

Needed: Nominations for PVGA Directors

The terms of seven members of the PVGA Board of Directors expire at the Annual Meeting scheduled for Wednesday, January 30, 2019, at the Mid-Atlantic Fruit and Vegetable Convention in Hershey. The Directors whose terms expire are:

Barron Hetherington – Ringtown – first elected 2019

Alan Kemmerer – Berwick – first elected 2017

David King – Bakerstown – first elected 2013

Robert Shenot – Wexford – first elected 2007

William Reynolds – Waynesboro – first elected 2007

Jonathan Strite – Harrisburg – first elected 2010

Timothy Weiser – York Springs – first elected 2007

All would be eligible for re-election under the 18-year term limits set by the Board. Under changes adopted at last year's Annual Meeting, the members will elect five members to the Board and the Board will name a sixth Director. Only six of the seven seats will be filled to return the Board to a total of 18 members over the next three years. The Board currently has 21 members due to allowing the Board to appoint additional Board members to provide diversity and potentially certain expertise in the Board makeup that the election process does not always provide.

Like last year, the election will be conducted by a mail-in ballot that will be mailed to all members with the dues renewal notices in late November/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 David Miller, who as Past President serves as chair of the Committee at dave@millerplantfarm.com.

PVGA Young Grower Award Applications Being Accepted

The "PVGA Young Grower" award was a new award established two year's ago. Brandon Christner was the first recipient at the 2017 Mid-Atlantic Convention and Peter Salerno III was the recipient at the 2018 Convention. 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 criteria for the Award. The criteria are as follows:

- is a PVGA Member who is 35 years old or younger;
- has been successfully growing vegetables, potatoes or berries for less than five years; 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 2019 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, 2018.

2019 Mid-Atlantic Convention Opens January 29

The 2019 Mid-Atlantic Fruit and Vegetable Convention will be held January 29 to 31, 2019, at the Hershey Lodge and Convention Center in Hershey, Pennsylvania. Over 2,100 fruit, vegetable, and berry growers and other industry persons from throughout the mid-Atlantic region and beyond are expected to attend. This year's convention will again feature several pre-convention workshops, a farm market bus tour, and a trade show with over 170 exhibitors plus three full days of six or more concurrent educational sessions.

The day before the main Convention opens, growers can chose between a bus tour of farm markets or several different workshops. The workshops include FSMA Grower Training, Irrigation Basics, High Tunnel Berry Production, Greenhouse Production, Introduction to Social Media, Pros and Cons of Thinning Apples Early, and Pennsylvania Pesticide Applicator License Training.

On the opening day of the Convention, Andy Masters, an award-winning author and international speaker on various

leadership and customer service topics who has presented over 750 programs across North America, will give the Keynote Presentation. There will also be sessions on Season Extension and High Tunnels, Organic Vegetables, Tree Fruit, Wildlife Controls, General Vegetables, Irrigation, Allium Pests, Snap Beans, Cut Flowers, Edible Flowers, Wholesale Marketing, Food Trends, and Farm Market Bakeries.

Sessions on the second day include Tomatoes, Tree Fruit, Stone Fruit, Farm Market Trends, Farm Market Financial Management, Small Fruit, Wine Grapes, Greenhouse Ornamentals, Soil Health, and General Vegetables. In addition, there will be special topics for farm workers presented in Spanish.

On the final day of the Convention, sessions on Sweet Corn, Pumpkins and Vine Crops, Peppers and Eggplant, Greenhouse Vegetables, Tree Fruit, Small Fruit, Stone Fruit, Potatoes, Pollinators, Farm Management, Creative Direct

(continued on page 2)

NEWS



Pennsylvania Vegetable Growers Association

An association of
commercial vegetable,
potato and berry growers.

President

Jonathan Strite '19

Harrisburg

First Vice President

Brian Campbell '21

Berwick

Second Vice President

Rita Resick '20

Somerset

Secretary-Treasurer

William Reynolds '19

Waynesboro

Past President

David Miller '20

York

Directors

Robert Amsterdam '21

Mechanicsburg

Peter Flynn '21

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Christopher Harner '20

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Barron Hetherington '19

Ringtown

Alan Kemmerer '19

Berwick

David King '19

Bakerstown

Kenneth Martin '20

New Berlin

Amy Metrick '21

Butler

Michael Orzolek '21

State College

Christopher Powell '20

Strasburg

John Shenk '20

Lititz

Robert Shenot '19

Wexford

Jeffrey Stoltzfus '20

Atglen

Mark Troyer '21

Waterford

Timothy Weiser '19

York Springs

Executive Secretary

William Troxell

Richfield

2019 Mid-Atlantic... (continued from page 1)

Marketing and Social Media Skills 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 for the past 41 years. In 2014, the Virginia State Horticultural Society also began meeting at the Convention as well. The Pennsylvania State University, University of Maryland, Rutgers University Cooperative Extension and Virginia Tech University all assist in organizing the three days of educational sessions.

The Convention has become one of the premier grower meetings in the Northeast. The Great American Hall and the Aztec Room at the Hershey Lodge and Convention Center will host the Trade Show. Several additional exhibitor booths have also been added in the lower level lobby area. 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. The program covers nearly every aspect of fruit, vegetable, potato and berry production. Commercial growers should not pass up this terrific educational opportunity. Further details about the Convention will be published in upcoming newsletters.

National News Briefs

More Tariffs on Farm Products as Trade War with China Escalates

Agriculture is in the crosshairs of a new wave of tariffs China is imposing on U.S. products in response to the Trump administration's move to tax additional Chinese imports. China added or increased tariffs on \$60 billion in U.S. goods, including numerous agricultural commodities and food products. Among the items hit with the new tariffs are honey, some vegetables, fruit juices, vegetable oils, animal hides and skins, numerous processed foods, and more. The new round of tariffs come on top of earlier retaliatory tariffs on U.S. agricultural products that have already disrupted markets and caused prices to drop, especially for soybean and pork producers. Farm Bureau has urged national leaders to work to open markets for U.S. agricultural products and sought to highlight the damage that trade wars inflict on farm families. "Farm Bureau urges our trade officials to engage in discussions with our trade partners to resolve trade concerns before resorting to tariffs," Farm Bureau said in a recent statement to the U.S. Senate Committee on Agriculture. "Tariffs targeting our largest agricultural export markets have resulted in retaliation against U.S. farmers, ranchers and agricultural and food businesses across the country. At this time of particular stress in the agricultural economy, expanding market opportunities for farmers and ranchers must be a priority for our trade efforts."

From the Farm Bureau Express, Penna. Farm Bureau, September 21, 2018.

Administration Releases Details of Tariff Aid Package

The U.S. Department of Agriculture has released the details of an aid package that aims to offer farmers some relief as they bear the brunt of trade disputes with several of the nation's top agricultural trading partners.

The three-pronged package will offer \$4.7 billion in direct payments to farmers affected by tariffs on U.S. agricultural products, enable USDA to purchase \$1.2 billion in affected commodities to distribute through nutrition programs and make \$200 million available to help develop foreign markets for U.S. agricultural products.

According to a Farm Bureau analysis, Pennsylvania farmers would be eligible for a combined \$36.08 million in direct payments, with the majority of that aid going to soybean producers. Keystone State dairy producers will be eligible for a combined \$6.41 million, making the average share per farm just less than \$1,000. Actual payments per farm will vary based on production.

The application period for direct payments is open now but producers must wait to apply until they
(continued on page 4)

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 Secretary, at the above addresses.

United Fresh Members Go to Washington

Several hundred members of the United Fresh Produce Association from across the country visited their representatives and senators during the last week of September as part of United's annual Washington Conference. PVGA Executive Secretary represented Pennsylvania growers in visits to Rep. Tom Marino and Rep. Lloyd Smucker and the offices of Senators Bob Casey and Pat Toomey.

United Fresh members presented the following descriptions of the United Fresh Produce Association's positions on five areas of concern: the Farm Bill, Ag Work Force, Food Safety Outbreak Investigations, Trade and Nutrition Programs.

Farm Bill

A new Farm Bill is written by Congress every five years to set agricultural policy and investment by the government. This legislation represents the largest investment in the produce industry as well as the nutritional well-being of children and families. Since 2002, Congress has supported significant investments in expanding and retaining export markets through existing programs such as the Market Access Program (MAP) and the Technical Assistance for Specialty Crops (TASC) programs, targeted research, programs designed to eliminate pests and diseases, increased access to fresh fruits and vegetables and block grants administered by states which support the fruit and vegetable sector. The produce industry has strongly supported these direct investments in productivity and profitability for our growers, packers and shippers. Through these efforts, the federal investment in the specialty crop industry is now greater than \$600 million annually.

The current Farm Bill expires at the end of September 2018, but the process of considering policy and funding priorities is well under way with separate bills approved by both Houses of Congress. To facilitate improvements to the existing Farm Bill, United Fresh helps coordinate the Specialty Crop Farm Bill Alliance to provide an industrywide approach in developing Farm Bill recommendations. In the last two Farm Bills, we've provided Congress with a set of comprehensive recommendations from a coalition of more than 140 specialty crop organizations, including fruits and vegetables, tree nuts, wine grape growers, and nursery and landscape organizations. Given the financial strains on Congress for Farm Bill programs, the fresh produce industry has needed to be aggressive in protecting and advancing our priorities.

This approach has resulted in a renewed focus on specialty crop industry challenges in both the House and Senate passed Farm Bills.

The fruit and vegetable industry is a critical part of the U. S. agriculture industry and our issues deserve serious consideration during the final negotiations of the 2018 Farm Bill. Our industry is unified in support of the recommendations of the Specialty Crop Farm Bill Alliance, which represents the common interests of members that transcend regions and products.

Farm Bill by the Numbers

- Specialty crop production in the United States accounts for \$66 billion in farm gate value and 33% of farm cash receipts for crops.
- Nearly 50% of the United States is considered farmland with fruit and vegetable farms accounting for 14 million acres.
- The 2014 Farm Bill provided a total of \$3 billion investments in the specialty crop industry.

- A recent study found that for every \$1 invested in MAP, there was a return of \$28.30 in export gains.

United Fresh urged Congress to support the Specialty Crop Farm Bill Alliance recommendations while approving the 2018 Farm Bill as soon as possible.

Ag Work Force

The U.S. fruit and vegetable industry is in crisis due to an ever-worsening shortage of labor. There is a critical need to reform our broken immigration system and help build a legal and reliable workforce. While Congress has come close several times to addressing this issue, fear and politics have always intervened. Long-term, we must have a two-fold labor solution - a pathway to legal status for our valued improperly documented workers already engaged in agriculture, and a new guest-worker program that is adequate enough to bring in skilled agriculture workers in our labor-intensive industry.

