.
- Keep pets off of benches and potting areas.
- Provide supports throughout the greenhouse to hang hose nozzles. Keep all containers and hose nozzles off the floor to prevent contamination with pathogens.
- Keep growing media in a clean area and covered.
- Avoid carrying over plant material.
- Avoid accumulating dirty pots, old growing media or plant debris in the media mixing area.
- Make sure trash bins in the greenhouses are covered so that disease spores do not spread to the crop.
- Use horticultural oil on vegetation/weeds outside, around the greenhouse perimeter to smother over-wintering pests.

Ms. Smith is retired from the Univ. of Massachusetts Extension Greenhouse Crops and Floriculture Program. Updated for 2020 by L. McKeag. For references and resources, see the online version of this article at https://ag.umass.edu/greenhouse-floriculture/fact-sheets/cleaning-disinfecting-greenhouse.

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