The reality of our farm labor force is that most are foreign-born and as many as 75 percent are falsely documented. In addition, this population is aging, without replenishment. The number of full-time equivalent field and crop workers in the U.S. fell by at least 146,000, or more than 20 percent, between 2002 and 2014. A report from the Pew Research Center found that 140,000 more Mexicans left the U.S. than came into it between 2009 and 2014.

While many bills dealing with parts of the problem have been introduced in both the House and Senate, Congress has not acted on meaningful immigration policy changes in nearly five years. While a new guest-worker program has been proposed in the House, it provides inadequate protection or incentive to our current workforce to participate. The prospects for any movement of legislation in either the House or Senate in 2018 are bleak.

United Fresh believes it's time for the agricultural sector to work with our allies in Congress to introduce new legislation in January that would truly help us solve the labor crisis we face.

Ag Labor by the Numbers

- As much as 75% of our foreign-born labor force is undocumented.
- With an aging population, the number of full-time equivalent field and crop workers fell by at least 146,000, or more than 20 percent, between 2002 and 2014.
- A report from the Pew Research Center found that 140,000 more Mexicans left the U.S. than those that came here between 2009 and 2014.
- H-2A workers only make up about 10% of the total workforce needed.
- In 2015, there were 145,864 H-2A workers requested; 74% more than in 2011. Of that number, 139,832 workers were provided to farms.

United Fresh members urged Congress to work with our industry to develop new legislation that could provide an effective solution to our labor crisis. That solution must include the following:

- Transition falsely documented workers to a legal status under appropriate conditions.
- Create a workable new guest worker program that addresses

(continued on page 8)

NEWS

National News Briefs *(continued from page 2)*

have final figures for their 2018 production. This round of payments will be based on 50 percent of producers' 2018 production. USDA has the option to issue a second round of payments to cover the remaining 50 percent of 2018 if it deems that necessary.

Farmers can apply for the aid through their local USDA service center. Applicants must have an ownership interest in the commodity, be actively engaged in farming, have an adjusted gross income of \$900,000 or less for tax years 2014 through 2016, and meet conservation compliance provisions.

For the first round of payments, producers will be paid \$8 per head for hogs, \$1.65 per bushel for soybeans, 12 cents per hundredweight for milk and 1 cent per bushel for corn. The food-purchase program will focus on a wide range of products affected by the tariffs, including pork, dairy, grapes, apples, potatoes, beef and more.

Additional information is available at www.farmers.gov/MFP.

From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, September 2018.

Congress Considers Permanent Tax Solutions for Farmers

The U.S. House Ways and Means Committee recently approved a Farm Bureau-supported bill that would make permanent the tax cuts Congress passed last year. The tax cuts for individuals and many farms and small businesses that file taxes as individuals that were implemented as part of last year's tax reform package are temporary and will go away unless Congress takes further action to make them permanent. The same is true for the new 20 percent business deduction for farm revenue that was included in the tax reform bill. The Protecting Family and Small Business Tax Cuts Act of 2018 would ensure that farms and families continue to see the benefits of tax reform by removing the temporary status from those provisions. Now that the legislation has cleared the Ways and Means Committee, it must face a vote by the full House. "Right now, it's uncertain as to whether or not they will or can do that," said Pat Wolff, senior director of congressional relations for American Farm Bureau Federation. "So, it's important for farmers and ranchers everywhere to tell their elected officials to make lower taxes permanent for farmers and small business."

From the Farm Bureau Express, Penna. Farm Bureau, September 21, 2018.

Disaster Assistance Available to Restore Streams Damaged by Flooding

USDA's Natural Resources Conservation Service is accepting applications through Oct. 15 for disaster assistance funding to stabilize and restore streams that were affected by flooding this summer. Funding is available for properties in Berks, Bradford, Chester, Columbia, Dauphin, Lackawanna, Lancaster, Lebanon, Luzerne, Lycoming, Montour, Northampton, Schuylkill, Sullivan, Susquehanna, Wayne, Wyoming, and York counties. Eligible sites must have a home or business within 50 feet of a stream that experienced severe damage, such as several feet or more of bank loss, exposed foundations, or the total failure of existing streambank structures. Projects must be completed in collaboration with a local government entity. For more information, contact your local NRCS service center for more information.

From the Farm Bureau Express, Penna. Farm Bureau, September 21, 2018.

Relief Fund Established for Farmers Affected by Hurricane Florence

North Carolina Farm Bureau has established a relief fund to help farmers recover from Hurricane Florence, which slammed the state with devastating floods last week. The full extent of the storm damage is not yet known but officials expect widespread damage to farms and a long recovery time. To contribute to the relief effort, visit <https://www.ncfb.org/Florence-Relief-Fund> or mail a check addressed to North Carolina Farm Bureau Foundation, Inc. and designated for "Florence Relief Fund" to: North Carolina Farm Bureau Foundation, Inc.; Florence Relief Fund; Attn: Perry Crutchfield; PO Box 27766; Raleigh, NC 27611-7766. For questions, call 919.782.1705.

From the Farm Bureau Express, Penna. Farm Bureau, September 21, 2018.

Deadline to Apply for Payments from Syngenta Settlement Approaching

Corn growers have just a short time left to claim their piece of the settlement that Swiss seed company Syngenta has agreed to pay in a class action lawsuit over marketing practices that disrupted U.S. corn exports in 2013.

The deadline for growers to apply for a payment is **Oct. 12**. Eligible producers received notices in May but, according to news reports, only about 15 percent have applied.

Farmers who planted corn between Sept. 15, 2013, and April 10, 2018 are eligible to receive part of the \$1.5 billion settlement that has been provisionally approved by a federal judge.

How much each farmer with an eligible claim will receive will depend on a variety of factors, including how much of the settlement is taken out for legal fees and how many farmers submit claims. Growers who planted certain varieties of Syngenta seed will receive lower payments than those who did not.

The lawsuit stems from Syngenta's marketing of a strain of genetically engineered corn prior to China approving that strain for importing. That resulted in China halting U.S. corn for about a year and grain prices plunged as a result.

For more information, visit www.cornseedsettlement.com or call **1.833.567.CORN**.

From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, September 2018.

EQUIP Deadline is October 19

Pennsylvania agricultural producers are encouraged to apply for technical and financial assistance to improve and enhance natural resources on their farm and forest land. Funding is available through the Environmental Quality Incentives Program and Agricultural Management Assistance program administered by the USDA Natural Resources Conservation Service. The first application cutoff date for fiscal year 2019 is Oct. 19 for both EQIP and AMA.

From Penna. Farm Bureau.



**New Product for
Leafy Vegetables,
Cucurbits, Potatoes
and Apples**

**Controls foliar
diseases: early blight,
late blight, downy
mildew, powdery
mildew**

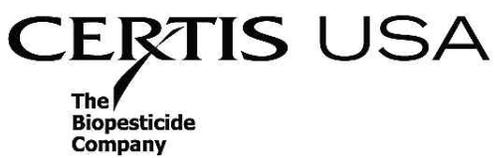
**IR Induced Resistance
biological plant
activator**

**Induces for longer
periods; low risk of
phytotoxicity**

**Ideal for resistance
management
programs**

4 hour REI, zero PHI

**The only fungicide in
the FRAC P6 category**



NEWS

State News Briefs

Farmers in Chesapeake Bay Watershed Can Be Reimbursed for Conservation Planning Costs

A state grant program that reimburses farmers in the Chesapeake Bay Watershed for the cost of professional assistance with conservation planning is back for another year.

Farmers can be reimbursed up to \$6,000 for the cost of hiring consultants to complete required Manure Management, Agriculture Erosion and Sediment Control, Nutrient Management, and Conservation plans. Plans developed during 2017 or later are eligible for reimbursement as long as they were not developed by the Natural Resources Conservation Service (or with NRCS funding), developed for Resource Enhancement and Protection Program (REAP) tax credits or developed for acres that previously received reimbursement through this program.

Applications are due by April 1, 2019 and grants will be awarded on a first-come, first-served basis.

Farmers in Bradford, Cameron, Carbon, Centre, Clearfield, Clinton, Columbia, Elk, Jefferson, Lackawanna, Luzerne, Lycoming, Montour, Northumberland, Potter, Schuylkill, Snyder, Sullivan, Susquehanna, Tioga, Union, Wayne, and Wyoming counties should contact Sara Bolton of Larson Design Group at sbolton@larsondesigngroup.com or **570.374.5700**.

Farmers in Adams, Bedford, Berks, Blair, Cambria, Chester, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Indiana, Juniata, Lancaster, Lebanon, Mifflin, Perry, Somerset, and York counties should contact Jedd Moncavage of TeamAg at jeddm@teamaginc.com or **717.721.6795**.

From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, September 2018.

New Conservation Practices Qualify in the Resource Enhancement & Protection Program

Applications for state tax credits through the 2018-2019 Resource Enhancement and Protection Program (REAP) are now being accepted by the State Conservation Commission. The REAP program offers tax credits for best management practices (BMPs) that improve farm production and protect natural resources.

Newly qualifying BMPs under the program will include up to three years of cover crop plantings and maintenance of riparian forested buffers including replanting, mowing and herbicide treatments, and legacy sediment remediation. Detailed maps depicting the location of crops will no longer be required.

Applications for REAP may be obtained from the State Conservation Commission by calling **717.705.4032**.

From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, September 2018.

DEP Booklet Offers Guidance on Post-Flooding Activities

Pennsylvania Department of Environmental Protection has released a booklet to help farmers and other landowners better understand the steps they can take to maintain streams following a flood.

The document explains what types of post-flood activities do and do not require permits, or at least verbal approval from DEP. It also includes information about resources to turn to with questions.

The booklet is available online at <http://files.dep.state.pa.us>

[/Newsroom/NewsroomPortalFiles/StreamMaintenanceBooklet.pdf](#).

From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, September 2018.

Reminder: Purchasing Unlabeled “Brown Bag” Seed is Illegal

With Pennsylvania facing a shortage of rye seed this planting season, farmers should keep in mind that it's against the law and dangerous to purchase unlabeled rye seed from feed mills to plant as a cover crop.

State law requires seed distributors to obtain a \$25 annual seed license from the Pennsylvania Department of Agriculture, which must be renewed annually. The law also requires seed labels to include critical information, including the complete name and address of the labeler, lot number, purity analysis, germination percentage, and the month and year in which the germination test was completed.

Purchasing feed grade rye to use as a cover crop comes with the risk of no germination if bins are fumigated at the feed mills and using uncleaned seeds can increase weeds, including palmer amaranth. Farmers are encouraged to look at other cover crop options such as wheat or barley if they are not able to purchase legal rye seeds this year.

For more information, visit www.agriculture.pa.gov or call **717.787.4894**.

From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, September 2018.

Expanding Efforts to Combat the Spotted Lanternfly

Penn State is spearheading the effort to stop the spotted lanternfly, which includes multiple participants from more than 80 universities in collaboration with other regulatory and agricultural agencies.

The strategy to control and possibly eliminate the pest will include educating communities on identification and the life habit of the spotted lanternfly, destroying egg masses, understanding its feeding preferences, developing biological controls and recommending effective pesticide applications. Thirteen counties in Pennsylvania are under quarantine and the pest has also been identified in New Jersey, Delaware and Virginia.

From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, September 2018.

DEP Offers the Small Business Advantage Grants to Agricultural Producers

The Pennsylvania Department of Environmental Protection's Small Business Advantage Grant offers agricultural producers and small businesses the opportunity to obtain a 50 percent matching grant of up to \$9,500 to prevent pollution and implement natural resource protection projects. Eligible projects include planting riparian buffers, installing stream bank fencing and other projects that manage storm water.

The Small Business Ombudsman Office began accepting applications for the 2018-2019 grant on July 20 and will continue to accept new applications until the \$1 million in funding is exhausted. The Small Business Ombudsman Office may be contacted at **717.772.5160** for more information.

From Penna. Agricultural Alliance Issues Update, Penna. Farm Bureau, September 2018.

(continued on page 10)

Save time, save money, save the planet.



This is the “Bio360 Biodegradable & Compostable Mulch Film”.

“Bio360 Biodegradable and Compostable Mulch Film” made of Mater-Bi, completely disappears without a trace and without leaving any toxic residue. It also saves both time and money because you don’t have to remove it. What’s more, you’ll be helping the planet. It also promotes rapid root growth and eliminates weeds. So it’s a win-win situation! Ask one of our representatives how much you can save using this revolutionary new product.

Nolt’s Produce Supplies
717-656-9764 - Leola, PA
noltsproducesupplies.net

For other regions, contact US
1-844-4BIO360 (1-844-424-6360)



NEWS

United Fresh Members... *(continued from page 3)*

- the needs of labor-intensive agriculture without unreasonable limitations on visas.
- Does not implement E-verify until after both parts of this immigration solution are fully implemented.
- Protect employers who have acted in good faith despite a broken legal immigration system.

Food Safety Outbreak Investigations

Today, inefficient and uncoordinated outbreak investigations fail to protect public health, erode consumer confidence in both government and the food industry, and cost companies unrelated to the food source hundreds of millions of dollars. Something is wrong, and Congress, federal agencies, industry and consumer groups need to begin a serious dialogue about how we can create a system that works.

What's Wrong Today?

- By the time a food product is identified as the source of an outbreak, the food is often out of the marketplace and few if any people are getting sick. Public warnings at that time cause fear and loss, without protecting health.
- Investigations are dependent upon a patchwork of local, state and federal agencies with different goals and priorities. Some state health departments, the Centers for Disease Control (CDC), U.S. Department of Agriculture (USDA) and the Food and Drug Administration (FDA) work hard to coordinate efforts; but responsibility is fundamentally too spread out to be fast and efficient.
- Government agencies are not taking advantage of knowledge and experience of food safety experts within industry who can help find answers more quickly and shorten investigations. Government must find a legal way to incorporate outside expertise in its investigations.
- Investigations are just one responsibility among many others for government agencies, often not deriving the staff or financial resources equivalent to the public health and financial impact they deserve.
- Communication to the public is haphazard coming from multiple points and does not reflect a clear and consistent process that can put facts in perspective.
- Most investigations end following an outbreak, when all resources should be devoted to finding the cause of the outbreak in order to prevent future illnesses.

United Fresh members urged Congress to:

- Hold hearings to determine how systematic flaws in outbreak investigations can be resolved so that public health is prioritized.
- Consider if an independent body, perhaps modeled after the National Transportation Safety Board (NTSB), could be created to better manage investigations. NTSB brings tremendous focus, resources, coordination, access to outside expertise and leadership to investigations of transportation accidents.
- In the interim, urge the administration to create a true food safety czar who is the sole leader for both FDA and USDA in investigating outbreaks. Alternatively, urge

FDA, CDC and USDA to identify the point person for outbreak investigations within each agency who together have the responsibility to make decisions and provide outbreak leadership within their agencies.

- Establish a definition for "emergency food borne outbreak" and provide funding for such emergency response (travel funds, lab surge capacity, lab supplies) to FDA, FSIS and CDC, or an independent investigative body.

Trade

The U.S. fruit and vegetable industry and American consumers are highly dependent upon international trade, both exports from the U.S. and imports into the country. However, specific patterns of trade vary greatly among different commodities. For example, exports are a major part of U.S. apple production, while the vast majority of avocados consumed in the U.S. come from Mexico, Chile and Peru. In addition, consumers today demand 24-7 availability of produce commodities regardless of geographical growing season. With this diversity, our industry has always supported free and fair trade globally, seeking to open markets to U.S. products while committing to reciprocal access for products to the United States.

Recent trade actions by the administration have further complicated the uncertainty of foreign markets for U. S. agriculture. Between China and the U.S. levying retaliatory tariffs that specifically impact on the produce industry, as well as the potential renegotiation of NAFTA and subsequent retaliatory actions by each country involved, trade issues have never been more relevant. The actions taken by each country have triggered a flurry of tariff announcements and have poisoned the well with regards to future free trade agreements.

Trade across the NAFTA countries serves both consumers and deeply connected supply chains in all countries, providing significant jobs not only in agriculture but in processing and distribution. United Fresh's message to all three countries' policy-makers is that we want to work together on any renegotiation of NAFTA, seeking to find solutions that serve our industry and each respective country.

Trade by the Numbers

- Total fresh fruit and vegetable exports worldwide were over \$7 billion in 2016.
- The United States has the lowest consumer expenditure of food consumed at home in the world at 6.4%.
- Over the last five years, overall fresh fruit and vegetable sales to our NAFTA partners have totaled more than \$25.1 billion.
- U.S. Agricultural exports to NAFTA countries directly and indirectly supported 509,332 jobs in 2016.
- NAFTA accounts for 16% of global trade and supports 14 million American jobs.
- Trilateral trade between Canada, Mexico and the U.S. grew 370 percent between 1994 and 2016.

United Fresh members urged Congress to:

- Work toward renegotiation of NAFTA that seeks a trilateral solution that serves our industry and U.S. consumers without disrupting the basic standards of free trade, limited tariffs and quotas.
- Find appropriate ways to support those segments of the U.S. fruit and vegetable sector that have been disadvantaged by some aspects of trade.

(continued on page 9)

United Fresh Members... (continued from page 8)

- Work toward new trade agreements that establish long-term certainty for businesses and facilitate trade, rather than erecting barriers that protect their internal producers.

Nutrition Programs

Only one in 10 Americans meet the Dietary Guidelines for Americans (DGA) recommendations for fruit and vegetable consumption. Federal nutrition programs - which have broad reach across every state and community – play a pivotal role in helping Americans achieve the goal of making half their plate fruits and vegetables.

School Meals

Over 14 million students eat school breakfast daily and 30 million students eat school lunch. Fruit and vegetable serving requirements ensure that kids receive a wide variety of produce and are provided in portions appropriate to meeting daily DGA recommendations.

United Fresh members urged Congress to:

- Maintain the current serving requirements for fruits and vegetables, including serving size and color subgroups for breakfast and lunch that ensure a wide variety of produce.
- Increase commodity assistance for breakfast to help ensure schools have access to more fresh fruits and vegetables.
- Continue to fund the USDA School Kitchen Equipment grants to help schools access much needed school kitchen equipment like cold storage, serving lines, and cutting and processing equipment to serve fresh fruits and vegetables.

Fresh Fruit and Vegetable Program (FFVP)

Nearly 7,600 elementary schools, serving four million students, participate in the FFVP that provides students with a free fresh fruit or vegetable snack every day. This important program has shown to increase overall consumption of produce and contribute to lower obesity in students. While all forms of fruits and vegetables have a place in the diet, FFVP is an extremely beneficial program allowing students to try fresh produce they often will not otherwise experience.

United Fresh members urged Congress to ensure FFVP serves only fresh fruits and vegetables, as consistent with the program's origin and current policy.

Women, Infant and Children's Program (WIC)

Today, more than 7 million low-income pregnant or breastfeeding women, their infants and young children participate in WIC, which provides a targeted food package consistent with the dietary needs of those specific populations. As part of this nutrition package, participants are provided a monthly fruit and vegetable voucher valued at \$11 for mothers and \$8 for each child. The Center for Disease Control (CDC) has attributed a recent decrease in early childhood obesity rates to the inclusion of fruits and vegetables in WIC.

United Fresh members urged Congress and the Administration to increase the WIC fruit and vegetable voucher allocations to the level supported in 2017 recommendations from the National Academy of Sciences.

(continued on page 10)

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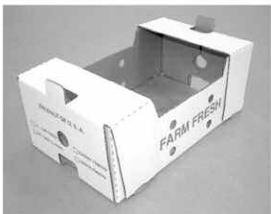
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NEWS

Registration Opens for New AgBiz Masters Class

AgBiz Masters recently opened registration for the next class that will be held November 2018 through March 2019. The nationally-recognized program helps young and beginning farmers develop skills to ensure long-term sustainability of their businesses.

AgBiz Masters delivers hands-on business and financial management training to young and beginning farmers. The program takes a blended learning approach where participants complete five online modules and attend several in-person, regional sessions during each year of the two-year program.

Topics covered in the program include:

Year one

- Megatrends of Agriculture
- Strategic Business Planning
- Preparing for Your Lender
- Constructing a Balance Sheet
- Constructing an Income Statement and Cash Flow Projection

Year two

- Understanding Lending Decisions
- Farm Business Management Factors and Benchmarks

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- › Strategic Business Planning
- › Preparing for Your Lender
- › Constructing a Balance Sheet
- › Constructing an Income Statement and Cash Flow Projection

MODULES: YEAR 2

- › Understanding Lending Decisions
- › Farm Business Management Factors and Benchmarks
- › Growth and Transition Management
- › Personal Financial Management
- › Communications, Ethics and Leadership

Takeaways

- › Record Keeping
- › Balance Sheet
- › Understanding a Lender
- › Financial Management
- › Growing the Farm
- › Networking
- › Connections
- › Business Plan
- › Transitions

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Growth and Transition Management
Personal Financial Management
Communications, Ethics and Leadership

In its nine years in existence, AgBiz Masters has reached more than 1,200 participants, including 466 graduates of the program. The program is targeted at young and beginning farmers in Pennsylvania, Maryland, Delaware, Virginia and West Virginia.

AgBiz Masters is offered by a network of agricultural organizations that includes PVGA. To learn more about AgBiz Masters and register online, visit www.AgBizMasters.com. The registration deadline is October 31, 2018. For more information, contact Kayla Wilson at kwilson@agchoice.com or 800-349-3568 ext. 6027.

United Fresh Members...

(continued from page 9)

Supplemental Nutrition and Access Program (SNAP)

SNAP represents the nation's largest nutrition safety net program, providing nearly 40 million Americans - about half of whom are children - with benefits to purchase food and beverages. Federal dollars are allocated to states, which distribute benefits monthly or bimonthly to recipients to purchase eligible foods at SNAP-approved retailers.

All Americans, including SNAP recipients, fall woefully short in consuming fruits and vegetables - but for low-income individuals, access and presumed affordability can be a challenge. Purchasing data from a 2016 USDA study that ranked commodity purchases in SNAP showed that no fresh produce commodities were included in the top 39 foods purchased. Today's SNAP program is simply failing to deliver the fruits and vegetables adults and children need. Incentive programs, like the Food Insecurity and Nutrition Incentive (FINI), help low-income individuals access produce and increase consumption, but more must be done to prioritize nutrition in SNAP.

United Fresh members urged Congress and the Administration to

- Increase FINI funding to serve more participants.
- Prioritize incentive programs that provide year-round access and convenient hours for consumers and ensuring incentives can only be used for fruits and vegetables.
- Elevate SNAP to not only be a successful food security program, but a nutrition program, by investing in and implementing research, retail and benefit strategies that improve nutrition for SNAP consumers, including increased consumption of fruits and vegetables.

State News Briefs (continued from page 6)

Free Legal Services for Farmers Available Through Penn State Law

Penn State Law is offering farmers the opportunity to obtain free legal services through its Rural Economic Development Clinic. The program gives law students a chance to gain practical legal experience working with clients under the supervision of faculty and licensed attorneys.

Through the clinic, student attorneys can work with clients to review or prepare legal documents, conduct research and provide advice. Students attorneys have helped clients with topics such as renting farmland and facilities, CSA membership agreements, farmers market rules, liability waivers and purchasing or establishing a business. Student attorneys cannot represent clients in litigation matters through the program.

Applications are now being accepted for work to be done during the fall 2018 semester. Clients will be selected on a first-come, first-served basis and should be able to travel to State College for client meetings. To apply or learn more, email Ross Pifer with a detailed explanation and background of the legal issue to be addressed at rpifer@psu.edu or call 814-865-3723.

From *Penna. Agricultural Alliance Issues Update*,
Penna. Farm Bureau, September 2018.

VEGETABLE PRODUCTION

Fall and Winter Crops are Just Getting Started in High Tunnels

Gordon Johnson

As summer crops finish in high tunnels, October and November provides 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.

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-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 October 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



G Johnson

Newly planted arugula in a high tunnel

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, Issue 26:27 – September 28, 2018.

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NEWS

Open Enrollment is Right Around the Corner!

It is that time of year again. Open enrollment is right around the corner and you may be starting to think about health insurance coverage and what that means for you, your farm and your employees.

Value of Offering Benefits to Your Employees

Health insurance plans can be expensive, so why should you offer these benefits to your employees? Here are some important reasons.

Offering health insurance benefits to your staff can help ensure a stable and motivated workforce and lower turnover rates. By investing in your employees and offering health insurance, you are showing them that you have their best interests in mind and value their job performance. This can help you to build a tight knit team that will stay for years.

Productivity improvements have been seen when employees have health coverage. When they are covered, employees are more likely to go for preventive services or see a doctor when sick. Health insurance coverage allows your employees to be healthier, return to work quicker, and stay on the job.

As the labor market gets more competitive, it can be difficult to attract and keep good employees. Employees see value in health insurance benefits and it gives them a reason to choose you versus a competitor.

Health insurance benefits can also increase morale throughout your staff and generate a positive culture. When employees feel valued, they are more likely to have a great attitude and be more positive at work.

There is also a potential tax benefit to offering health insurance; you may be able to deduct your health plan contributions. This is not always the case and we recommend that you speak with a financial or legal advisor before taking advantage of this possible tax benefit.

Healthcare Options

There are lots of options (and lots of letters) available to an employer who is looking to offer health insurance benefits to their staff. These include HMOs, PPOs, EPOs, HDHPs, HSAs, and STM Plans Health Plan. We'll explain each below.

Health Maintenance Organizations (HMO) – HMO's generally have a more limited number of providers who are considered "participating" or "in network". Each person is required to choose a Primary Care Physician (PCP) from the available participating providers and all care is coordinated through the PCP. HMO's do not include coverage for care received from non-participating (or "out of network") providers.

Preferred Provider Organizations (PPO) – PPO's provide the most choice in where to receive care. The participating provider network is generally the largest and coverage is also available for care received from out of network providers. A Primary Care Physician is not required. Care received from in network providers generally costs much less than care received from out of network providers.

Exclusive Provider Organizations (EPO) – EPO's are similar to PPOs but they do not cover care received from out of network providers.

High Deductible Health Plans (HDHP) – These plans typically have higher deductibles and total out of pocket costs than other plan designs. Most benefits are subject to the deductible, including office care and prescription drugs. Certain preventive (wellness) services are covered in full and not subject to the

deductible. HDHPs can also be coupled with Health Savings Accounts (HSAs).

Health Savings Accounts (HSA) – HSA's are savings accounts that are owned by the employee and can be used to pay for out-of-pocket medical expenses. Dollars deposited into the HSA may be made "pre-tax". Dollars withdrawn from the HSA to be used to pay for qualified medical expenses are generally not subject to taxation.

Short Term Medical Plans (STM) – STM's are like PPOs in coverage and networks. A key difference is that coverage is available only for a short, defined period of time (typically 60 days). These types of plans can generally be purchased at any time during the year. Importantly, these plans may not meet Affordable Care Act rules and therefore an individual enrolled in one of these type plans may be subject to health care reform individual mandate penalty.

Agri-Services Agency also administers their own plans that meet healthcare reform rules. Availability of these plans is limited.

Other Considerations

When you are looking into coverage and designing your health insurance benefits for your employees, you should consider the deductible levels, out of pocket maximums, prescription drug coverage, and provider networks.

Deductibles can vary widely, from as little as \$0 to several thousand dollars. The size of the deductible chosen directly affects the cost of the plan. Consider what you and your employees may be comfortable with.

Out of pocket maximums are the most an individual will pay during the year for covered medical services. These too can vary greatly and directly affect the cost of the plan.

For prescription drug coverage, you should consider what drugs are covered and which pharmacies participate in the plan.

You should also consider provider networks. Some plans have networks with a very broad range of providers available, while others use a very limited set of providers. Does the plan cover medical care received from non-participating or out of network providers and what is the cost? Always make sure you know if your local provider, hospital, and pharmacy are part of the participating provider network.

Offering health insurance benefits to your staff is a great way to attract qualified skilled workers, decrease turnover rates, and increase morale and productivity. There are many options and factors to consider that could make the process seem daunting or confusing. From working with major carriers at both the national and regional levels to having qualified staff who can answer all of your questions, Agri-Services Agency is available to help. Give us a call today at 1-877-466-9089 or visit our website at www.agri-servicesagency.com for more information on how we can help.

Are You Growing Cover Crops for Maximum Benefits?

Gordon Johnson

For most of Delaware, the optimal window for cover crop planting is in the month of September and we are nearing the end of the planting window where soil health benefits can be maximized. As we move into October, cover crop selection becomes limited due to reduced daylength and lower temperatures thus limiting potential soil health benefits.

Vegetable growers understand the benefit of growing cover crops to maintain soil health. Most vegetable production systems are tillage intensive and organic matter is oxidized by soil microorganisms at a high rate. Cover crops are an important means to add organic matter back into vegetable production systems.

Cover crop acreage has been growing in the region, largely due to nutrient management efforts and an emphasis on growing cover crops for soil health benefits. Successful programs have been implemented by the USDA-NRCS and Conservation Districts to increase cover crop plantings for soil improvement.

Nutrient management goals and soil health goals are not necessarily the same. You can think about this with the question are you growing *cover* or *crops*?

In nutrient-management based cover crop programs, the goals are to have crops that can take up residual nitrogen and provide cover to reduce erosion losses. Non-legumes predominate, with most of the acres planted in small grains such as rye with some recent use of radishes. No fertilizer or limited fertilizer can be used with these cover crops. In this case, the answer to the question above is that a *cover* is being grown. While there

will be soil health benefits, they are not maximized.

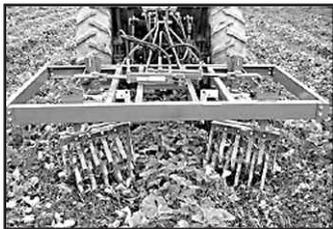
In contrast, when soil improvement is the primary goal, the cover crops are grown as crops. You are growing plants to maximize the benefits they provide. To increase organic matter and improve soil health the main goal is to produce maximum biomass above ground and below ground. A secondary goal would be to provide different types of organic matter with cover crop mixtures to support a diverse soil microbial environment.

In other situations, the goals will be different. With leguminous cover crops a goal may be to maximize the amount of nitrogen fixed. With soil compaction reducing crops such as radishes, the goal is to maximize the amount of "biodrilling" – the amount of tap roots being produced. With biofumigant crops, the goal is to maximize the production of fumigant-like chemicals the crops produce. With mulch-based systems, the goal is to maximize above ground biomass.

What these soil improvement and specific use goals have in common is the need to treat the cover crop as a crop to optimize plant growth. This would include seeding at the proper rate to achieve optimal stands, planting at the right time, using seeding methods to get maximum seed germination and plant survival, having sufficient fertility to support good plant growth, providing water during dry periods, managing pests (insects, diseases, weeds), and inoculating legumes. If cover crop mixtures are being used, the ratios of seeds being planted must be considered to have the best balance of plants in the final stand.

The best cover crop stands are obtained with a drill or
(continued on page 16)

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VEGETABLE PRODUCTION

Blister Beetles on Swiss Chard

Jerry Brust

Normally at this time of year when I talk about any insect problems in crucifers I talk about harlequin bugs that feed by sucking out plant juices and inject toxins into the plant. But I have gotten reports about several fields and even high tunnels where blister beetles feeding is defoliating swiss chard (Fig. 1). The presence of blister beetles now is not unusual as they are often found in large clusters in late summer-early fall. They can arrive in large groups, seemingly overnight and can do a great deal of damage in a short period of time.

Adults are large, oblong beetles with relatively large heads, long 'necks' and usually with some stripes (but not always) (Fig. 1). Striped blister beetles are shades of gray or brown with yellow stripes running lengthwise on their wing covers. The ash-gray blister beetle is gray, the black blister is completely black, and the margined blister beetle is black with a grayish band around the edge of each wing cover (Fig. 1A). Blister beetle abdomens usually extend past their leathery wings. Striped blister beetles hide beneath plants during the hotter periods of the day, becoming active when temperatures are more suitable for them. If disturbed when on plants beetles will immediately fall to the ground and run. Adults begin laying eggs in late spring or early summer and continue through most of the season. A female can lay one to two hundred eggs just beneath the soil surface and eggs hatch within a couple of weeks.

If you look up blister beetles most of the literature deals with the beetles as a threat to horses and livestock. The beetles secrete and contain within them a blistering agent called cantharidin. Cantharidin is toxic if ingested and it persists in beetles long after they are dead. Humans who ingest the beetle can suffer severe damage to the urinary tract and gastrointestinal lining.

Blister beetles begin feeding on the edges of leaves eventually leaving only stems (Fig. 2). Blister beetles will feed on just about any leaf that grows in a vegetable field such as tomato and other solanaceous vegetables as well as leafy greens, crucifers, spinach and others.

Pyrethroids can be used to control blister beetles on most vegetable crops. Pyrethroids will reduce the damage, but there is often a 7-day pre-harvest interval (phi) with some of the chemicals depending on what the crop is. So be sure to check the label to find the correct phi for the particular product you are using on the particular crop you are using it on. It should be noted that once established, beetles are difficult to eliminate completely. Organic growers have an even more arduous task of managing them. Row covers will keep this pest as well as harlequin bugs off your plants. However, if row covers are not used then I often see diatomaceous earth (DE) recommended for beetle control. If it rains DE does not work very well and overall, I have not had much luck with it controlling the beetles. Spinosad alone or mixed with other products such as neem or kaolin clay have been found to reduce feeding damage in 24-48 hours. Having large numbers of grasshoppers near your vegetable fields over the years can increase blister beetle numbers greatly in the general area.

*Dr. Brust is the IPM Vegetable Specialist at University of Maryland. From the **Weekly Crop Update**, Univ. of Delaware Extension, Issue 26:26 – September 21, 2018.*

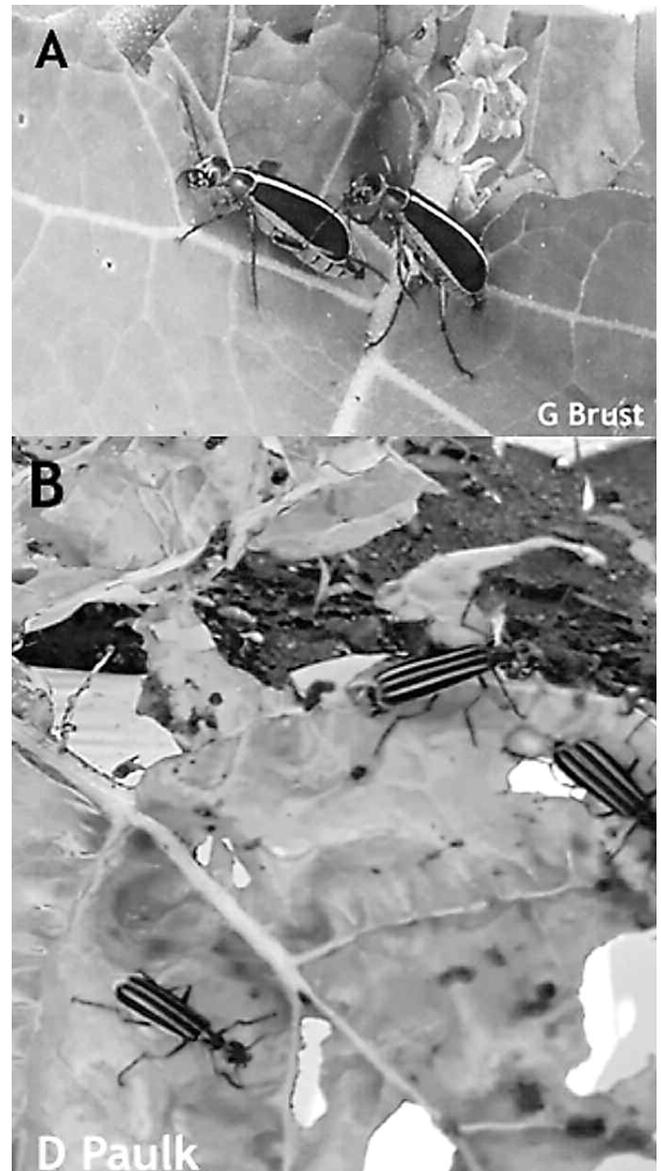


Figure 1. Margined (A) and Striped (B) blister beetles



Figure 2. Blister beetle feeding resulting in defoliated leaves

Cabbage Maggots are Out and About

Jerry Brust

The unceasing wet weather we have had this summer has made some fall planted cole crop fields vulnerable to cabbage maggots, *Delia radicum* (CM). The flies that are attacking cole and radish fields now are most probably 4th generation CM. We usually see some damage from this late generation of flies in our area, but it is usually scattered around. This year it is much more pervasive throughout the area. This widespread damage is due to how wet it has been, which has a dramatic cooling effect on the soil, CM larvae are better able to survive in the wet, cooler soils vs the drier hotter soils that we normally have in the summer and early fall. Adult flies are most active from 10 am to 2 pm and are inactive at night, in strong winds and when temperatures are below 50°F or above 80°F. Female cabbage maggot flies seek out and lay eggs on the lower portions of stems of young host seedlings or in nearby cracks in the soil. Within a few days the eggs hatch and the tiny maggots burrow down to the roots or bulb (radish and turnip) and begin feeding. The maggots usually feed for 2 to 3 weeks before pupating in the soil. Most of these pupae will overwinter in the soil, so it is important to be sure to rotate any cole crops out of the fall planted area for spring planting. A Diazinon, Lorsban or Verimark soil application pre- or at-planting will help reduce CM problems. Using row-cover over the newly planted seed would also control CM. Once damage is found in radish or turnip bulbs there is no rescue treatment.

Dr. Brust is the IPM Vegetable Specialist at University of Maryland. From the Weekly Crop Update, Univ. of Delaware Extension, Issue 26:27 – September 28, 2018.



Figure 1. Turnip with feeding damage.

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VEGETABLE PRODUCTION

Heat and Moisture Effects on Cole Crops

Gordon Johnson

September-maturing cole crops have been negatively affected by the high August and September temperatures and uneven moisture (dry to wet). While cabbage, kale, and collards can tolerate high temperatures; Brussels sprouts, broccoli, and cauliflower are more sensitive to excess heat. These three crops do best under moderate and even temperatures and even water supplies. They do not develop properly when temperatures are in the 90s.

In broccoli, high temperatures can lead to uneven development of the crown leading to a bumpy appearance and looser head. This reduces the grade and price potential. In Brussels sprouts high temperatures can cause sprouts to be very loose, elongated and unmarketable. In cauliflower high heat can cause loose curd.

The following are some other disorders that can be prevalent when cole crops are exposed to uneven moisture and excessive heat.

Are You Growing... (continued from page 13)

seeder that places the seed at the proper depth, at the proper seeding rate, with good soil to seed contact. Fertilization and liming programs should be used to support season-long growth – fertilizers and other soil amendments will be necessary in most cases. Nitrogen will need to be added for non-legumes.

When the crop is terminated is also key. The cover crops should be allowed to grow to the stage that maximizes the benefits they offer before killing the crops. Allowing a winter cover to grow for an extra week in the spring can make a large difference in the amount of biomass produced.

Again, consider the question are you growing a cover or a crop? The answer is important to achieve your cover crop goals.



Above-ground biomass for a mulch-based vegetable production system after spring burn-down. Note the differences between the cover crop strips.

Tipburn of Cauliflower, Cabbage, and Brussels Sprouts - This problem can cause severe economic losses. Tipburn is a breakdown of plant tissue inside the head of cabbage, individual sprouts in Brussels sprouts, and on the inner wrapper leaves of cauliflower. It is a physiological disorder which is associated with an inadequate supply of calcium in the affected leaves, causing a collapse of the tissue and death of the cells. Calcium deficiency may occur where the soil calcium is low or where there is an imbalance of nutrients in the soil along with certain weather conditions. (High humidity, low soil moisture, high potash and high nitrogen aggravate calcium availability). Secondary rot caused by bacteria can follow tipburn and heads of cauliflower can be severely affected. Some cabbage and cauliflower cultivars are relatively free of tipburn problems.

Cabbage Splitting - Cabbage splitting can develop when moisture stress is followed by heavy rain. The rapid growth rate associated with rain, high temperatures and high fertility cause the splitting. Proper irrigation may help prevent splitting and there are significant differences between cultivars in their susceptibility to this problem.

Lack of Heads in Broccoli and Cauliflower - During periods of extremely warm weather (days over 86°F and nights over 77°F) broccoli and cauliflower can remain vegetative since they do not receive enough cold for head formation. This can cause a problem in scheduling the marketing of even volumes of crop.

Cauliflower Purple Coloring and Yellowing - The market demands cauliflower which is pure white or pale cream in color. Heads exposed to sunlight develop a yellow and/or red to purple pigment. Certain varieties are more susceptible to purple off-colors, especially in hot weather. Self-blanching varieties have been developed to reduce problems with curd yellowing. For open headed varieties, the usual method to exclude light is to tie the outer leaves when the curd is 8 cm in diameter. Leaves may also be broken over the curd to prevent yellowing. In hot weather blanching may take 3 to 4 days, but in cool weather, 8 to 12 days or more may be required. Cauliflower fields scheduled to mature in cool weather (September and October) that are well supplied with water and planted with "self-blanching" cultivars will not need tying. Newer orange cauliflower and green broccoflower varieties are being planted. They are less susceptible to off-colors but still can develop purpling under warm conditions.

Cauliflower Ricing - "Riciness" and "fuzziness" in cauliflower heads is caused by high temperatures, exposure to direct sun, too rapid growth after the head is formed, high humidity, or high nitrogen. "Ricing" is where the flower buds develop, elongate and separate, making the curd unmarketable.

Development of Curd Bracts in Cauliflower - Curd bracts or small green leaves between the segments of the curd in cauliflower is caused by too high of temperature or drought. High temperatures cause a reversion to vegetative growth with production of bracts on the head. In a marketable cauliflower head, the individual flower buds are undeveloped and undifferentiated.

Dr. Johnson is the Extension Vegetable & Fruit Specialist at the Univ. of Delaware. From the Weekly Crop Update, Univ of Delaware Extension, Issue 26:24 – September 7, 2018.

Dr. Johnson is the Extension Vegetable & Fruit Specialist at the Univ. of Delaware. From the Weekly Crop Update, Univ of Delaware Extension, Issue 26:27 – September 28, 2018.

Black Rot in Cole Crops

Beth Gugino

Be on the lookout for black rot on fall cole crops including cauliflower, kale, broccoli, etc. The application of copper-based products are typically recommended to reduce further spread by protecting the surfaces of adjacent plants from splash dispersed bacteria however, under very wet weather the efficacy can be more limited.

Black rot is caused by the bacterial pathogen *Xanthomonas campestris* pv. *campestris* and has been a common problem for growers for over 100 years. It is primarily a disease of the above ground portion of the plant however, the bacteria can enter through the roots and move systemically within the plant. Plants can become infected at any stage of growth. Typically symptoms initially appear at the margin of the leaves where the bacteria enter into the hydathodes (natural opening) located along the leaf edge. However, the bacteria can also enter through wounds following heavy rain, hail, insect feeding or mechanical injury. Depending on the weather conditions, symptoms may be visible within 8 to 12 days or it may take up to 40 days for symptom expression. Foliar lesions are usually yellow and V-shaped from the leaf margin towards the mid-rib. As the disease progresses, the veins in the yellow tissue will become dark in color and can extend from the leaves into the main vein. Optimal conditions for disease development are higher temperatures from 77 to



V-shaped lesions characteristic of black rot on the leaves of cole crops (Photo: Beth K. Gugino).

86°F and free moisture either from rain, fog, dew or irrigation. Extended periods of warm wet weather favor rapid pathogen spread and disease development.

The bacterial pathogen can survive from season to season in crop residue, cruciferous weeds and on seed. The bacteria are not thought to survive long in the soil in the absence of host tissue. The bacteria associated with the seed will infect the cotyledon leaves (first leaves following germination) and then the first true leaves through the hydathodes. As the bacteria multiply inside the leaf they move through the xylem (water conducting tissue) towards the stem. During the growing season, the

bacteria are moved between plants through rain or irrigation splashing, blowing of detached leaves, insects, cultivation equipment or people working in the field especially when the plants are wet.

Although it is too late for this year, since seed can be an important source of the pathogen, it is important to select high quality, pathogen-free seed. As few as 2 or 3 infected seeds in 10,000 are enough to cause a serious epidemic. Hot water seed treatment can help eliminate bacteria from the surface of the seed and under the seed coat (broccoli and cauliflower at 122°F for 20 min) however, cole crop seed is prone to seed coat split-

(continued on page 20)

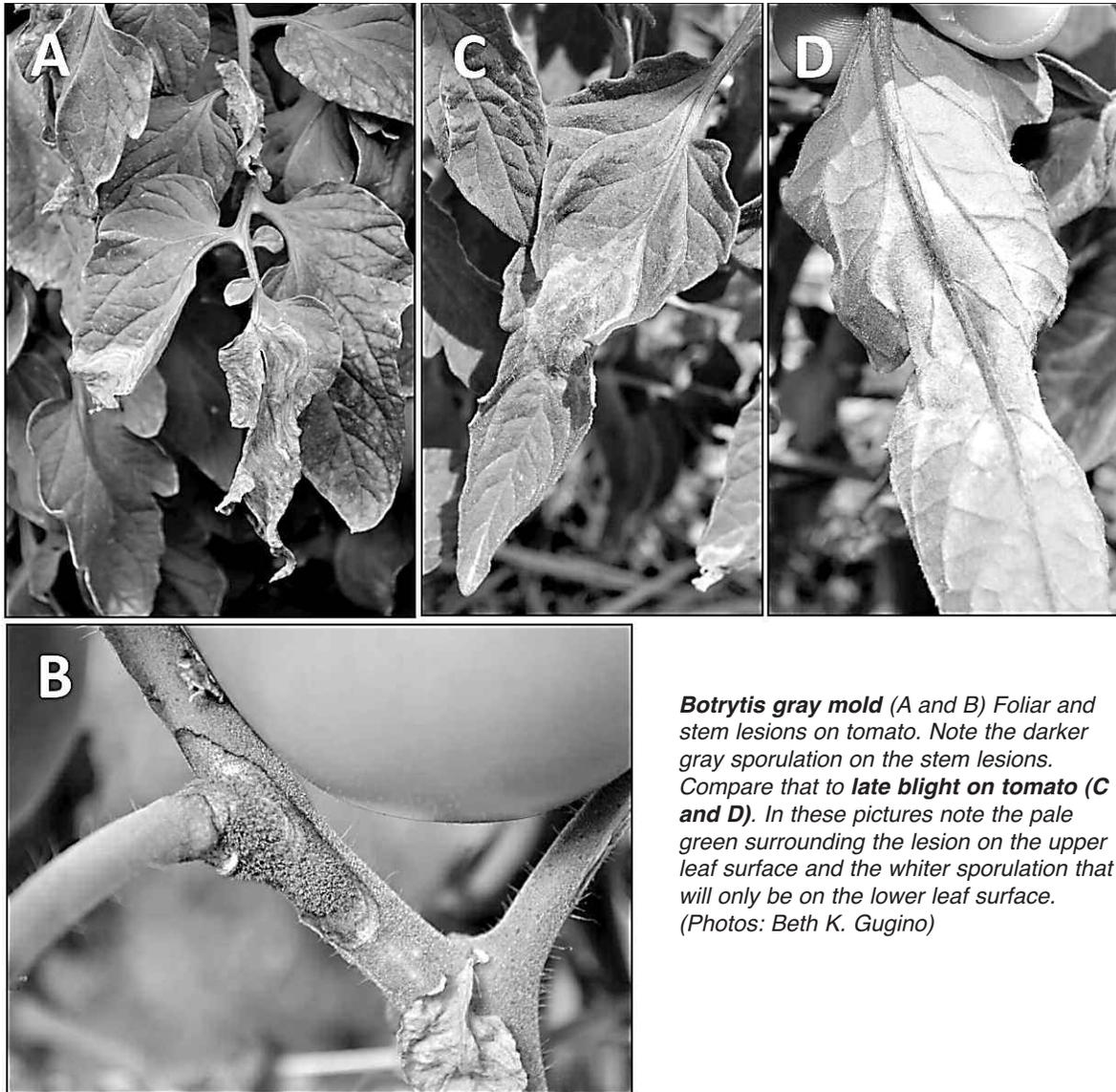
VEGETABLE PRODUCTION

Be on the Lookout for Botrytis and Late Blight in High Tunnel Tomatoes

Beth Gugino

This fall as the temperature drops, dew periods extend, and the skies remain cloudy on the lookout for late blight and Botrytis gray mold in high tunnel tomatoes. Although high tunnels provide direct protection from rain, high relative humidity and dew can still provide the moisture necessary for disease

fruit can become infected from dying flower petals that hang on as the fruit develop. These lesions are whitish in color, very soft and watery and typically develop near the stem end. This is in complete contrast to late blight that causes dark-brown greasy firm lesions on the fruit.



Botrytis gray mold (A and B) Foliar and stem lesions on tomato. Note the darker gray sporulation on the stem lesions. Compare that to **late blight on tomato** (C and D). In these pictures note the pale green surrounding the lesion on the upper leaf surface and the whiter sporulation that will only be on the lower leaf surface. (Photos: Beth K. Gugino)

development. Gray mold affects many different types of vegetables and ornamentals so there are many potential sources of this pathogen. It easily grows on weakened or senescing (dying) plant tissue such as old flower blossoms or leaf litter however, it can still cause lesions on the leaves and stems. Sometimes the foliar lesions can be confused for late blight since both are irregular in shape however gray mold will develop more of a concentric ring pattern and the fuzzy growth (sporulation) is darker and grayer in color and can develop on both the upper and lower leaf surface as well as the surface of stem lesions. Stems can become girdled and break and foliar symptoms can become severe enough to cause defoliation. The

For gray mold, general sanitation is important since it is a very good saprophyte. Also maximizing and maintaining good air circulation through cultural practices. Disease development is favored by temperatures from 64 to 75°F and typically develops on more mature plants that have dense canopies. Foliar applications of products such as Scala (FRAC code 9, 1-day PHI), Botran (FRAC code 14, 0-day PHI), and Fontelis (FRAC code 7, 0-day PHI) will help manage the disease and are labeled for use in greenhouse (and high tunnel) tomato production.

Even this late in the season, if you suspect late blight, please contact me or your local Penn State Extension Office. It is important that we collect a sample to characterize the genotype. The presence of a new genotype could alter our current and future management recommendations. For the latest reports visit USAblight.org.

Dr. Gugino is with the Department of Plant Science at Penn State Univ. From the **Pennsylvania Vegetable Disease Update**, Penn State Extension, September 12, 2018.

Viruses in Cucurbits

Jerry Brust

I am seeing and getting reports of virus infected squash, pumpkin and cucumber fields, so I thought I'd go over some information about viruses. Several aphid species are responsible for transmission of the most common viruses in cucurbits. Although some cucumber beetles have been shown to vector some viruses (such as Cucumber mosaic virus) their success rate under field conditions makes them a minor contributor to most virus infection problems.

However, Squash mosaic virus I and II (SqMV) is vectored most commonly by spotted cucumber beetles and possibly by a few other species of cucumber beetles. The spotted cucumber beetle can carry the virus for 10-20 days and transmit the virus when it regurgitates fluid into their feeding site. SqMV-I infection usually results in mild plant symptoms while SqMV-II infection results in severe plant symptoms. SqMV is usually first introduced into a field via seedborne infection and is not very common in cucurbit fields in the mid-Atlantic compared with the viruses vectored by aphids.

Aphid vectored viruses belong to two main virus families: potyviruses: papaya ringspot virus-W (PRSV), watermelon mosaic virus (WMV), and zucchini yellow mosaic virus (ZYMV); and cucumoviruses: cucumber mosaic virus (CMV).

Aphid Virus Infection and Symptoms - WMV is capable of infecting all commercially grown cucurbits. The most common symptoms caused by this virus is leaf mosaic (variegated patterns of dark and light green to yellow that form a mosaic) and leaf distortion (Fig. 1A). Symptoms may vary from plant to plant according to the species or varieties, virus concentration in the

plant, timing of infection, single or mixed infections, or temperature making symptoms mild or more severe (Fig 1). External symptoms may develop within four or five days after young plants become infected but may take up to 14 days to develop when the foliage is older and more mature. Symptoms develop more rapidly at 79° to 89°F than at 61° to 75°F. Cucurbit plants rarely become infected in the seedling stage.

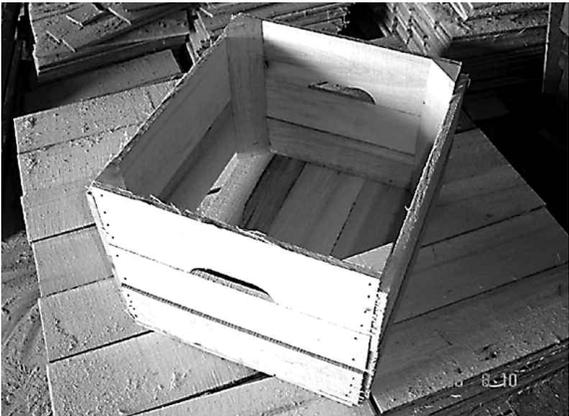
Typically, viruses affect most cucurbit fruit by causing lumps, bumps and rings to appear on the skin of the fruit (Fig. 2). However, at times there is little loss if the fruit has been pollinated and begins to grow before virus infection occurs. Infection just at pollination may cause the fruit to have blotches or stripes of green or yellow color (Fig. 3). If the plant is infected before pollination there usually is no fruit production, but if some are produced then symptoms on the fruit include surface discoloration, bumps and other fruit deformity, early browning, shrinking or death, small fruit size and poor yields. Secondary infection by other microorganisms may occur on the virus infected fruits and cause soft rot.

On plants, viruses can either infect the plant alone or together. If a plant is infected by only one virus, the symptoms generally are milder than if by two or more. Infection by two viruses initially causes strong mosaic and distortion on leaves. Infected plants have smaller and smaller new leaves. Late stage infections include leaves that turn yellow or become scorched along the edge.

(continued on page 20)



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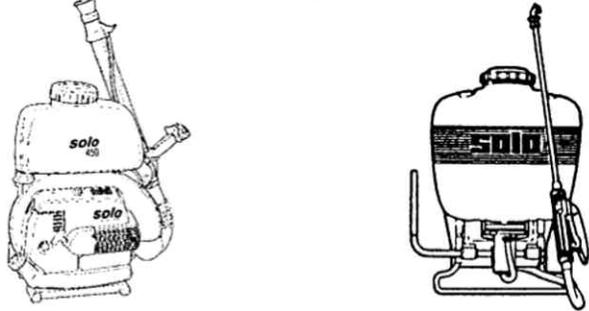


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VEGETABLE PRODUCTION

Viruses in Cucurbits (continued from page 19)

Aphid species - Out of a possible 50 species of aphids that can be found in cucurbit fields, only a few have been shown to carry and effectively transmit the mosaic viruses. The melon (*Aphis gossypii*) and green peach (*Myzus persicae*) aphids were strong vectors while the potato (*Macrosiphum euphorbia*) and bean (*Aphis fabae*) aphids were poor vectors. The corn leaf aphid is one of the most numerous in pumpkin and squash fields but does not carry the virus.

Management - Aphids transmit the virus to plants through their sucking mouthparts. Viruses that are non-persistently transmitted are difficult to manage because the aphids acquire and transmit the virus so quickly. The non-persistent (NP) acquisition or transmission of the virus is completed in a matter of seconds to 1 minute. NP viruses cannot spread very far from where they were originally acquired. Pesticides sprayed on the plant will eventually kill the aphids, but too late to stop them from transmitting the virus. Therefore, insecticides have little effect on NP virus transmission by transient, non-colonizing aphids, though insecticides can control direct damage (foliar deformation and honeydew deposits) and secondary transmission of the virus in a field. Insecticides include Fulfill, Beleaf, the neonicotinoids and some of the pyrethroids.

Resistant varieties: A limited number of resistant varieties are available for certain viruses on squash and pumpkin while cucumber has many more resistant cultivars available – see the Mid-Atlantic Commercial Vegetable Production Recommendations guide. Most of the squash cultivars with virus resistance have just intermediate resistance, which means that the plant can restrict the growth and development of the

Black Rot... (continued from page 17)

ting and needs to be planting promptly. Also keep in mind that seed companies may treat for bacterial diseases like black rot and that treating the seed will void any agreements made with the seed company regarding seed performance. Surface disinfecting the seed with sodium hypochlorite will help minimize bacteria on the surface of the seed but not under the seed coat. Scout transplants and rogue symptomatic ones as well as those in the surrounding flats which are likely infected but not yet showing symptoms. Keep the transplant production area clean and disinfect transplant trays and other equipment between uses. Harden plants off by reducing water and fertilizer rather than by topping them mechanically. If you are not growing your own transplants talk with your supplier to understand what measures he/she has in place to manage black rot.

Once planted in the field, copper is the primary management tool and provides minimal efficacy when conditions are favorable, so the emphasis needs to be placed on management prior to planting. In the field, rotate a minimum of three years between cole crops to allow the crop residue to thoroughly decompose and eliminate cruciferous weeds in and around the field which can harbor the bacteria. Implement practices that reduce potential leaf wetness and water splash during the season and avoid field activities when the plants are wet. As will bacterial disease on other vegetable crops, fixed copper will help slow disease spread in the field from splash dispersed bacteria but will not help manage disease development once the bacteria are inside the plant.

*Dr. Gugino is with the Department of Plant Science at Penn State Univ. From the **Pennsylvania Vegetable Disease Update**, Penn State Extension, September 5, 2018.*

virus and show less severe symptoms compared with a susceptible plant. Some cultivars of yellow summer squash carry a “precocious yellow gene,” which mask the color-breaking that is common with most cucurbit viruses.

Reflective mulch: This mulch is highly reflective (Fig. 4) and the light reflecting off the mulch confuses the aphids when they fly over the mulch and therefore do not land on the plants. The mulch works until the cucurbit plants cover the plastic mulch. This control method can increase the time with no infection occurring in the field by 2-4 weeks. For crops such as squash or cucumbers this can be the difference between just a few harvests and many harvests.

Planting dates: Virus infection is less severe when cucurbits are planted earlier in the season. The fruit is not affected as much in earlier plantings because the fruit was set before the virus arrived. Planting several successions of cucumber or squash will help to mitigate all but late season virus infections.

Weeds as Alternative Hosts - Many weeds can act as reservoirs for viruses even though they show no symptoms. Aphids will often land on these weedy plants and probe the plants at which time they acquire the virus in a matter of seconds. Some of these weeds include: Shepherd’s purse, Virginia pepperweed, Chicory, Canada thistle, Jerusalem artichoke, Prickly lettuce, Dandelion, Cocklebur, Endive, Escarole, Sunflower, Yellow rocket, many Wild mustards and radish, Marsh yellowcress, Pennycress, several Chickweed species, Common lambsquarter, and most Morning glory and Speedwell weeds.

*Dr. Brust is the IPM Vegetable Specialist at University of Maryland. From the **Weekly Crop Update**, Univ of Delaware Extension, Issue 26:24 – September 7, 2018.*



Figure 1. Virus symptoms on plants can be more severe (A) or milder (B)



Figure 2. Fruit with virus infection causing lumps and bumps

(continued on page 21)

Sweet Potato Harvest and Storage

R. Hazzard and updated for 2018 by S.B. Scheufele

Many growers have started harvesting sweet potatoes, either for early markets or to add variety where other crops have come up short. Research done by Becky Sideman at UNH Extension has shown that, when possible, sweet potatoes should be dug as late as possible in the fall to maximize yields, though frost and cool soil temperatures are also a consideration—for more information, see Becky’s full reports on Growing Sweet Potatoes in New Hampshire (https://extension.unh.edu/resources/files/Resource006096_Rep8608.pdf) and Sweetpotato early harvest study, 2014 (https://extension.unh.edu/resources/files/Resource004491_Rep6396.pdf). Once harvested, sweet potato’s storage needs differ from other common New England root crops. Once harvest is completed—generally by early to mid-October—curing and storage considerations continue to be important.

Harvesting. Sweet potato roots continue to grow until the leaves are killed by frost or until soil temperatures fall consistently below 65°F, whichever comes first. Check current soil temperatures here: <http://newa.cornell.edu/index.php?page=soil-temperature-map>. Time of harvest is often determined by digging up a few representative plants and assessing the percentage of roots in different size classes—the crop can be harvested whenever the majority of the roots are the desired size.



Photo – Univ. of Mass.

If a hard frost occurs the tops of the plants turn black, then it is imperative to harvest as quickly as possible regardless of root size. Chilling injury can occur if soil temperatures drop to 55°F or below. It is also important to avoid holding sweet potatoes in saturated, low-oxygen soil conditions prior to harvest, as this promotes rapid decay in storage.

Curing. Sweet potatoes are very susceptible to damage at harvest, as the roots do not have a thick protective outer layer like potato tubers do, and abrasions and wounds can lead to rot in storage. Curing immediately after harvest is recommended when sweet potatoes will be held in storage for later sales. Curing minimizes damage and loss during storage by healing harvest wounds. During the curing process, a corky periderm layer is

formed below damaged areas, which prevents invasion by pathogen and limits water loss. To cure sweet potatoes, keep roots at 82°F to 86°F and high relative humidity (90-97% RH) for 4 to 7 days. Respiration rate is high during curing, so ventilation is important to remove CO₂ and replenish O₂. A greenhouse can provide good curing conditions.

A freshly harvested sweet potato is more starchy than it is sweet. During curing and storage, starches in the sweet potato are converted to sugars, improving flavor. The change in sugars

(continued on page 22)

Viruses in Cucurbits *(continued from page 20)*



Figure 3. Fruit with mild virus infection

G Brust

Figure 4. Reflective mulch and cucurbit planting



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POTATO PRODUCTION

Harvesting and Curing Potatoes

K. Campbell-Nelson, M.B. Dicklow, and R. Hazzard

No matter the scale, harvest and curing principles remain the same. Storage will not improve the quality of tubers, so harvest when environmental conditions are ideal and pay careful attention to pre-harvest preparation to ensure that the highest quality potatoes come out of the field.

Optimum Environmental Conditions for Harvest

As cooler weather approaches, conditions become favorable for harvest and curing potatoes for long-term storage. Optimum environmental conditions for harvest include soil temperature of 45-65°F, tuber temperature should be 50-50F, and soil moisture should be approximately 60 and 80 percent of field capacity for loam and sandy soils, respectively. This level of soil moisture ensures that soil clods are not so hard that they damage skins during harvest but not so moist that they remain stuck to potatoes as they are brought into storage. Temperatures below 45°F will increase tuber bruising and temperatures above 60°F can increase transpiration and drying of potatoes or development of disease in storage. Vine-kill should take place about 2-3 weeks before these environmental conditions are expected. This year, planting dates varied widely, as some were delayed in planting due to our long, cool spring.

Pre-Harvest Preparation

Maturity is indicated by the ability of the tuber to resist skinning during harvest. Periodically dig a few plants to see how easily the skins peel. Sugar content is a maturity index for processing potatoes, with both immaturity and overmaturity resulting in higher sugar levels. Mature potatoes resist bruising and have lower respiration rates than immature potatoes.

Vine killing stops tuber growth at the desired size after bulking, stabilizes the tuber solids, controls hollow heart disorder, promotes skin set, and allows for easier digging and harvesting. Vines may have died down naturally but if they are still green, mow or use a vine desiccant to kill the plants once tubers are

Sweet Potato... (continued from page 21)

is measurable within one week, but it is recommended to wait at least three weeks after harvest before consuming sweet potatoes to allow for more conversion of starches to sugars and maximum eating quality.

Storage. Sweet potatoes can maintain excellent quality for up to a year if proper storage conditions are achieved. The ideal storage conditions for sweet potato are the same as for winter squash; moderately warm (55-60°F) and 60-75% relative humidity. Like winter squash, sweet potato suffers chilling injury at temperatures below 55°F and injury increases 7 with lower temperatures or longer periods of exposure. Signs of chilling injury include shriveled, sunken, dark areas on the tuber surface, and blackening of tubers when cut open. 'Hardcore' is a physiological disorder caused by chilling, in which areas of the tuber become hard—the condition is not apparent in fresh roots but appears after cooking. Because chilling injury is irreversible and makes tubers unmarketable, growers should take particular care to avoid field, curing, or storage conditions that dip below 55°F.

Ms. Hazzard and Ms. Scheufele are with the Univ. of Massachusetts Extension Vegetable Program. From

Vegetable Notes for Vegetable Farmers in Massachusetts,
Univ. of Mass. Ext., Vol 30, No. 23, September 20, 2018.

mature. Killing vines also reduces the risk of late blight causing tuber infections, as the pathogen requires a living host to grow and produce spores.

Skin set is achieved by allowing 2-3 weeks for tuber skins to mature in the field after vine kill. During bulking, the outermost layer of potato skin is only loosely attached to underlying tissues, to allow for rapid growth of the tuber without the skin cracking. The cells in this layer are soft and easily damaged. Vine kill on mature potatoes will initiate "skin set" – the outermost layer of skin cells will begin to bind tightly to the underlying tissues and produce suberin, creating a tough, durable skin that is resistant to infection and dehydration. Good skin set greatly reduces the amount of wounding at harvest and increases the storability of tubers.

Harvest Practices to Prevent Wounding and Bruising

Check harvesting and transporting equipment before harvest begins to make sure it is working properly and does not bruise or wound tubers, and continue to inspect during harvest to determine injury points. Potatoes should not drop more than 4-6" and all equipment surfaces should be padded. Replace bare chains with rubberized links where possible, except for the primary chain. Adjust chain and ground speed so that chains are loaded to full capacity during harvest, and potatoes will "flow" rather than drop from one chain to another. In many cases, increasing ground speed helps to achieve this. Adjust the digger blade so that potatoes flow onto the upper surface of the chain rather than bumping into the front. Ensure that digger blades will cut cleanly through the soil – control weeds prior to harvest to avoid tangling, and sharpen blades before harvesting.

Curing

During the first 2-3 weeks of storage, wounds and bruises from harvest are suberized to prevent invasion of pathogens. This process is called curing, and it is essential for completing skin set.

Maintain temperatures at 50-60°F. Harvesting when pulp temperatures are already in this range is ideal. The ability to move from field to curing temperatures will depend on storage ventilation systems, varieties, availability of cooling air, and humidity controls. If potatoes are harvested during hot weather and cool off slowly, the likelihood of storage rot is increased. If active refrigeration is available, potatoes can be harvested at 62-65°F pulp temperature and cooled effectively. Storage areas with no refrigeration should not be loaded with potatoes with a pulp temperature above 60°F.

Maintain relative humidity at 85-95%. Low relative humidity will result in poor suberization. During the curing phase, tubers will lose moisture through cuts and bruises and incompletely suberized skin. As much as 2-4% of the tuber weight can be lost in the form of water during the first month in storage. If managed properly, this water loss can be minimized and, if captured, this lost moisture can be used to maintain the high relative humidity needed during curing for 3-6 hours per day. A humidifier can also be used to maintain proper humidity.

Uniform air movement is necessary during curing to remove heat from the field and from respiring tubers, to supply oxygen, and to prevent condensation within the pile. Monitor temperatures within the tuber bins or pile to avoid heat buildup,

(continued on page 23)



POTATO PRODUCTION

Harvesting and... (continued from page 22)

which increases tuber rot. In a through-the-pile forced air ventilation system, fans should be operated minimally – usually 1-2 hours per day provides sufficient oxygen but minimizes moisture loss.

Curing and storage must take place in the dark since even low light levels can cause development of chlorophyll (greening) and solanine, a toxic, bitter compound, in tuber skins, rendering tubers unmarketable. 1-2 weeks in low light can result in greening, and higher light levels cause faster greening.

Curing infrastructure: Curing may be accomplished within the space that will be used for storage, or in a different location. Diversified farms and those who are in the process of building up their fall/winter storage infrastructure may find it more challenging to provide the appropriate conditions for curing. On a small scale (up to about 1100 cubic feet), curing can be accomplished using a Cool-bot and humidifier in an insulated space. A combination of vents and fans to exhaust warm air and bring in cool air, controlled with relative humidity and temperature sensors, can make best use of outdoor conditions to manage the indoor environment. Good environmental control is very difficult in an open barn situation.

When tuber quality is poor: Potatoes affected by freezing injury, Pythium leak, late blight, or soft rot will break down at normal curing temperatures. If this is the case, eliminate the curing period—grade out the rot and sell immediately, or cool rapidly to 45°F with low to medium relative humidity. Questionable potato lots should be harvested closer to 55° F if they must be stored. Chilling injury is cumulative and is worse the longer the tubers are in chilling temperatures. Freezing occurs at 30°F, but chilling injury can occur after a few weeks at 32°F.

Disease Management

When late blight is around, spores can be carried by rain-water onto tubers and cause problems in storage. The pathogen can only survive on living tissue, so vine kill is key in disease management if late blight is present on the foliage. If black scurf (*Rhizoctonia* spp.) or silver scurf (*Helminthosporium solani*) are present, they will increase in severity as long as tubers remain in the soil. Wireworms can also cause tuber damage. If markets are ready or suitable storage space is available, minimize the effects of these diseases and pests by starting harvest as soon as skins are set.

If the soil is wet during harvest, soil may adhere to the tubers and promote infection by soft rot organisms. Potato fields that have been saturated with water will be especially prone to post-harvest diseases. Bacterial soft rot (*Erwinia* spp.), Fusarium dry rot, pink rot (*Phytophthora erythroseptica*), and Pythium leak are four serious tuber rotting pathogens that cause the most significant losses in storage. A good online resource on tuber diseases can be found at http://vegetablem-donline.ppath.cornell.edu/factsheets/Potato_Detection.htm#Click2. However, finding a photo online that looks like your problem is not the same as having a plant pathologist confirm what is on YOUR tubers! Send samples to the [Penn State] Plant Diagnostic Lab to get an accurate diagnosis. Proper identification is key as different tuber blights require different management techniques. Grade out diseased tubers before storage as much as possible, as some diseases can spread in storage.

Cooling and Storage

After the curing period, cool tubers as soon as possible but gradually and steadily to the holding temperature. Ideal holding

conditions are as follows: 80-90% relative humidity and 38-40°F for tablestock and seed potatoes, 45-50°F for chipping, and 50-55°F for French fry stock.

Sterilizing Storage An important aspect of potato disease control in storage is providing a pathogen-free environment. All storage and potato handling surfaces should be thoroughly cleaned and disinfected prior to putting the crop in storage. Surfaces should be well-moistened with disinfectant spray. Spray bin walls until there is slight runoff. Recommended disinfectants are quaternary ammonium compounds such as Hyamine 2389. Bins or equipment treated with quaternary compounds must be rinsed with clean water before coming into contact with potatoes to be used for human consumption. Read disinfectant labels carefully regarding use on walls or floors versus use on food-contact surfaces and to determine suitability for your needs. Organic produce may not come in contact with surfaces that have been treated with quaternary ammonium compounds. Chlorine, ozone, and peroxyacetic acid are approved disinfectants for organic produce.

Sprout inhibitors may be needed, depending on storage goals, storage conditions, and cultivar. Potatoes harvested in warm temperatures will be more likely to sprout in storage. Later maturity varieties usually have a longer period of dormancy (2-3 months).

*The authors are or formerly are with the Univ. of Massachusetts Extension Vegetable Program. From **Vegetable Notes for Vegetable Farmers in Massachusetts**, Univ. of Mass. Ext., Vol 30, No. 22, September 8, 2018.*

NEWS

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Online registration runs Sept. 15 through Dec. 15, 2018. Learn more and register at www.pfb.com/agliteracy.

*From **Penna. Agricultural Alliance Issues Update**, Penna. Farm Bureau, September 2018.*

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